Welcome to Phoenix for the Eighth Annual Winter Meeting of the Society for Urodynamics and Female Urology. As in previous years, the meeting is being held in conjunction with the International Society of Pelvic Neuromodulation (ISPiN), and we will have valuable input from the Geriatric Urological Society (GUS) and the Society for Genitourinary Reconstructive Surgery (GURS). Our scientific program remains very topic-oriented with emphasis on basic science, urodynamics, female urology, neuromodulation, neurourology, voiding dysfunction and pelvic reconstructive surgery. The meeting will run through lunchtime Saturday, March 5.

My program co-chairs, Drs. Toby Chai (basic science), Tomas Griebling (geriatrics) and Steven Siegel (ISPiN) are honored to present a program, which we feel covers varied areas of interest in a format that is both interesting and educational. The meeting starts with a program dedicated to basic science and translational research, which extends over one and a half days. We believe the collaboration between clinicians and basic scientists is one of the outstanding and unique aspects of the meeting. We will continue to offer daily breakout sessions in various areas to increase the breadth of topics covered and allow for more intimate discussion and sharing of ideas. We will have breakout sessions devoted to urodynamics, prolapse, reconstruction as well as other current topics of interest.

We will continue to have industry-sponsored symposia over lunch. We hope many of you will take advantage of these symposia, remembering that without the sponsorship of industry, the cost of this meeting would be prohibitive.

We are very excited about the program but realize that participation from those attending the meeting enhances the educational experience for all. So, in addition to state-of-the-art lectures, podium and poster presentations and breakout sessions, we have allotted time for discussion.

Our hotel, the Arizona Biltmore, is an outstanding meeting venue, providing luxurious amenities, restaurants and activities on site. It is a beautiful, luxury resort located in sunny Phoenix offering spas, fitness centers, golf, tennis and many outdoor activities. This is a perfect winter get away, and the meeting facilities are second to none. Please plan on joining us for our welcome reception on Wednesday night for drinks and light hors d’oeuvres as you meet with Industry Partners in the exhibit hall. At the conclusion of the scientific program on Friday, we will have a cocktail reception and award presentations in the exhibit hall.

My co-chairs and I are anticipating another terrific meeting. Thanks for coming!

J. Christian Winters, MD
SUFU Program Chair
THANK YOU TO REVIEWERS

Due to the large number of abstracts submitted this year, the selection process was done anonymously. We gratefully acknowledge the participation of:

Jennifer Anger, MD
Katie N. Ballert, MD
Wade Bushman, MD
Charles Butrick, MD
R. Duane Cespedes, MD
Christopher Chermansky, MD
J. Quentin Clemens, MD
Craig V. Comiter, MD
Margot S. Damaser, PhD
Deborah R. Erickson, MD
Sophie Fletcher, MD
Matthew O. Fraser, PhD
Gamal M. Ghoniem, MD
Angelo E. Gousse, MD
Tomas Griebling, MD
Howard B. Goldman, MD
Magdy M. Hassouna, MD
Adonis K. Hijaz, MD
Michael J. Kennelly, MD
Kimberly Kenton, MD, MS
Adam P. Klausner, MD
Kathleen C. Kobashi, MD
Stephen R. Kraus, MD
Deborah J. Lightner, MD
Steven P. Petrou, MD
Paul Pettit, MD
Nirit Rosenblum, MD
Steven W. Siegel, MD
John T. Stoffel, MD
Suzette E. Sutherland, MD

And we thank each reviewer for the timely review of the abstracts and for conforming with the scoring grid.

2011 SUFU Meeting Program Chairs
J. Christian Winters, MD
Toby Chai, MD
Tomas Griebling, MD
Steven W. Siegel, MD

We would also like to thank the 2011 SUFU Essay Competition Reviewers:

Gary Lemack, MD (Chair)
Katie Ballert, MD
Elizabeth Takacs, MD
<table>
<thead>
<tr>
<th>Time</th>
<th>Tuesday, March 1, 2011</th>
<th>Wednesday, March 2, 2011</th>
<th>Thursday, March 3, 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GENERAL SESSION ROOM</strong></td>
<td>Frank Lloyd Wright, GHIJ</td>
<td>Frank Lloyd Wright, GHIJ</td>
<td>Frank Lloyd Wright Ballroom, Salon E</td>
</tr>
<tr>
<td><strong>REGISTRATION OPEN</strong></td>
<td>12:00 p.m. – 5:00 p.m.</td>
<td>7:30 a.m. – 6:30 p.m.</td>
<td>7:00 a.m. – 5:00 p.m.</td>
</tr>
<tr>
<td><strong>EXHIBIT HALL OPEN</strong></td>
<td>Location: FLW Ballroom, Salon F</td>
<td>7:00 a.m. – 4:00 p.m.</td>
<td>7:00 a.m. – 5:00 p.m.</td>
</tr>
<tr>
<td><strong>SPEAKER READY ROOM OPEN</strong></td>
<td>Location: Four Peaks</td>
<td>7:30 a.m. – 5:00 p.m. (Speaker Ready Room only)</td>
<td>7:00 a.m. – 5:00 p.m. (Speaker Ready Room and Video Viewing)</td>
</tr>
<tr>
<td>7:00 a.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7:30 a.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:00 a.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:30 a.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:30 a.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:30 a.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:00 a.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:30 a.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:00 p.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:30 p.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:00 p.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:30 p.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2:30 p.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3:00 p.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3:30 p.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4:00 p.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4:30 p.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5:00 p.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5:30 p.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6:00 p.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6:30 p.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7:00 p.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7:30 p.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:00 p.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Registration Open**
- Location: Frank Lloyd Wright Foyer
- 12:00 p.m. – 5:00 p.m.
- 7:30 p.m. – 6:30 p.m.
- 7:00 a.m. – 5:00 p.m.

**Exhibit Hall Open**
- Location: FLW Ballroom, Salon F
- 7:00 a.m. – 4:00 p.m.
- 7:00 a.m. – 5:00 p.m.

**Speaker Ready Room Open**
- Location: Four Peaks
- 7:30 a.m. – 5:00 p.m. (Speaker Ready Room only)
- 7:00 a.m. – 5:00 p.m. (Speaker Ready Room and Video Viewing)
<table>
<thead>
<tr>
<th>Time</th>
<th>FRIDAY March 4, 2011</th>
<th>SATURDAY March 5, 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00 a.m.</td>
<td>Continental Breakfast in Exhibit Hall</td>
<td>Continental Breakfast in Exhibit Hall</td>
</tr>
<tr>
<td>8:00 a.m.</td>
<td>Annual Business Meeting</td>
<td>Male Incontinence / Urodynamics Poster Session</td>
</tr>
<tr>
<td>8:30 a.m.</td>
<td></td>
<td>Pelvic Organ Prolapse / Reconstruction Poster Session</td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td>Pelvic Organ Prolapse / Reconstruction Poster Session Location: Frank Lloyd Wright Ballroom, Salons I&amp;J</td>
<td>Pelvic Organ Prolapse / Reconstruction Podium Session Location: Frank Lloyd Wright Ballroom, Salon E</td>
</tr>
<tr>
<td>9:30 a.m.</td>
<td>Female Urology / Incontinence Podium Session Location: Frank Lloyd Wright Ballroom, Salon E</td>
<td>Pelvic Organ Prolapse / Reconstruction Podium Session Location: Frank Lloyd Wright Ballroom, Salon E</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>Break – Visit Exhibits</td>
<td>Prize Essay Winner Presentations</td>
</tr>
<tr>
<td>10:30 a.m.</td>
<td>Announcements Complex Lower GU Trauma and Its Aftermath</td>
<td>ISPIN Session II Chat Room: A Directed Open Forum on Current Topics in Neuromodulation</td>
</tr>
<tr>
<td>11:00 a.m.</td>
<td>Urethral Injectibles in 2011</td>
<td></td>
</tr>
<tr>
<td>11:30 a.m.</td>
<td></td>
<td>Adjourn</td>
</tr>
<tr>
<td>12:00 p.m.</td>
<td>Industry Sponsored Lunch Symposium Location: Frank Lloyd Wright Ballroom, Salons A&amp;B</td>
<td></td>
</tr>
<tr>
<td>12:30 p.m.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:00 p.m.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:30 p.m.</td>
<td>Case Presentations in Voiding Dysfunction and Incontinence</td>
<td></td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2:30 p.m.</td>
<td>Break</td>
<td></td>
</tr>
<tr>
<td>3:00 p.m.</td>
<td>ISPIN Session I Bowel Sacral Neuromodulation</td>
<td></td>
</tr>
<tr>
<td>3:30 p.m.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4:00 p.m.</td>
<td>Neuromodulation Grant Winner Presentations</td>
<td></td>
</tr>
<tr>
<td>4:30 p.m.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5:00 p.m.</td>
<td>1. Management of Stress Incontinence and Pelvic Organ Prolapse in Elderly Women Location: Frank Lloyd Wright Ballroom, Salons A&amp;B</td>
<td>2. Advanced Urodynamics Location: Frank Lloyd Wright Ballroom, Salons I&amp;J</td>
</tr>
<tr>
<td>5:30 p.m.</td>
<td>2. Advanced Urodynamics Location: Frank Lloyd Wright Ballroom, Salons I&amp;J</td>
<td>3. Management of GU Strictures After the Treatment of Prostatic Disease Location: Frank Lloyd Wright Ballroom, Salon E</td>
</tr>
<tr>
<td>6:00 p.m.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6:30 p.m.</td>
<td>Cocktail Hour and Award Presentations in Exhibit Hall Location: Frank Lloyd Wright Ballroom, Salon F</td>
<td></td>
</tr>
<tr>
<td>7:00 p.m.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUFU 2010 – 2011 Board of Directors</td>
<td>6</td>
</tr>
<tr>
<td>Needs and Objectives</td>
<td>7</td>
</tr>
<tr>
<td>CME Accreditation</td>
<td>7</td>
</tr>
<tr>
<td>2011 Industry Partners</td>
<td>8</td>
</tr>
<tr>
<td>2011 Exhibitors and Educational Grant Provider</td>
<td>9</td>
</tr>
<tr>
<td>Hotel Map</td>
<td>10</td>
</tr>
<tr>
<td>General Information: Registration, Exhibit Hall and Speaker Ready Room Hours</td>
<td>11</td>
</tr>
<tr>
<td>Program Schedule</td>
<td>13</td>
</tr>
<tr>
<td>Mark Your Calendars</td>
<td>14</td>
</tr>
<tr>
<td>SUFU Annual Business Meeting Agenda</td>
<td>61</td>
</tr>
<tr>
<td>Evening Events</td>
<td>62</td>
</tr>
<tr>
<td>About Phoenix</td>
<td>62</td>
</tr>
<tr>
<td>Restaurants in Phoenix</td>
<td>63</td>
</tr>
<tr>
<td>Invited Speakers’ Lecture Summaries</td>
<td>65</td>
</tr>
<tr>
<td>Poster Session Abstracts</td>
<td>143</td>
</tr>
<tr>
<td>Podium Session Abstracts</td>
<td>221</td>
</tr>
<tr>
<td>2011 Lapides Essay Contest Winner</td>
<td>245</td>
</tr>
<tr>
<td>2011 Prize Essay Winners</td>
<td>246</td>
</tr>
<tr>
<td>Videos</td>
<td>248</td>
</tr>
<tr>
<td>Membership Application</td>
<td>250</td>
</tr>
<tr>
<td>Alphabetical Index of Presenters</td>
<td>251</td>
</tr>
</tbody>
</table>
BOARD OF DIRECTORS 2010 – 2011

OFFICERS

President
Victor W. Nitti, MD
NYU Medical Center
New York, NY

Vice President
J. Christian Winters, MD
Louisiana State University
New Orleans, LA

Secretary/Treasurer
Eric S. Rovner, MD
Medical University of South Carolina
Charleston, SC

Immediate Past President
E. Ann Gormley, MD
Dartmouth-Hitchcock Med. Ctr.
Lebanon, NH

Past President
Roger R. Dmochowski, MD
Vanderbilt University Medical Center
Nashville, TN

Members at Large
J. Quentin Clemens, MD
University of Michigan Medical Center
Ann Arbor, MI

Craig V. Comiter, MD
Stanford University Medical Center
Stanford, CA

Angelo E. Gousse, MD
Bladder Health & Reconstructive Urology Institute
Miramar, FL

Kathleen C. Kobashi, MD
Virginia Mason Medical Center
Seattle, WA

Raymond R. Rackley, MD
The Cleveland Clinic
Cleveland, OH

Sandip P. Vasavada, MD
Cleveland Clinic Foundation
Cleveland, OH

STANDING COMMITTEE CHAIRS

Practice Standards and Parameters Committee Chair
Steven W. Siegel, MD
Metro Urology
St. Paul, MN

Residency Education Committee Chair
Gary E. Lemack, MD
Univ. Texas SW Med. Center
Dallas, TX

Membership Committee Chair
Alan J. Wein, MD, PhD (Hon)
Univ. of PA Hlth System/Div. Of Urology
Philadelphia, PA

Education Committee Chair
Harriette M. Scarpero, MD
St. Thomas Hospital
Nashville, TN

Basic Science Committee Chair
Toby C. Chai, MD
University of Maryland Medical Center
Baltimore, MD

SUFU
Society for Urodynamics & Female Urology, Inc.

EXECUTIVE OFFICE
Two Woodfield Lake
1100 E Woodfield Road, Suite 520
Schaumburg, IL 60173
Phone: (847) 517-7225 • Fax (847) 517-7229
Website: www.sufuorg.com
Email: info@sufuorg.com

Executive Director
Wendy J. Weiser

Associate Director
Debbie Roller
NEEDS AND OBJECTIVES

Needs
The clinical science of pelvic pain, interstitial cystitis, stress urinary incontinence, intrinsic sphincteric deficiency and male post-prostatectomy incontinence is a rapidly developing area. Attendees of the SUFU program need to be aware of the latest updates and controversies in these topics. This meeting will provide active interactions between clinicians, investigators and basic scientists regarding diagnostic, therapeutics, and research topics related to urinary incontinence, chronic pelvic pain, and neuromodulation. Attendees will benefit from the ongoing review of these topics, which will assist them in assessing and providing the optimal patient care.

Objectives
At the conclusion of this program, participants should be able to:
1) Describe the pathophysiology of pelvic pain, and identify translational concepts in treatment
2) Identify the roles of conservative, pharmacologic and interventional therapies in the management of chronic pain
3) Explain the contemporary clinical trials in interstitial cystitis
4) Identify the most efficacious injectable agents in the treatment of intrinsic sphincteric deficiency
5) Review the latest advancements in neuromodulation in colorectal disorders
6) Identify the latest evidence in the evaluation of men with post-prostatectomy incontinence
7) Illustrate the use of male sling procedures and artificial urinary sphincter devices in the treatment of postprostatectomy incontinence

CME ACCREDITATION

Accreditation Statement
This activity has been planned and implemented in accordance with the Essential Areas and policies of the Accreditation Council for Continuing Medical Education through the joint sponsorship of the University of Oklahoma College of Medicine and the Society for Urodynamics & Female Urology (SUFU). The University of Oklahoma College of Medicine is accredited by the ACCME to provide continuing medical education for physicians.

The University of Oklahoma College of Medicine designates this live activity for a maximum of 27.50 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Conflict Resolution Statement
The University of Oklahoma College of Medicine, Office of Continuing Professional Development has reviewed this activity’s speaker and planner disclosures and resolved all identified conflicts of interest, if applicable.

General Disclaimer
The statements and opinions contained in this program are solely those of the individual authors and contributors and not of the SUFU. The appearance of the advertisements is not a warranty, endorsement, or approval of the products or services advertised or of their effectiveness, quality, or safety. The content of this publication may contain discussion of off-label uses of some of the agents mentioned. Please consult the prescribing information for full disclosure of approved uses. The SUFU disclaims responsibility for any injury to persons or property resulting from any ideas or products referred to in the abstracts or advertisements.

Special Assistance
We encourage participation by all individuals. If you have a disability, advance notification of any special needs will help us better serve you. Call (847) 517-7225 if you require special assistance to fully participate in the meeting.
THANK YOU TO OUR 2011 INDUSTRY PARTNERS

Diamond Plus

Diamond

Astellas

Coloplast

Medtronic

Ruby

AMS

Topaz

Ethicon

Laborie

Uroplasty
THANK YOU TO OUR 2011 EXHIBITORS

Alphabetical as of 2/16/2011

Allergan
American Medical Systems, Inc.
Astellas Pharma US, Inc.
Astra Tech Inc.
Bard Medical Division
Boston Scientific Corporation
Caldera Medical, Inc.
Coloplast
Ethicon Women’s Health & Urology
Generic Medical Devices, Inc. — GMD
Intuitive Surgical, Inc.
LABORIE
Life-Tech, Inc.
Mediwatch USA, Inc.
Medtronic, Inc.
National Association for Continence
Olympus/Gyrus ACMI
Pfizer, Inc.
SRS Medical Systems
TTMed Urology/Thomson Reuters
Uroplasty, Inc.
Watson Pharmaceuticals

THANK YOU TO OUR EDUCATIONAL GRANT PROVIDER
HOTEL MAP

Frank Lloyd Wright Ballroom

[Diagram of the Frank Lloyd Wright Ballroom with labels for Pre-Function North, Pre-Function Central, Pre-Function South, and Salon A, Salon B, Salon C, Salon D, Salon E, Salon F, Salon G, Salon I, Salon II.]
### GENERAL INFORMATION

**Registration / Information Desk Hours**  
*Location: Frank Lloyd Wright Foyer*

<table>
<thead>
<tr>
<th>Day</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuesday, March 1, 2011</td>
<td>12:00 p.m. – 5:00 p.m.</td>
</tr>
<tr>
<td>Wednesday, March 2, 2011</td>
<td>7:30 a.m. – 6:30 p.m.</td>
</tr>
<tr>
<td>Thursday, March 3, 2011</td>
<td>7:00 a.m. – 5:00 p.m.</td>
</tr>
<tr>
<td>Friday, March 4, 2011</td>
<td>7:00 a.m. – 6:00 p.m.</td>
</tr>
<tr>
<td>Saturday, March 5, 2011</td>
<td>7:00 a.m. – 6:00 p.m.</td>
</tr>
</tbody>
</table>

**Exhibit Hall Hours**  
*Location: Frank Lloyd Wright Ballroom, Salon F*

<table>
<thead>
<tr>
<th>Day</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wednesday, March 2, 2011</td>
<td>7:00 p.m. – 8:30 p.m.</td>
</tr>
<tr>
<td>Thursday, March 3, 2011</td>
<td>7:00 a.m. – 4:00 p.m.</td>
</tr>
<tr>
<td>Friday, March 4, 2011</td>
<td>7:00 a.m. – 4:00 p.m.</td>
</tr>
<tr>
<td>(Cocktail Reception and Award Presentations)</td>
<td>6:00 p.m. – 7:30 p.m.</td>
</tr>
<tr>
<td>Saturday, March 5, 2011</td>
<td>7:00 a.m. – 10:30 a.m.</td>
</tr>
</tbody>
</table>

**Speaker Ready Room/Video Viewing Hours**  
*Location: Four Peaks*

<table>
<thead>
<tr>
<th>Day</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wednesday, March 2, 2011</td>
<td>7:30 a.m. – 5:00 p.m.</td>
</tr>
<tr>
<td>Thursday, March 3, 2011</td>
<td>7:00 a.m. – 5:00 p.m.</td>
</tr>
<tr>
<td>Friday, March 4, 2011</td>
<td>7:00 a.m. – 5:00 p.m.</td>
</tr>
<tr>
<td>Saturday, March 5, 2011</td>
<td>7:00 a.m. – 12:00 p.m.</td>
</tr>
</tbody>
</table>
PROGRAM SCHEDULE

2011 Winter Meeting
Society for Urodynamics and Female Urology
March 1 – 5, 2011
MARK YOUR CALENDARS!

SUFU at the AUA 2011
May 14, 2011
Renaissance Washington, DC
Washington, DC

SUFU 2012 Annual Meeting
February 28 – March 3, 2012
The Roosevelt
New Orleans, LA

SUFU 2013 Annual Meeting
February 26 – March 2, 2013
Caesar’s Palace
Las Vegas, NV
SUFU BASIC SCIENCE RESEARCH MEETING
Located in Salons G-J of Frank Lloyd Wright Ballroom

12:00 p.m. – 5:00 p.m.  Registration/Information Desk Hours
  Location: Frank Lloyd Wright Foyer

1:30 p.m. – 2:40 p.m.  Pacemaker Cells in the Bladder
  Moderator: Lori A. Birder, PhD
  Panelists: Adam P. Klausner, MD
           Sang Don Koh, MD, PhD
           Vivian Cristofaro, PhD

2:40 p.m. – 3:00 p.m.  Break

3:00 p.m. – 4:20 p.m.  Connective Tissue in POP/UI
  Moderator: Margot S. Damaser, PhD
  Panelists: Steven Abramowitch, PhD
           Darius J. Bagli, MD
           Kanchan Chitaley, PhD
           Ching-Shwun Lin, PhD

4:20 p.m. – 4:35 p.m.  Break

4:35 p.m. – 5:20 p.m.  NIH Grant Funding: Challenges and Opportunities for the Academic Urologist
  Moderator: Adonis K. Hijaz, MD
  Panelists: Firouz Daneshgari, MD
           Toby C. Chai, MD
           Jennifer Anger, MD

5:30 p.m. – 7:30 p.m.  Basic Science Poster Session I
  (with Wine & Cheese)
  Moderators: Firouz Daneshgari, MD
              Adam P. Klausner, MD

Poster #BS1  ANGIOTENSIN II TYPE I (AT-1) RECEPTOR INHIBITION PREVENTS THE URODYNAMIC AND DETRUSOR CHANGES ASSOCIATED WITH BLADDER OUTLET OBSTRUCTION – A MOUSE MODEL
Craig Comiter, MD and Hardeep Phull, BS
Stanford University, Stanford, CA
(Presented by: Craig Comiter)
Poster #BS2*  SANCTURA XR MUSCARINIC ANTAGONIST RESISTS TRANSPORT (SMART) ACROSS THE BLOOD-BRAIN BARRIER (BBB): A PROSPECTIVE NEUROCOGNITIVE, BIODISTRIBUTION AND PHARMACOKINETIC STUDY OF EXTENDED RELEASE TROSPIUM
Michael Oefelein, MD, FACS¹, Gary Kay, PhD², Howard Goldman, MD, FACS³, John Ling, PhD⁴, Kavitha Bhasi, PhD⁵, Cara Tannenbaum, MD⁶ and David Staskin, MD⁷
¹Urology, Allergan, Irvine, CA; ²Cognitive Research Corporation, St. Pete, FL; ³Cleveland Clinic Foundation, Cleveland, OH; ⁴Pharmacology, Allergan, Irvine, CA; ⁵Pharmacology, Allergan, Irvine CA; ⁶Univ of Montreal, QC, Canada; ⁷Tufts University, Boston, MA
(Presented by: David Staskin)

*Not CME Accredited

Poster #BS3  ANATOMIC AND HISTOLOGIC EXAMINATION OF THE PORCINE VAGINA AND SUPPORTIVE STRUCTURES: IN SEARCH OF AN IDEAL MODEL FOR PELVIC FLOOR DISORDERS EVALUATION AND MANAGEMENT
Daniel Gruber, MS, MD¹, William Warner, MD¹, Eric Lombardini, VMD², Christopher Zahn, MD³ and Jerome Buller, MD³
¹Walter Reed Army Medical Center, Washington DC; ²Armed Forces Radiobiology Research Institute, Bethesda, MD; ³Uniformed Services University, Bethesda, MD
(Presented by: Daniel Gruber)

Poster #BS4*  INTRAVESICAL THERAPY BY LIPOSOMES COMPOSED OF LIPIDS ENDOGENOUS TO URINARY TRACT DOES NOT AFFECT SERUM LEVELS OF LIPID OR ITS METABOLITES
Michele Anthony¹, David Chancellor¹, Vikas Tyagi, MD², Michael Chancellor, MD², Pradeep Tyagi, PhD² and Jonathan Kaufman, PhD¹
¹Lipella Pharmaceuticals, Pittsburgh, PA; ²William Beaumont Hospital, Royal Oak, MI
(Presented by: Michele Anthony)

*Not CME Accredited

Poster #BS5*  AGE ASSOCIATED CHANGES IN URINARY PROTEOME OF OAB PATIENTS
Vikas Tyagi, MD¹, Harvey Qu, PhD², Kenneth Peters, MD³, Yao-Chi Chuang, MD³, HT Liu, MD⁴, Hann-Chorng Kuo, MD⁴, Naoki Yoshimura, MD, PhD⁵, Shachi Tyagi, MD⁶, Michael Chancellor, MD¹ and Pradeep Tyagi, PhD¹
¹William Beaumont Hospital, Royal Oak, MI; ²Oakland University, Rochester, MI; ³Chang Gung Memorial Hospital, Kaohsiung, Taiwan; ⁴Buddhist Tzu Chi General Hospital, Hualien, Taiwan; ⁵University of Pittsburgh, Pittsburgh, PA; ⁶UPMC, Pittsburgh, PA
(Presented by: Vikas Tyagi)

*Not CME Accredited
**Poster #BS6**

URINE ANALYSIS OF CONFIRMED UTI PATIENTS REVEAL HIGHER LEVELS OF CXC CHEMOKINES COMPARED TO PATIENTS WITH LUTS BUT WITHOUT UTI
Pradeep Tyagi, PhD¹, Vikas Tyagi, MD¹, Harvey Qu, PhD², Kenneth Peters, MD¹, Yao-Chi Chuang, MD³, HT Liu, MD⁴, Hann-Chorng Kuo, MD⁴, Priyanka Tyagi, MS and Michael Chancellor MD¹
¹William Beaumont Hospital, Royal Oak, MI; ²Oakland University, Rochester, MI; ³Chang Gung Memorial Hospital, Kaohsiung, Taiwan; ⁴Buddhist Tzu Chi General Hospital, Hualien, Taiwan
(Presented by: Pradeep Tyagi)

*Not CME Accredited*

**Poster #BS7**

DIFFERENTIAL EFFECT OF BLADDER INHIBITION BY ELECTRICAL STIMULATION OF THE SPINAL NERVE AND THE DORSAL NERVE OF THE CLITORIS
Xin Su, Angela Nickles and Dwight Nelson
Medtronic Inc.
(Presented by: Thaddeus Brink)

*Not CME Accredited*

**Poster #BS8**

EFFECT OF AGING ON URETHRAL AND BLADDER FUNCTION OF RATS
Andrea Staack, MD, PhD¹, Joanne Leung, BS², Rong Zhang, DDS, PhD², Danielle Ziva Shulaker², David Tehrani, BS², Ais Wu, BS², Vanda Lopez Guenther, MD² and Larissa Rodriguez, MD²
¹Division of Female Urology, Urodynamics, and Pelvic Reconstructive Surgery, Department of Urology, David Geffen Medical, Los Angeles, CA; ²Department of Urology, David Geffen Medical School, Los Angeles, CA
(Presented by: Andrea Staack)

*Not CME Accredited*

**Poster #BS9**

THE EFFECT OF CHRONIC WATER AVOIDANCE STRESS ON BLADDER MAST CELL ACTIVITY IN A RODENT MODEL
Una Lee, MD¹, Ariana Smith, MD², Viktorya Golovatscka¹, Sylvie Bradesi, PhD¹ and Larissa Rodriguez, MD¹
¹Los Angeles, CA; ²Philadelphia, PA
(Presented by: Una Lee)

**Poster #BS10**

NICOTINIC AND PURINERGIC RECEPTOR INTERACTIONS IN RAT BLADDER SMOOTH MUSCLE
Alvaro Munoz, PhD¹, Adan Dagnino-Acosta, PhD¹, Paz Vital, PhD¹, Cristopher Smith, MD¹, Timothy Boone, MD, PhD¹² and George Somogyi, MD, PhD¹
¹Baylor College of Medicine, Houston, TX; ²The Methodist Hospital
(Presented by: Alvaro Munoz)
Poster #BS11  EFFERENT NERVOUS EXCITATION OF DETRUSOR AND SPHINCTER DURING PHASIC DETRUSOR OVERACTIVITY  
Françoise Valentini, MD, PhD and Pierre Nelson, PhD  
ER6-UPMC (Paris 06) France  
(Presented by: Françoise Valentini)

Poster #BS12  WITHDRAWN

Poster #BS13  ADJUSTABLE PASSIVE STIFFNESS (APS) IN WHOLE BLADDERS FROM PARTIAL BLADDER OUTLET OBSTRUCTED (PBOO) MICE  
John Speich, PhD¹, Adam Klausner, MD², Samuel Chacko, DVM, PhD³, Stephen Zderic, MD⁴ and Paul Ratz PhD⁵  
¹Virginia Commonwealth University School of Engineering, Richmond, VA; ²Virginia Commonwealth University School of Medicine, Richmond, VA; ³University of Pennsylvania School of Medicine, Philadelphia, PA; ⁴Children's Hospital of Philadelphia, Philadelphia, PA  
(Presented by: John Speich)

Poster #BS14  LUMBOSACRAL NEURONAL ACTIVITY IS ENHANCED FROM ACTIVATION OF UROTHELIAL PURINERGIC RECEPTORS  
Alvaro Munoz PhD¹, George Somogyi MD, PhD¹, Timothy Boone MD, PhD¹-² and Christopher Smith MD¹  
¹Baylor College of Medicine, Houston, TX; ²The Methodist Hospital  
(Presented by: Alvaro Munoz)

Poster #BS15*  INHIBITION OF EXTRACELLULAR SIGNAL-REGULATED KINASES (ERK1/2) ACTIVITY IS EFFECTIVE IN REDUCING BLADDER HYPERALGESIA IN AN ANIMAL MODEL OF BLADDER PAIN  
H. Henry Lai, MD¹, Chang-Shen Qiu, MD¹, Lara Crock¹, Maria Elena Morales¹, Timothy Ness, MD, PhD² and Robert Gereau, IV, PhD¹  
¹Washington University, St. Louis, MO; ²University of Alabama, Birmingham, AL  
(Presented by: H. Henry Lai)  
*Not CME Accredited

Poster #BS16  STRENGTH AND DEGRADATION CHARACTERISTICS OF BIODEGRADABLE POLYMER FIBERS AND ELECTROSPUN MESH DURING SHORT TERM SALINE IMMERSION  
Sandeep Manandhar¹, Nandika D'Souza, PhD¹, Leslie Robertson, MS², Robert Eberhart, PhD³, Harry F. Tibbals, PhD¹ and Philippe Zimmern, MD⁴  
¹Univ. of North Texas, Denton, Texas; ²College of Visual Arts and Design, Denton, Texas; ³UT Southwestern Medical Center, Dallas, Texas; ⁴UT Southwestern Medical Center, Dallas, TX  
(Presented by: Philippe Zimmern)
AN EXPANDED MODEL OF PRESSURE/FLOW MOUSE CYSTOMETRY
Phillip Smith, MD¹, Anthony DeAngelis, PhD, Lisa DeAngelis, MD and George Kuchel, MD
¹University of Connecticut Health Center, Farmington, CT
(Presented by: Phillip Smith)

MATURATION, NOT AGING, IS ASSOCIATED WITH ALTERED URINE STORAGE AND VOIDING IN AN AGING MOUSE CYSTOMETRIC MODEL
Phillip Smith, MD, Anthony DeAngelis, PhD, Lisa DeAngelis, MD and George Kuchel, MD
University of Connecticut Health Center, Farmington, CT
(Presented by: Phillip Smith)

ACUTE EFFECTS OF BLADDER AND RECTAL FUNCTION AFTER TRAUMATIC BRAIN INJURY IN RATS
Haihong Jiang, MD, PhD¹, Olga Kokiko-Cochran, PhD², Kevin Li³, Margot Damaser, PhD¹ and Yu-Shang Lee, PhD³
¹Department of Biomedical Engineering, Glickman Urological and Kidney Institute, Cleveland Clinic, Cleveland, OH; ²Department of Neurosciences, Research Core Services, Cleveland Clinic, Cleveland, OH; ³Department of Neurosciences, Cleveland Clinic, Cleveland, OH
(Presented by: Haihong Jiang)

MORPHOLOGICAL EXPRESSION OF PDGFRα CELLS, AND NOT ICC, IN MURINE BLADDER
Byoung Koh, BS and Sang Don Koh, MD, PhD
Reno, NV
(Presented by: Sang Don Koh)

COMPARING DIFFERENT DECELLULARIZATION PROTOCOLS OF ANIMALS’ BLADDERS FOR MESENCHYMAL STEM CELL-BASED TISSUE ENGINEERING
Wally Mahfouz, MD, Oleg Loutochin, MD, Coutu Daniel, PhD, Jacques Galipeau, MD, PhD and Jacques Corcos, MD
JGH, Montreal, QC, Canada
(Presented by: Wally Mahfouz)
Poster #BS22  A NEW METHOD FOR OBJECTIVE ANALYSIS OF DETRUSOR RHYTHM DURING THE FILLING PHASE
Ashley King, MD¹, Adam Klausner, MD²,³, Neerav Mangipudi⁴, Corey Johnson, MD¹, Michael Byrne, MD¹, John Speich, PhD⁵, Harry Koo, MD¹ and Paul Ratz, PhD⁶
¹Virginia Commonwealth University School of Medicine, Richmond, VA; ²Virginia Commonwealth University School of Medicine; ³McGuire Veterans Hospital, Richmond, VA; ⁴Virginia University, Richmond, VA; ⁵Virginia Commonwealth University, School of Engineering, Richmond, VA; ⁶Virginia Commonwealth University, School of Biochemistry & Molecular Biology, Richmond, VA
(Presented by: Adam Klausner)

Poster #BS23  NEUROGENIC BLADDER CAUSES MARKED BLADDER REMODELING IN MICE WITH EXPERIMENTAL AUTOIMMUNE ENCEPHALOMYELITIS
Ahmet Ozer, MD¹, Kenan Izgi, MD², Andrew Horowitz, MD¹, Fuat Bicer, MD¹, Firouz Daneshgari, MD¹ and Cengiz Altuntas, MD¹
¹Case Western Reserve University, Cleveland, OH; ²Cleveland State University, Cleveland, OH
(Presented by: Andrew Horowitz)

Poster #BS24  CHRONIC PAIN RESPONSE IN MICE WITH EXPERIMENTAL AUTOIMMUNE ENCEPHALOMYELITIS
Kenan Izgi, MD¹, Fuat Bicer, MD², Ahmet Ozer, MD², Andrew Horowitz, MD², Firouz Daneshgari, MD² and Cengiz Altuntas, PhD²
¹Cleveland State University, Cleveland, OH; ²Case Western Reserve University, Cleveland, OH
(Presented by: Andrew Horowitz)
**WEDNESDAY, MARCH 2, 2011**  
*Basic Science sessions located in the Frank Lloyd Wright GHIJ unless otherwise noted.*

**SUFU BASIC SCIENCE RESEARCH MEETING**  
*Located in Salons G-J of Frank Lloyd Wright Ballroom*

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:30 a.m. – 5:00 p.m.</td>
<td><strong>Speaker Ready Room Hours</strong>&lt;br&gt;<em>Location: Four Peaks</em></td>
<td></td>
</tr>
<tr>
<td>7:30 a.m. – 6:30 p.m.</td>
<td><strong>Registration/Information Desk Hours</strong>&lt;br&gt;<em>Location: Frank Lloyd Wright Foyer</em></td>
<td></td>
</tr>
<tr>
<td>7:30 a.m. – 8:30 a.m.</td>
<td><strong>Breakfast</strong>&lt;br&gt;<em>Location: Frank Lloyd Wright Foyer</em></td>
<td></td>
</tr>
</tbody>
</table>
| 8:30 a.m. – 8:40 a.m. | **Welcome**<br>**J. Christian Winters, MD**  
Program Chair  
**Victor W. Nitti, MD**  
SUFU President  
**Toby C. Chai, MD**  
Basic Science Committee Chair |                                 |
| 8:40 p.m. – 9:45 a.m. | **State-of-the-Art Presentation – Genomic Medicine for Personalizing 21st Century Patient Care: The Agony and the Ecstasy**  
**Presenter: Charis Eng, MD, PhD, FACP** |                                 |
| 9:45 a.m. – 10:15 a.m. | **RAND IC Epidemiology Study Update**<br>**Presenter: Sandra H. Berry**  
RAND Corporation |                                 |
| 10:15 a.m. – 10:45 a.m. | **Break**                                                      |                                 |
| 10:45 a.m. – 12:00 p.m. | **MAPP**<br>**Moderator:** **Deborah R. Erickson, MD**  
**Panelists:** **J. Quentin Clemens, MD**  
**David J. Klumpp, PhD**  
**H. Henry Lai, MD**  
**Timothy J. Ness, MD, PhD** |                                 |
| 12:00 a.m. – 1:30 p.m. | **Lunch**                                                      |                                 |
1:30 p.m. – 2:10 p.m. State-of-the-Art Presentation – BACH Update  
Presenter: Raymond C. Rosen, PhD

2:10 p.m. – 3:15 p.m. Entrepreneurial Session – How to Commercialize Research Creativity  
Moderator: Karl B. Thor, PhD  
Panelists: Michael B. Chancellor, MD  
Susan Keay, MD, PhD  
Gerald W. Timm, PhD

3:15 p.m. – 3:45 p.m. Break

3:45 p.m. – 5:00 p.m. Pathophysiologic Principles in OAB – Can This Work into Clinical Phenotyping?  
Moderator: Toby C. Chai, MD

Central Nervous System fMRI Imaging  
Stasa Tadic, MD, MS

Urethelial Afferent Signaling  
Lori A. Birder, PhD

Focal and Regional Bladder Instability  
Matthew O. Fraser, PhD

Detrusor Smooth Muscle Factors  
Georgi V. Petkov, PhD

5:00 p.m. – 6:30 p.m. Basic Science Poster Session II  
Moderators: Matthew O. Fraser, PhD  
Christopher P. Smith, MD

Poster #BS25  A MODEL OF BLADDER HYPOCONTRACTILITY IN THE RAT: PELVIC NERVE CRUSH  
Christopher Chermansky, MD¹, Denise Chow, MD¹, Qiang Wu, MD¹ and Matthew Fraser, PhD²  
¹LSUHSC Department of Urology New Orleans, LA; ²Duke University Division of Urology, Durham, NC  
(Presented by: Christopher Chermansky)

Poster #BS26  NON-INVASIVE MEASUREMENT OF BLADDER PRESSURE IN MEN: A LEAP FORWARD  
Becky Clarkson, PhD¹, Wendy Robson, RN², Frank McArdle, PhD³, Robert Pickard, MD⁴, Clive Griffiths, PhD³ and Michael Drinnan, PhD³  
¹University of Pittsburgh, Pittsburgh, PA; ²Urology Dept, Freeman Hospital, Newcastle upon Tyne, UK; ³Regional Medical Physics Department, Freeman Hospital, Newcastle upon Tyne, UK; ⁴Newcastle University, Newcastle upon Tyne, UK  
(Presented by: Becky Clarkson)
Poster #BS27  
**POPULATION-BASED DESCRIPTION OF FAMILIAL CLUSTERING IN OVERACTIVE BLADDER (OAB)**
Kristina Allen-Brady, PhD, MSPH, Lisa Cannon-Albright, PhD, MStat, Jan Baker, APRN and Peggy Norton, MD
University of Utah, Salt Lake City, Utah
(Presented by: Kristina Allen-Brady)

Poster #BS28  
**CAFFEINE INGESTION INDUCES URINARY FREQUENCY AND DETRUSOR OVERACTIVITY IN MICE**
Richard Kershen MD, Travis Mann-Gow BS and Peter Zvara MD, PhD
The University of Vermont, Burlington, VT
(Presented by: Richard Kershen)

Poster #BS29*  
**INTRAVENOUS MESENCHYMAL STEM CELLS FACILITATE RECOVERY FROM STRESS URINARY INCONTINENCE AFTER CHILDBIRTH INJURY**
Charusopng Dissaranan, MD¹, Bradley Gill, BSE², Michelle Cruz², Levilester Salcedo, MD², Brian Balog, BS², Matthew Kiedrowski, BS², Marc Penn, MD, PhD², Howard Goldman, MD² and Margot Damaser, PhD³
¹Cleveland Clinic, Ohio; ²Cleveland Clinic; ³Cleveland Clinic, Louis Stokes Cleveland VA Medical Center
(Presented by: Charusopng Dissaranan)

*Not CME Accredited

Poster #BS30*  
**PANNEXIN-1 CHANNELS PROVIDE A PATHWAY FOR ATP RELEASE FROM RAT BLADDER MUCOSA**
Mia Thi PhD¹, Arnold Melman MD², David Spray PhD³ and Sylvia Suadicani PhD⁴
¹Department of Surgery/Division of Orthopedics and Dominick P. Purpura Department of Neuroscience, Albert Einstein College of Medicine, Bronx, NY; ²Department of Urology, Albert Einstein College of Medicine, Bronx, NY; ³Dominick P. Purpura Department of Neuroscience, Albert Einstein College of Medicine, Bronx, NY; ⁴Department of Urology and Dominick P. Purpura Department of Neuroscience, Albert Einstein College of Medicine, Bronx, NY
(Presented by: Sylvia Suadicani)

*Not CME Accredited

Poster #BS31  
**FEASIBILITY OF INJECTION OF MCP-3 INTO MOUSE URETHRA**
Lauren Byrne, MD, Zhenghong Lee, MD, Zubeyir Altuntas, MD, Michael Kavran, MS, Firouz Daneshgari, MD and Adonis Hijaz, MD
Case Western Reserve University, Cleveland, OH
(Presented by: Lauren Byrne)
Poster #BS32  ALTERED CAVEOLAE-MEDIATED PURINERGIC SIGNALING IN SPONTANEOUSLY HYPERTENSIVE RATS WITH DETRUSOR OVERACTIVITY  
Vivian Cristofaro, PhD, Samar Lowalekar, MD, Subbarao V. Yalla, MD and Maryrose P. Sullivan, PhD  
West Roxbury, MA  
(Presented by: Vivian Cristofaro)

Poster #BS33*  MUSCARINIC INHIBITION OF NON-ADRENERGIC, NON-CHOLINERGIC (NANC) TRANSMISSION IN THE RAT URINARY BLADDER IN VIVO  
F. Aura Kullmann, Grace Wells, MS, David McKenna, BS and Karl Thor, PhD  
Urogenix Inc./Astellas, Durham, NC  
(Presented by: F. Aura Kullmann)  
*Not CME Accredited

Poster #BS34*  MUSCARINIC RECEPTORS INHIBIT PURINERGIC NEUROTRANSMISSION IN RAT  
Darryl Kitney, BSc¹, Karl B. Thor, PhD¹, Christopher H. Fry, PhD² and F. Aura Kullmann, PhD¹  
¹Urogenix Inc./Astellas, Durham, NC; ²University of Surrey, Guildford, UK  
(Presented by: Darryl Kitney)  
*Not CME Accredited

Poster #BS35  VISCERAL PAIN RESPONSE IN BALBC/J MICE IMMUNIZED WITH UROPLAKIN UP3B AS A MURINE MODEL FOR INTERSTITIAL CYSTITIS  
Kenan Izgi, MD¹, Ahmet Ozer, MD², Justin Isariyawongse, MD², Fuat Bicer, MD², Cagri Sakalar, PhD³, Firouz Daneshgari, MD² and Cengiz Altuntas, PhD²  
¹Cleveland State University, Cleveland, OH; ²Case Western Reserve University, Cleveland, OH; ³Cleveland Clinic Foundation  
(Presented by: Justin Isariyawongse)

Poster #BS36  EXPRESSION OF RHO-KINASE ACTIVITY IN FEMALE PELVIC FLOOR RELAXATION  
Hana Yoon, MD, PhD¹, Jae Yup Hong, MD, PhD², Ju Tae Seo, MD, PhD³ and Young Ho Kim, MD, PhD⁴  
¹Ewha Womans University; ²Cha University, Pundang, Gyoungki, Korea; ³Kwandong University Jeil Hospital, Seoul, Korea; ⁴Soonchunhyang University, Pucheon, Korea  
(Presented by: Hana Yoon)

Poster #BS37  OPTIMIZING MUSCLE STEM CELL CONSTRUCTS FOR PELVIC FLOOR  
Jason Kim, MD¹, Heather-Marie Wilson, PhD², Alvaro Lucioni, MD¹, Kathleen Kobashi, MD¹ and Margaret Allen, MD²  
¹Virginia Mason Medical Center, Seattle, WA; ²Benaroya Research Institute, Seattle, WA  
(Presented by: Jason Kim)
Poster #BS38  BONE MARROW MESENCHYMAL STROMAL CELL THERAPY FOR EXTERNAL URETHRAL SPHINCTER RESTORATION IN A RAT MODEL OF STRESS URINARY INCONTINENCE
Oleg Loutochin, MD, Lysanne Campeau, MD, Nicoletta Eliopoulos, PhD, Manaf Bouchentouf, PhD, Bertil Blok, MD, Jacques Galipeau, MD, PhD and Jacques Corcos, MD
JGH, Montreal, QC, Canada
(Presented by: Oleg Loutochin)

Poster #BS39  THE EFFECT OF DONOR AGE ON INDUCED PLURIPOTENT STEM CELLS FROM WOMEN WITH PELVIC FLOOR DISORDERS
Yan Wen, MD¹, Prachi Gujar, MS², Roger Jarvis, PhD², Thomas Baer, PhD³, Renee Reijo Pera, PhD² and Bertha Chen, MD⁴
¹Stanford University, Stanford, CA; ²Institute for Stem Cell Biology and Regenerative Medicine, Stanford University, Stanford, CA; ³Stanford Photonics Research Center, Stanford University, Stanford, CA; ⁴Stanford University School of Medicine, Stanford, CA
(Presented by: Bertha Chen)

Poster #BS40  CHARACTERIZATION OF SNPS WITHIN THE MMP-1 PROMOTOR REGION IN WOMEN WITH AND WITHOUT POP
Ilya Gorbachinsky, MD¹, Lysanne Campeau, MD², Jennifer Stancill², Jan Rohozinski, PhD², Karl-Erik Andersson, MD, PhD², Julie Ziegler, MA³, Carl Langefeld, PhD³ and Gopal Badlani, MD¹
¹Wake Forest University Baptist Medical Center, Department of Urology, Winston-Salem, NC; ²Wake Forest University Institute for Regenerative Medicine, Winston-Salem, NC; ³Wake Forest University Health Sciences, Department of Biostatistics, Winston-Salem, NC
(Presented by: Ilya Gorbachinsky)

Poster #BS41  COMPARISON OF MMP-1 ENZYMATIC ACTIVITY AND TIMP-1 INHIBITION IN WOMEN WITH PELVIC ORGAN PROLAPSE
Lysanne Campeau, MD¹, Ilya Gorbachinsky, MD², Julie T. Ziegler, MA³, Carl D. Langefeld, PhD³, Karl Erik Andersson, MD, PhD¹, Jan Rohozinski, PhD¹ and Gopal Badlani, MD²
¹Wake Forest Institute for Regenerative Medicine, Winston-Salem, NC; ²Wake Forest University Baptist Medical Center, Department of Urology, Winston-Salem, NC; ³Wake Forest University Health Sciences, Department of Biostatistics, Winston-Salem, NC
(Presented by: Lysanne Campeau)
Poster #BS42  FEASIBILITY OF SUBMUCOSAL BLADDER PRESSURE SENSING
Paul Fletter¹, Steve Majerus², Adam Boger, PhD³, Kenneth Gustafson, PhD³, Steven Garverick, PhD², Hui Zhu, MD⁴ and Margot Damaser, PhD⁵
¹Research Service, Louis Stokes Cleveland VA Medical Center, Cleveland, OH; ²Dept. of Electrical Engineering and Computer Science, Case Western Reserve University, Cleveland, OH; ³Dept. of Biomedical Engineering, Case Western Reserve University, Cleveland, OH; ⁴Dept. of Urology, University Hospitals, Cleveland, OH; ⁵Dept. of Biomedical Engineering, Lerner Research Institute, Cleveland Clinic, Cleveland, OH
(Presented by: Paul Fletter)

Poster #BS43  IN VITRO CHARACTERIZATION OF PHENOTYPIC DIFFERENCES BETWEEN PRIMARY CULTURED RAT AND HUMAN BLADDER UROTHELIAL CELL
Yu-Chao Hsu, MD¹, Yan Sun, PhD² and Toby C. Chai, MD²
¹Division of Male and Female Urology, Department of Surgery, Chang Gung Memorial Hospital, Taoyuan, Taiwan; ²Division of Urology, University of Maryland School of Medicine, Baltimore, MD
(Presented by: Yu-Chao Hsu)

Poster #BS44* NGF INDUCED SIGNALING IN THE BLADDER IS MODULATED BY CAVEOLAE
Vivian Cristofaro, PhD¹, Celia D. Cruz, PhD², Samar Lowalekar, MD¹, Soumil Mhaskar¹, Subbarao V. Yalla, MD¹, Maryrose P. Sullivan, PhD¹ and Francisco Cruz, MD²
¹West Roxbury, MA; ²Porto, Portugal
(Presented by: Samar Lowalekar)

Poster #BS45* EVALUATION OF THE TENSILE PROPERTIES OF THE TVT-O AND SUB-URETHRAL TAPE I-STOP® IN LONG-TERM FOLLOW-UP IN VIVO RAT MODEL
Wally Mahfouz, MD¹, Oleg Loutochin, MD², Maude Carmel, MD², Chiara E. Ghezzi, PhD², Showan N. Nazhat, PhD², Robert Moore, PhD² and Jacques Corcos, MD²
¹JGH, Montreal, QC, Canada; ²McGill University, Montreal, QC, Canada
(Presented by: Wally Mahfouz)

Poster #BS46  THE EFFECTS OF DIABETES ON URETHRAL BIOMECHANICAL PROPERTIES IN THE RAT USING SIMULTANEOUS MULTI-POSITION MEASUREMENTS
Matthew Fraser, PhD, Zhongguang Yang, MD and Paul Dolber, PhD
Dept. of Surgery, Duke University Medical Center, Durham, NC
(Presented by: Matthew Fraser)
**POSTER SESSIONS**

**Poster #BS47**

**THE EFFECTS OF ADMINISTRATION OF AUTONOMIC DRUGS ON NON-VOIDING CONTRACTIONS IN THE RAT DURING VIDEO URODYNAMICS**

Matthew Fraser, PhD and Paul Dolber, PhD
Dept. of Surgery, Duke University Medical Center, Durham, NC
(Presented by: Matthew Fraser)

**Poster #BS48**

**STANDARDIZATION OF VAGINAL DISTENTION INJURY IN A RAT MODEL OF BIRTH TRAUMA AND RESULTANT STRESS URINARY INCONTINENCE**

Nicholas Boncher, MD, Gino Vricella, MD, Michael Kavran, MS, Nan Xiao, MD, Firouz Daneshgari, MD and Adonis Hijaz, MD
Case Western Reserve University, Cleveland, Ohio
(Presented by: Nicholas Boncher)

---

**SCHEDULE**

**12:30 p.m. – 6:30 p.m. Fellows Forum**
(for participating fellows only)
*Location: Begins in Frank Lloyd Wright Ballroom, Salon E*

**5:00 p.m. – 6:30 p.m. Fellowship Program Directors Meeting**
*Location: Frank Lloyd Wright Ballroom, Salon E*

**7:00 p.m. – 8:30 p.m. SUFU Welcome Reception with Industry Partners in Exhibit Hall**
*Location: Frank Lloyd Wright Ballroom, Salon F*
Continental Breakfast in Exhibit Hall  
*Location: Frank Lloyd Wright Ballroom, Salon F*

Residents and Fellows Breakfast  
*Location: Frank Lloyd Wright Ballroom, Salon D*  
Moderators: Gary E. Lemack, MD  
Harriette M. Scarpero, MD  
Jason P. Gilleran, MD

Exhibit Hall Open  
*Location: Frank Lloyd Wright Ballroom, Salon F*

Registration/Information Desk Hours  
*Location: Frank Lloyd Wright Foyer*

Video Viewing in Speaker Ready Room  
*Location: Four Peaks*

**Video #1**  
PURE TRANSGENDIAL EXCISION OF MESH EROSION INVOLVING THE BLADDER  
Farzeen Firoozi, MD¹ and Howard B. Goldman, MD²  
¹NSLIJ, New Hyde Park, NY; ²Cleveland Clinic, Cleveland, Ohio  
(Presented by: Farzeen Firoozi)

**Video #2**  
SUTURELESS SACROCOLOPOPEXY  
Serge Marinkovic, MD  
Decatur, IL  
(Presented by: Serge Marinkovic)

**Video #3**  
UTERINE PRESERVATION: BILATERAL SACROSPINOUS SUSPENSION USING UPHOLD MESH KIT  
Gamal Ghoniem, MD, FACS¹, Melanie Crites, DO² and Bader Almosaieed, MD²  
¹Cleveland Clinic Florida, Weston, FL; ²Cleveland Clinic Florida  
(Presented by: Gamal Ghoniem)

**Video #4**  
LAPAROSCOPIC RETROPUBLIC URETHROLYSIS  
Hung-Jui Tan, MD, Alon Z. Weizer, MD and Humphrey O. Atiemo, MD  
University of Michigan, Ann Arbor, MI  
(Presented by: Hung-Jui Tan)
THURSDAY, MARCH 3, 2011

General Session located in the Frank Lloyd Wright Ballroom, Salon E unless otherwise noted.

Video #5 TROUBLESHOOTING NEUROMODULATION — THE BASICS
Bradley Gill, BSE, Courtney Lee, MD, William Roth, BS and Sandip Vasavada, MD
Cleveland Clinic, Cleveland, OH
(Presented by: Bradley Gill)

Video #6 ROBOTIC-ASSISTED LAPAROSCOPIC VESICOVAGINAL FISTULA REPAIR: THE EXTRAVESICLE TECHNIQUE
Alexandra Rogers, MD¹, David Thiel, MD², Steven Petrou, MD² and Theodore Brisson, MD³
¹Jacksonville, FL; ²Mayo Clinic Florida; ³Trident Health Systems, Charleston, SC
(Presented by: Alexandra Rogers)

Video #7 ROBOTIC HYSTERECTOMY WITH SACROCOLUMPEXY
Ryan Pickens, MD¹ and Wesley White, MD²
¹UTMCK; ²UTMCK, Knoxville, TN
(Presented by: Ryan Pickens)

Video #8 ROBOT-ASSISTED LAPAROSCOPIC BLADDER DIVERTICULECTOMY
Courtney Lee, MD, Michael White, MD, Rackley Raymond, MD and Jihad Kauok, MD
Glickman Urological and Kidney Institute, Cleveland Clinic Fdn., Cleveland, OH
(Presented by: Courtney Lee)

Video #9 AIUST, THE SINGLE INCISION TRANSOBTURATOR SLING FOR WOMEN WITH STRESS URINARY INCONTINENCE
Vincent Lucente, MD, MBA
Institute for Female Pelvic Medicine, Allentown, PA
(Presented by: Vincent Lucente)

Video #10 URETHROPLASTY WITH VESTIBULAR FLAP
Christopher Yang, MD¹, Don Arnold, II, MD¹, Bruno Frea, MD² and Ervin Kocjancic, MD¹
¹University of Illinois at Chicago, Chicago, IL; ²University of Udine, Udine, Italy
(Presented by: Christopher Yang)

Video #11 TRANSVAGINAL COLPOCLEISIS IN THE TREATMENT OF VAGINAL VAULT PROLAPSE IN THE ELDERLY FEMALE: SURGICAL TECHNIQUE
Denise Chow, MD¹, Michelle Koski, MD¹, Joanna Togami, MD¹, Ralph Chesson, MD³, Ahmet Bedestani, MD³, and Jack Winters, MD¹
¹Louisiana State University/Ochsner Clinic Foundation, Departments of Urology, New Orleans, LA; ²Louisiana State University/Ochsner Clinic Foundation, New Orleans, LA; ³Louisiana State University, Department of Obstetrics and Gynecology, New Orleans, LA
(Presented by: Denise Chow)
Video #12  MODIFIED LATZKO PROCEDURE (PARTIAL COLPOCLEISIS) FOR VESICOVAGINAL FISTULA REPAIR: TECHNIQUE AND OUTCOMES
Denise Chow, MD¹, Ahmet Bedestani, MD², Ralph Chesson, MD² and Jack Winters, MD¹
¹Louisiana State University/Ochsner Clinic Foundation, Departments of Urology, New Orleans, LA; ²Louisiana State University, Department of Obstetrics and Gynecology, New Orleans, LA
(Presented by: Denise Chow)

Video #13  ROBOTIC-ASSISTED ABDOMINAL SACRAL COLPOPEXY AND RECTOPEXY FOR THE TREATMENT OF COMPLEX VAGINAL VAULT AND RECTAL PROLAPSE
Michelle Koski, MD, Denise Chow, MD, Richard Vanlangendonck, MD and J. Christian Winters, MD
Louisiana State University/Ochsner Clinic Foundation Departments of Urology, New Orleans, LA
(Presented by: Michelle Koski)

Video #14  ROBOTIC-ASSISTED LAPAROSCOPIC AUGMENTATION CYSTOPLASTY
Jason Kim, MD, Stephen Lukasewycz, MD, Alvaro Lucioni, MD, Paul Kozlowski, MD and Kathleen Kobashi, MD
Virginia Mason Medical Center, Seattle, WA
(Presented by: Jason Kim)

Video #15  ELEVATE ANTERIOR REPAIR
Alienor Gilchrist, MD and Eric Rovner, MD
Medical University of South Carolina, Department of Urology
(Presented by: Alienor Gilchrist)

Video #16  ROBOTIC-ASSISTED VESICOVAGINAL FISTULA REPAIR
Aqsa Khan, MD¹, Claudia Sevilla² and Jennifer Anger, MD, MPH¹
¹Department of Urology, University of California - Los Angeles, Los Angeles, CA; ²David Geffen School of Medicine, University of California Los Angeles, Los Angeles, CA
(Presented by: Aqsa Khan)

Video #17  THE ELEVATE SYSTEM FOR REPAIR OF FEMALE PELVIC PROLAPSE
Larry T. Sirls, MD and Dmitriy Nikolavsky, MD
William Beaumont Hospital, Royal Oak, MI
(Presented by: Larry T. Sirls)
**GENERAL SESSION**

**7:55 a.m. – 8:00 a.m.**  
**Introduction**  
J. Christian Winters, MD

**SUFU – IC Painful Bladder Syndrome**  
Moderator: Raymond R. Rackley, MD

**8:00 a.m. – 8:20 a.m.**  
**Neurobiology of Urogenital Pain**  
Timothy J. Ness, MD, PhD

**8:20 a.m. – 9:35 a.m.**  
**IC Painful Bladder Syndrome**

**Overview of Diagnosis and Treatment of IC/PBS**  
Deborah R. Erickson, MD

**Clinical Trials and Outcomes in IC/PBS**  
Christopher K. Payne, MD

**APF as a Biomarker of IC/PBS**  
Susan Keay, MD, PhD

**Translating Clinical and Basic Science Findings into Patient Management**  
Raymond R. Rackley, MD

**9:35 a.m. – 10:00 a.m.**  
Questions and Answers

**10:00 a.m. – 10:30 a.m.**  
Break – Visit the Exhibits

**10:30 a.m. – 11:30 a.m.**  
**Debate: What Will Be the Standard Sling in 2015**  
Moderator: E. Ann Gormley, MD

**Retropubic MUS**  
Howard B. Goldman, MD

**TOT**  
Kathleen C. Kobashi, MD

**Mini Slings**  
Michael J. Kennelly, MD

**Other Synthetic Slings**  
Larissa V. Rodriguez, MD
THURSDAY, MARCH 3, 2011
General Session located in the Frank Lloyd Wright Ballroom, Salon E unless otherwise noted.

11:45 a.m. – 12:45 p.m. Industry Sponsored Lunch Symposium
Location: Frank Lloyd Wright Ballroom, Salons A&B

“Meeting the Challenges of OAB Therapy with Clinical and Practical Approaches”
Speaker: David Staskin, MD
Funding Provided By: Pfizer, Inc.

11:45 a.m. – 12:45 p.m. Industry Sponsored Lunch Symposium
Location: Frank Lloyd Wright Ballroom, Salons C&D

“Patient Selection and Expectation Management for Male and Female Urinary Incontinence”
Moderator: Craig V. Comiter, MD, Palo Alto, CA
Female Continence: Manish P. Patel, MD, Gastonia, NC
Male Continence: Gregory Bales, MD, Chicago, IL
Funding Provided By: Coloplast

1:00 p.m. – 2:20 p.m. IC & Pelvic Pain / Geriatrics / BPH Podium Session
Moderators: Melissa R. Kaufman, MD, PhD
Christian O. Twiss, MD

Podium #1
A PENNY FOR YOUR THOUGHTS: A NATIONAL SURVEY OF UROLOGISTS’ VIEWS, ATTITUDES AND PRACTICE PATTERNS IN THE MANAGEMENT OF INTERSTITIAL CYSTITIS/PAINFUL BLADDER SYNDROME
Helen R. Levey, DO, MPH, Leah Nash and Robert Moldwin, MD
The Arthur Smith Institute for Urology North Shore-Long Island Jewish Health System, New Hyde Park, NY
(Presented by: Helen R Levey)

Podium #2
TEMPORAL ASSOCIATION BETWEEN INTERSTITIAL CYSTITIS/BLADDER PAIN SYNDROME (IC/BPS) AND NON-BLADDER CONDITIONS
J. Quentin Clemens, MD, Marc Elliott, PhD, Marika Suttorp, MS, Sandra Berry, MA
RAND Corporation, Santa Monica, CA
(Presented by J. Quentin Clemens)

Podium #3
A QUALITATIVE ANALYSIS OF SYMPTOM CLUSTERING AMONG WOMEN DIAGNOSED WITH INTERSTITIAL CYSTITIS/BLADDER PAIN SYNDROME, ENDOMETRIOSIS, VULVODYNIA, AND OVERACTIVE BLADDER
Sarah Outcault, MSc¹, J. Quentin Clemens, MD, FACS, MSCI², Gery Ryan, PhD¹ and Sandra Berry, MA¹
¹RAND Corporation, Santa Monica, CA; ²University of Michigan Medical Center, Ann Arbor, MI
(Presented by: Sarah Outcault)
DOES THE PELVIC FLOOR DISTRESS INVENTORY QUESTIONNAIRE (PFDI-20) ADEQUATELY REFLECT THE VISUAL ANALOGUE SCALE FOR PELVIC PAIN IN WOMEN?
Jason Gilleran, MD¹, Donna Carrico, NP² and Kenneth Peters, MD²
¹MI; ²Royal Oak, MI
(Presented by: Jason Gilleran)

INCREASING POPULATION USE OF MEDICATION CHANGES INDICATIONS AND FREQUENCY OF SURGERY FOR BPH. THE ICELANDIC EXPERIENCE
Johann Ingimarsson, MD¹, Helgi Isaksson, MD², Hermann Sigbjarnarson, MD¹ and Gudmundur Geirsson, MD, PhD²
¹Dartmouth-Hitchcock, Lebanon, NH; ²Landspitali-University Hospital, Reykjavik, Iceland
(Presented by: Johann Ingimarsson)

*Not CME Accredited

DOES THE EXTENT OF EVALUATION OF LOWER URINARY TRACT SYMPTOMS (LUTS) IMPACT THE SUCCESS OF BLADDER OUTLET REDUCTION SURGERY (BORS)?
Matthew McIntyre, MD, Scharan Clarke, Samuel Nickles, MD, Amy Wahlquist, MS and Stephen Savage, MD
MUSC, Charleston, SC
(Presented by: Matthew McIntyre)

MECHANISM OF BIOFEEDBACK THERAPY FOR URGENCY INCONTINENCE IN OLDER WOMEN
Werner Schaefer, DI¹, Derek Griffiths, PhD², Stasa Tadic, MD¹, Subashan Perera, PhD¹ and Neil Resnick, MD¹
¹Division of Geriatric Medicine, University of Pittsburgh, Pittsburgh, PA; ²University of Pittsburgh
(Presented by: Werner Schaefer)

DEFINING OAB: DISAGREEMENT AMONG THE EXPERTS
Una Lee, MD¹, Victoria Scott¹, R. Rashid¹, A. Behniwal¹, Sally Maliski¹ and Jennifer Anger, MD, MPH²
¹Los Angeles, CA; ²Cedars-Sinai, UCLA, Los Angeles, CA
(Presented by: Una Lee)
THURSDAY, MARCH 3, 2011

General Session located in the Frank Lloyd Wright Ballroom, Salon E unless otherwise noted.

2:20 p.m. – 2:50 p.m.  Blaivas Lectureship: Long-Term Renal Function in Spinal Cord Injury
L. Keith Lloyd, Jr., MD

2:50 p.m. - 3:20 p.m.  Break – Visit the Exhibits

3:20 p.m. – 3:30 p.m.  SUFU Post Prostatectomy Incontinence Study
Victor W. Nitti, MD

3:30 pm. – 4:35 p.m.  Panel Discussion: Male Stress Urinary Incontinence
Moderator: Brian J. Flynn, MD
- What We Know and What We Don’t Know About Male SUI
  William Jaffe, MD
- Factors Predictive of Post Prostatectomy Incontinence
  Jaspreet Sandhu, MD
- Current State-of-the-Art for Male Anti-Incontinence Procedures
  Kurt A. McCammon, MD
- Patient Selection Criteria for Anti-Incontinence Procedures
  Arthur P. Mourtzinos, MD

4:35 p.m. – 5:35 p.m.  BREAKOUT SESSIONS

1. Basic Urodynamics
   Location: Frank Lloyd Wright Ballroom, Salons I&J
   Stephen R. Kraus, MD (Director)
   Alexander Gomelsky, MD
   Joanna M. Togami, MD

2. Practical Workshop: Approaches to Managing Pelvic Pain
   Location: Frank Lloyd Wright Ballroom, Salons A&B
   How to Trigger Point Injections
   Karen Noblett, MD (Director)
   Physical Therapy
   Julie Sarton, PT
   Acupuncture
   Pam Jacobson, LAc, Dipl OM

3. Uterine Sparing: Indications and Techniques
   Location: Frank Lloyd Wright Ballroom, Salon E
   Suzette E. Sutherland, MD (Director)
   Nirit Rosenblum, MD
   Sandip P. Vasavada, MD
THURSDAY, MARCH 3, 2011
General Session located in the Frank Lloyd Wright Ballroom, Salon E unless otherwise noted.

CONCURRENT PODIUM/POSTER SESSIONS
5:35 p.m. – 7:05 p.m.
Male Incontinence / Urodynamics Podium Session
Location: Frank Lloyd Wright Ballroom, Salon E
Moderators: Humphrey Atiemo, MD
Matthew P. Rutman, MD

Podium #9
THE VIRTUE SLING FOR POST-PROSTATECTOMY INCONTINENCE – SAFETY, EFFICACY, AND URODYNAMIC CHANGES AT 6 MONTHS FOLLOW-UP
Craig Comiter, MD¹, Eugene Rhee, MD² and Victor Nitti, MD³
¹Stanford University, Stanford, CA; ²Kaiser Permanente, San Diego, CA; ³NYU, New York, NY
(Presented by: Craig Comiter)

Podium #10*
THE EFFECT OF EXTERNAL BEAM RADIATION ON URODYNAMIC PARAMETERS AND PATIENT SATISFACTION IN MEN WITH POST-PROSTATECTOMY INCONTINENCE
Eva Fong, MD, Benjamin Brucker, Abdullah Demirtas, MD, Daniela Kaefer, BA, Nirit Rosenblum, MD and Victor Nitti, MD
NYU Medical Center
(Presented by: Benjamin Brucker)
*Not CME Accredited

Podium #11
WITHDRAWN

Podium #12
WITHDRAWN

Podium #13
DURABILITY OF SUBJECTIVE OUTCOMES OF THE ADVANCE SLING: INITIAL INSIGHTS
Bradley Gill, BSE, Hanhan Li, BS, Amy Nowacki, PhD, Hadley Wood, MD and Sandip Vasavada, MD
Cleveland Clinic, Cleveland, OH
(Presented by: Bradley Gill)

Podium #14
URODYNAMIC CHANGES 12 MONTHS AFTER RETROPUBIC AND TRANSOBTURATOR MIDURETHRAL SLINGS
Stephen Kraus, MD¹, Gary Lemack, MD², Toby Chai, MD³, Wendy Leng, MD⁴, Michael Albo, MD⁵, Elizabeth Mueller, MD⁶, Lary Sirls, MD⁷, Tracy Wilson, MD⁸, Liyuan Huang⁹ and Heather Litman, PhD⁹
¹University of Texas Health Science Center, San Antonio, TX; ²University of Texas Southwestern, Dallas, TX; ³University of Maryland, Baltimore, MD; ⁴University of Pittsburgh, Pittsburgh, PA; ⁵University of California San Diego Medical Center, San Diego, CA; ⁶Loyola Medical Center, Maywood, IL; ⁷William Beaumont Hospital, Royal Oak, MI; ⁸University of Alabama, Birmingham, AL; ⁹New England Research Institutes, Watertown, MA
(Presented by: Stephen Kraus)
Podium #15  URODYNAMIC DIFFERENCES BETWEEN DYSFUNCTIONAL VOIDING AND PRIMARY BLADDER NECK OBSTRUCTION IN WOMEN
Benjamin Brucker, MD, Eva Fong, MD, Christopher Kelly, MD, Sagar Shah, MD, Nirit Rosenblum, MD and Victor Nitti, MD
Department of Urology New York University Langone Medical Center, New York, NY
(Presented by: Benjamin Brucker)

Podium #16*  DETRUSOR AFTER-CONTRACTION IS ASSOCIATED WITH BLADDER OUTLET OBSTRUCTION
Seung-June Oh¹, Sung-Yong Cho, MD¹, Min Su Jeong, MD¹, Jun-Seok Yi, MD¹, Ji Hyun Park, MD¹, Kyu-Sung Lee, MD², Myung Soo Choo, MD³ and Duk Yoon Kim, MD⁴
¹Seoul National University Hospital, Seoul, Korea; ²Sungkyunkwan University Samsung Medical Center, Seoul, Korea; ³Asan Medical Center, Seoul, Korea; ⁴Daegu Catholic University Medical Center, Daegu, Korea
(Presented by: Seung-June Oh)
*Not CME Accredited

Podium #17*  IS ABDOMINAL STRAINING SEEN ON URODYNAMICS A NORMAL VARIANT OF FEMALE VOIDING OR AN ARTIFACT?
Christopher Gomez, MD¹, Daniel Caruso, MD, MBA², Prashanth Kanagarajah, MD³ and Angelo Gousse, MD³
¹Bladder Health and Reconstructive Urology Institute, Memorial Hospital Miramar, Miramar, FL; ²Daniel Caruso, PA; ³Bladder Health and Reconstructive Urology Institute, Miramar, FL
(Presented by: Christopher Gomez)
*Not CME Accredited

5:35 p.m. – 7:05 p.m.  Female Urology / Incontinence Moderated/Non-Moderated Poster Session
Location: Frank Lloyd Wright Ballroom, Salons G&H
Moderators:  Phillip Smith, MD
Tracey Wilson, MD

MODERATED
Poster #M1  EARLY EXPERIENCE OF TRANSVAGINAL/OBTURATOR ADJUSTABLE (TVA/TOA) TAPE IN FEMALE STRESS/MIXED URINARY INCONTINENCE
Seong Jin Jeong¹, Daesung Kim¹ and Seung June Oh²
¹Seoul National University Bundang Hospital, Seongnam, Korea; ²Seoul National University Hospital, Seoul, Korea
(Presented by: Seong Jin Jeong)
Poster #M2  HOW DOES THE UROGENITAL DISTRESS INVENTORY 6 SCORE CHANGE AFTER MID-URETHRAL SLING SURGERY?
Jason Kim, MD, Gjanje Smith, MD, Alvaro Lucioni, MD, Fred Govier, MD and Kathleen Kobashi, MD
Virginia Mason Medical Center, Seattle, WA
(Presented by: Jason Kim)

Poster #M3  COMPARISON OF SHORT AND LONG TERM OUTCOMES IN A PATIENT POPULATION UNDERGOING RETROPUBIC MID-URETHRAL SLING PLACEMENT
Jason Kim, MD, Gjanje Smith, MD, Alvaro Lucioni, MD, Fred Govier, MD and Kathleen Kobashi, MD
Virginia Mason Medical Center, Seattle, WA
(Presented by: Jason Kim)

Poster #M4  CARDIOVASCULAR RISK FACTORS AND DISEASE IN WOMEN WITH OVERACTIVE BLADDER “WET” VS “DRY”
W. Stuart Reynolds, MD, Ekene Enemchukwu, MD, Laura Chang Kit, MD, Roger Dmochowski, MD and Melissa Kaufman, MD, PhD
Vanderbilt University Medical Center, Nashville, TN
(Presented by: W. Stuart Reynolds)

Poster #M5  IS THE STANDING STRESS TEST EQUIVALENT TO THE 24 HOUR PAD TEST IN THE ASSESSMENT OF STRESS INCONTINENCE?
Danielle Markle, MD and Karen Noblett, MD
University of California, Irvine
(Presented by: Danielle Markle)

Poster #M6  LOWER URINARY TRACT SYMPTOMS AND PELVIC PAIN IN YOUNG NULLIPAROUS WOMEN AND THE EFFECTS OF PEDIATRIC VOIDING DYSFUNCTION
W. Stuart Reynolds, MD, Laura Chang Kit, MD¹, Roger Dmochowski, MD¹ and Harriette Scarpero, MD²
¹Vanderbilt University Medical Center, Nashville, TN; ²Nashville, TN
(Presented by: W. Stuart Reynolds)

Poster #M7  STRESS URINARY INCONTINENCE AFTER ROBOTIC SACROCOLPOPEXY WITH AND WITHOUT CONCOMITANT MIDURETHRAL SLING
Andrea Crane, MD¹, Elizabeth Geller, MD¹, Ashley Woodward, MD² and Catherine Matthews, MD¹
¹The University of North Carolina at Chapel Hill, Chapel Hill, NC; ²Virginia Commonwealth University, Richmond, VA
(Presented by: Andrea Crane)
Poster #M8  COST-EFFECTIVENESS OF PERCUTANEOUS TIBIAL NERVE STIMULATION VERSUS EXTENDED-RELEASE TOLTERODINE FOR OVERACTIVE BLADDER
Heidi Chen, MD, Richard Bercik, MD and Stephen Thung, MD, MSCI
Yale University School of Medicine, New Haven, CT
(Presented by: Heidi Chen)

Poster #M9  PERCUTANEOUS TIBIAL NERVE STIMULATION: EFFECT ON FECAL INCONTINENCE FROM TWO RECENT OVERACTIVE BLADDER TRIALS
Sneha Vaish, MD¹, Steve Siegel, MD², Kenneth Peters, MD³, Donna Carrico, NP³, Leslie Wooldridge, GNP³ and Scott MacDiarmid, MD⁵
¹Metro Urology; ²Metro Urology, Woodbury, MN; ³William Beaumont, Royal Oak, MI; ⁴Mercy Health Partners; ⁵Alliance Urology, Greensboro, NC
(Presented by: Sneha Vaish)

Poster #M10*  EFFICACY OF NEUROSTIMULATION USING A NOVEL TRANSDERMAL AMPLITUDE MODULATED SIGNAL (TAMS) IN A PRE-CLINICAL DETRUSOR OVERACTIVITY (DO) RAT MODEL
Ash Monga¹, Michael Hoffman, BS², Anthony DiUbaldi, MS³ and Steve Wahlgren, MS³
¹Southampton University Hospital; ²Ethicon, Inc., Somerville, NJ; ³Ethicon Endo-Surgery, Somerville, NJ
(Presented by: Ash Monga)

*Not CME Accredited

NON-MODERATED

Poster #NM1  DORSAL BUCCAL MUCOSAL GRAFT URETHROPLASTY FOR TREATMENT OF FEMALE URETHRAL STRICTURES
Rajveer Purohit MD¹,²,³, Jerry Blaivas MD¹,²,³, Johnson Tsui BS¹,³, Janice Santos MD³,⁴ and Jeffrey Weiss MD¹,³
¹SUNY Downstate College of Medicine, Brooklyn, NY; ²Weill Cornell Medical College, New York, NY; ³Institute for Bladder and Prostate Research, New York, NY; ⁴Columbia University Medical Center, New York, NY
(Presented by: Rajveer Purohit)

Poster #NM2  SOCIAL NETWORKS LACK USEFUL CONTENT FOR INCONTINENCE
Kamran Sajadi, MD and Howard Goldman, MD
Cleveland, OH
(Presented by: Kamran Sajadi)

Poster #NM3  CAN VIDEOURODYNAMICS PREDICT SLING LOCATION IN PATIENTS WITH SUI FOLLOWING MIDURETHRAL SLING?
Alienor Gilchrist, MD, Colin Goudelocke, MD and Rovner Eric, MD
Department of Urology, Medical University of South Carolina, Charleston, SC
(Presented by: Alienor Gilchrist)
THURSDAY, MARCH 3, 2011

General Session located in the Frank Lloyd Wright Ballroom, Salon E unless otherwise noted.

Poster #NM4  PREDICTORS OF SUCCESSFUL VOIDING PRIOR TO HOSPITAL DISCHARGE AFTER STRESS URINARY INCONTINENCE SURGERY
Barbara Robinson, MD¹, Gena Dunivan, MD², Brent Parnell, MD², Allison Serra, BA² and AnnaMarie Connolly, MD²
¹University of North Carolina; ²University of North Carolina, Chapel Hill, NC
(Presented by: Barbara Robinson)

Poster #NM5  COMPLEX REPETITIVE DISCHARGES ARE COMMON IN NORMAL WOMEN
Olga Ramm, MD¹, Elizabeth Mueller, MD, MSME¹, Linda Brubaker, MD, MS¹, Lior Lowenstein, MD² and Kimberly Kenton, MD, MS¹
¹Loyola, Maywood, IL; ²Rambam, Haifa, Israel
(Presented by: Olga Ramm)

Poster #NM6  TEN-YEAR OUTCOMES OF THE TENSION-FREE VAGINAL TAPE PROCEDURE FOR TREATMENT OF FEMALE STRESS URINARY INCONTINENCE
Ji-Yeon Han, MD¹, Ha Na Lee, MD², Kyung-Sung Lee, MD, PhD² and Myung-Soo Choo, MD, PhD¹
¹Asan Medical Center; ²Samsung Medical Center
(Presented by: Myung-Soo Choo)

Ha Na Lee, MD, PhD¹, Won Jin Cho, MD², Ji-Yeon Han, MD³, Myung-Soo Choo, MD, PhD³ and Kyu-Sung Lee, MD, PhD³
¹Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Korea; ²Samsung Medical Center, Seoul, Korea; ³Asan Medical Center, University of Ulsan College of Medicine, Seoul, Korea
(Presented by: Ha Na Lee)

Poster #NM8  THE URODYNAMICS OF VOIDING FUNCTION IN FEMALES: GRADING OF BLADDER OUTFLOW CONDITIONS ON A CONTINUOUS SCALE
Werner Schaefer, DI¹, Becky Clarkson, PhD¹, Derek Griffiths, PhD², Stasa Tadic, MD¹ and Neil Resnick, MD¹
¹Division of Geriatric Medicine, University of Pittsburgh, Pittsburgh, PA; ²University of Pittsburgh
(Presented by: Werner Schaefer)

Poster #NM9  WITHDRAWN

Poster #NM10  WITHDRAWN
THURSDAY, MARCH 3, 2011

General Session located in the Frank Lloyd Wright Ballroom, Salon E unless otherwise noted.

Poster #NM11  RELATIONSHIP BETWEEN BODY MASS INDEX AND OVERACTIVE BLADDER IN WOMAN CORRELATED WITH URODYNAMIC EVALUATION
Tariq Al-Shaiji, MBChB, FRCSC, Brenda Caley, RN¹, Blayne Welk, MD, FRCSC², Sender Herschorn, MD, FRCSC² and Sidney Radomski, MD, FRCSC¹
¹Toronto Western Hospital, Toronto, ON, Canada; ²Sunnybrook Health Science Centre, Toronto, ON, Canada
(Presented by: Tariq Al-Shaiji)

Poster #NM12  ACELLULAR CADAVERIC DERMAL ALLOGRAFT PUBOVAGINAL SLINGS: INTERMEDIATE OUTCOMES AFTER 2 YEARS FOLLOW UP
Sara Lenherr, MD, John Bresette, MD, Arthur Mourtzinos, MD and John Stoffel, MD
Lahey Clinic Department of Urology, Burlington, MA
(Presented by: Sara Lenherr)

Poster #NM13  LONG TERM FOLLOW-UP DATA ON THE MINIARC™ SINGLE INCISION SLING SYSTEM FOR THE TREATMENT OF STRESS URINARY INCONTINENCE
Ryan Pickens, MD¹, Adam Stewart, MD², Wesley White, MD², Joe Mobley, MD, MPH² and Frederick Klein, MD
UTMCK, Knoxville, TN
(Presented by: Ryan Pickens)

Poster #NM14  IS "OAB-DRY" REALLY DRY?
Jennifer Anger, MD¹, Lisa Rogo-Gupta, MD², A. Behniwal², R. Rashid², A. Nissim², T. Le², Ariana Smith, MD², Mark Litwin, MD², Sally Malitski² and Larissa Rodriguez, MD²
¹UCLA, Los Angeles, CA; Cedars-Sinai Medical Center Los Angeles, CA; ²UCLA Los Angeles, CA
(Presented by: Lisa Rogo-Gupta)

Poster #NM15  PRE-OPERATIVE EVALUATION OF PATIENTS WITH SYMPTOMS OF OBSTRUCTION UNDERGOING SLING EXCISION – RETROPUBIC MESH SLINGS ARE MORE OBSTRUCTIVE THAN TRANSOBTURATOR SLINGS
Benjamin Dillon, MD, Sunshine Murray, MD, Rashel Haverkorn, MD, Philippe Zimmern, MD and Gary Lemack, MD
UT Southwestern Medical Center, Dallas, TX
(Presented by: Benjamin Dillon)

Poster #NM16  DOES PAD USAGE REFLECT THE SEVERITY OF URINARY INCONTINENCE?
Mazyar Ghanaat, BS¹², Johnson Tsui, BS¹², Jerry Blaivas, MD¹²³, Milan Shah, BA¹², Jeffrey Weiss, MD¹², Rajveer Purohit, MD¹²³ and Matthew Rutman, MD⁴⁵
¹SUNY Downstate College of Medicine, Brooklyn, NY; ²Institute for Bladder and Prostate Research, New York, NY; ³Weill Cornell Medical College, New York, NY; ⁴Columbia University Medical Center, New York, NY; ⁵Institute for Bladder and Prostate Research, New York, NY
(Presented by: Mazyar Ghanaat)
THURSDAY, MARCH 3, 2011

General Session located in the Frank Lloyd Wright Ballroom, Salon E unless otherwise noted.

Poster #NM17  ARE THE NEWER SINGLE INCISION SLINGS ARE AS EFFECTIVE AS THE RETROPUBIC MIDURETHRAL SLINGS FOR FEMALE STRESS URINARY INCONTINENCE?
Amit Chakrabarty, MD
Urologic Clinics of North Alabama, Huntsville, AL
(Presented by: Amit Chakrabarty)

Poster #NM18  CARDIOVASCULAR RISK FACTORS AND DISEASE IN WOMEN WITH OVERACTIVE BLADDER VS STRESS INCONTINENCE CONTROLS
W. Stuart Reynolds, MD, Michelle Koski, MD, Ekene Enemchukwu, MD, MPH, Melissa Kaufman, MD, PhD and Roger Dmochowski, MD
Vanderbilt University Medical Center, Nashville, TN
(Presented by: W. Stuart Reynolds)

Poster #NM19  DEPRESSION IN WOMEN WITH DETRUSOR OVERACTIVITY AND URODYNAMIC STRESS INCONTINENCE
Cynelle Murray, MD¹, Shazia Malik, MD², Vanessa Sun, MD², Christina Dancz, MD² and Begum Ozel, MD²
¹LAC-USC Medical Center, Los Angeles, CA; ²Keck School of Medicine, University of Southern California, Los Angeles, CA
(Presented by: Cynelle Murray)

Poster #NM20  FLUID INTAKE AND RISK OF STRESS, URGENCY, AND MIXED URINARY INCONTINENCE
Ying Jura, MD¹, Mary Townsend, ScD², Gary Curhan, MD³, Neil Resnick, MD⁴ and Francine Grodstein, ScD³
¹Massachusetts General Hospital, Boston, MA; ²Harvard School of Public Health, Boston, MA; ³Brigham and Women’s Hospital, Boston, MA; ⁴School of Medicine, University of Pittsburgh, Pittsburgh, PA
(Presented by: Ying Jura)

Poster #NM21  A LONGITUDENAL EVALUATION OF SUBJECTIVE POSTOPERATIVE SYMPTOMS AND DISSATISFACTION IN WOMEN CURED OF STRESS INCONTINENCE AFTER SLING SURGERY
Alex Gomelsky, MD and B. Jill Williams, PhD
LSUHSC-Shreveport
(Presented by: Alex Gomelsky)
THURSDAY, MARCH 3, 2011

General Session located in the Frank Lloyd Wright Ballroom, Salon E unless otherwise noted.

Poster #NM22 DISPARATE TERMINOLOGY USED BETWEEN HEALTHCARE WORKERS AND SPANISH-SPEAKING LATINAS WITH PELVIC FLOOR DISORDERS: LOST IN TRANSLATION?
Claudia Sevilla¹, Aqsa Khan MD¹, Rezoana Rashid¹, Cecilia Wieslander MD², Sally Maliski RN, MPH³, Rebecca Rogers MD⁴ and Jennifer Anger MD, MPH⁵
¹UCLA Dept of Urology, Los Angeles, CA; ²UCLA Dept of OB/GYN, Los Angeles, CA; ³UCLA School of Nursing, Los Angeles, California; ⁴University of New Mexico, Alburquerque, NM; ⁵Cedars-Sinai Medical Center and UCLA Dept of Urology, Los Angeles, CA
(Presented by: Claudia Sevilla)

Poster #NM23 LOWER URINARY TRACT SYMPTOM PROGRESSION IN WOMEN WITH MULTIPLE SCLEROSIS IS NOT INEVITABLE REGARDLESS OF SEVERITY OF NEUROLOGICAL DISEASE
Benjamin Dillon MD¹, Rashel Haverkorn MD², Sunshine Murray MD², Elliot Frohman MD², Philippe Zimmern MD² and Gary Lemack MD²
¹UT Southwestern Medical Center; ²UT Southwestern Medical Center, Dallas, TX
(Presented by: Benjamin Dillon)

Poster #NM24 WITHDRAWN

Poster #NM25 PATIENT SATISFACTION AFTER INTRAVESICAL BOTULINUM TOXIN TYPE A INJECTION FOR REFRACTORY DETRUSOR OVERACTIVITY
Hala Imam, MD, PhD
Gastroenterology Unit, Internal Medicine Department, Assiut University Hospital, Assiut, Egypt
(Presented by: Hala Imam)

Poster #NM26 MINIARC SINGLE-INCISION SLING FOR STRESS URINARY INCONTINENCE
Sneha Vaish, MD¹, Jannah Thompson, MD² and Suzette Sutherland, MD³
¹Metro Urology; ²Grand Rapids, MI; ³Plymouth, MN
(Presented by: Sneha Vaish)

Poster #NM27 PATIENT-REPORTED SURGERY OUTCOMES FOR STRESS URINARY INCONTINENCE DIFFER DEPENDENT ON QUESTIONNAIRE
Jason Kim, MD, Alvaro Lucioni, MD, Gjanje Smith, MD, Fred Govier, MD and Kathleen Kobashi, MD
Virginia Mason Medical Center, Seattle, WA
(Presented by: Jason Kim)
FRIDAY, MARCH 4, 2011

General Session located in the Frank Lloyd Wright Ballroom, Salon E unless otherwise noted.

7:00 a.m. – 4:00 p.m.  Exhibit Hall Open
Location: Frank Lloyd Wright Ballroom, Salon F

7:00 a.m. – 5:00 p.m.  Video Viewing in Speaker Ready Room
Location: Four Peaks

7:00 a.m. – 6:00 p.m.  Registration/Information Desk Hours
Location: Frank Lloyd Wright Foyer

7:00 a.m. – 8:00 a.m.  Continental Breakfast in Exhibit Hall
Location: Frank Lloyd Wright Ballroom, Salon F

GENERAL SESSION
8:00 a.m. – 8:30 a.m.  Annual Business Meeting

CONCURRENT PODIUM/POSTER SESSIONS
8:30 a.m. – 10:00 p.m. Female Urology / Incontinence Podium Session
Moderators: Courtenay K. Moore, MD
Leslie M. Rickey, MD, MPH

Podium #18*  BOTULINUM TOXIN-A FOR REFRACTORY DETRUSOR OVERACTIVITY IN WOMEN: A 240 PATIENT RANDOMISED PLACEBO CONTROLLED TRIAL
Douglas Tincello, BSc, MBChB, MD, FRCOG¹, Mark Slack, MBBS, FRCOG², Sara Kenyon, PhD³, Christopher Mayne, MBBS, FRCOG⁴, Philip Toozs-Hobson, MBBS, FRCOG⁵, Keith Abrams, PhD¹ and David Taylor, MBBS, FRCOG¹
¹University of Leicester; ²Addenbrooke's Hospital, Cambridge; ³University of Birmingham; ⁴University Hospitals of Leicester NHS Trust; ⁵Birmingham Women's Hospital
(Presented by: Douglas Tincello)

Podium #19  CAFFEINE INTAKE AND RISK OF STRESS, URGENCY, AND MIXED URINARY INCONTINENCE
Ying Jura, MD¹, Mary Townsend, ScD², Gary Curhan, MD³, Neil Resnick, MD⁴ and Francine Grodstein, ScD³
¹Massachusetts General Hospital, Boston, MA; ²Harvard School of Public Health, Boston, MA; ³Brigham and Women's Hospital, Boston, MA; ⁴School of Medicine, University of Pittsburg, Pittsburg, PA
(Presented by: Ying Jura)

*Not CME Accredited
Podium #20  EVALUATING THE QUALITY OF URINARY INCONTINENCE AND PROLAPSE TREATMENT (EQUIPT) STUDY: QUALITY INDICATOR DEVELOPMENT FOR URINARY INCONTINENCE
Aqsa Khan, MD¹, Krista Kiyosaki², Victoria Scott³, Claudia Sevilla⁴, Sarah Connor, MPH¹, Carol Roth, RN, MPH⁴, Mark Litwin, MD, MPH¹, Larissa Rodriguez, MD¹, Neil Wengen, MD⁵, Paul Shekelle, MD, PhD⁴ and Jennifer Anger, MD, MPH⁶
¹Department of Urology, University of California, Los Angeles, CA; ²University of Hawaii Medical School, Honolulu, HI; ³David Geffen School of Medicine, University of California, Los Angeles, CA; ⁴Southern California Evidence-Based Practice Center RAND Corporation, Los Angeles, CA; ⁵Department of Medicine, University of California, Los Angeles, CA; ⁶Department of Urology, Cedars-Sinai Medical Center, University of California, Los Angeles, CA
(Presented by: Aqsa Khan)

Podium #21  DETRUSOR LEAK POINT PRESSURE (DLPP) IN NON-NEUROGENIC WOMEN WITH URGE INCONTINENCE
Ariana Smith, MD, Mary Wang, NP, William Jaffe, MD and Alan Wein, MD, PhD (hon)
University of Pennsylvania, Philadelphia, PA
(Presented by: Ariana Smith)

Podium #22  MANAGEMENT OF URETHRAL STRICTURES IN WOMEN
Jerry Blaivas, MD¹²³, Rajveer Purohit, MD²³⁴, Janice Santos, MD³⁵, Jeffrey Weiss, MD³⁴ and Johnson Tsui, BS³⁴
¹SUNY Downstate College of Medicine, New York, NY; ²Weill Cornell Medical College, New York, NY; ³Institute for Bladder and Prostate Research, New York, NY; ⁴SUNY Downstate College of Medicine, Brooklyn, NY; ⁵Columbia University Medical Center, New York, NY
(Presented by: Jerry Blaivas)

Podium #23  WITHDRAWN

Podium #24  A COMPARISON OF A USDA CERTIFIED ORGANIC VAGINAL LUBRICANT VERSUS PLACEBO IN THE ASSESSMENT OF SYMPTOMS RELATED TO VAGINAL ATROPHY
Darlene Gaynor-Krupnick, DO¹, Julie Spencer, RN, DMP² and Carol Shaffer, RN, PhD³
¹Great Falls, VA; ²Leesburg, VA; ³Reston, VA
(Presented by: Darlene Gaynor-Krupnick)

Podium #25  LOWER BODY PLYOMETRIC EXERCISE AND PELVIC FLOOR MUSCULAR ENGAGEMENT
Bruce Crawford, MD
University of Nevada, Reno, NV
(Presented by: Bruce Crawford)
FRIDAY, MARCH 4, 2011
General Session located in the Frank Lloyd Wright Ballroom, Salon E unless otherwise noted.

Podium #26
FUNCTIONAL OUTCOMES AFTER REPAIR OF MESH EROSION INTO THE LOWER URINARY TRACT
Laura Chang Kit, MD and Roger Dmochowski, MD
Vanderbilt University, Nashville, TN
(Presented by: Laura Chang Kit)

8:30 a.m. – 10:00 a.m.
Pelvic Organ Prolapse / Reconstruction Moderated/Non-Moderated Poster Session
Location: Frank Lloyd Wright Ballroom, Salons G&H
Moderators: Elise J.B. De, MD
Adonis K. Hijaz, MD

Poster #M11
IDENTIFYING BARRIERS TO COMMUNICATION AND DISEASE UNDERSTANDING AMONG SPANISH-SPEAKING LATINAS WITH PELVIC FLOOR DISORDERS
Aqsa Khan, MD¹, Claudia Sevilla², Rezoana Rashid², Cecilia Wieslander, MD³, Sally Maliski, RN, PhD⁴, Rebecca Rogers, MD⁵,⁶ and Jennifer Anger, MD, MPH⁷
¹Department of Urology, University of California, Los Angeles, CA; ²David Geffen School of Medicine, University of California, Los Angeles, CA; ³Department of OB-Gyn, University of California, Los Angeles, CA; ⁴UCLA School of Nursing, Los Angeles, CA; ⁵Department of Urogynecology; ⁶University of New Mexico, Albuquerque, NM; ⁷Department of Urology, Cedars-Sinai Medical Center, University of California, Los Angeles, CA
(Presented by: Aqsa Khan)

Poster #M12
EVALUATING THE QUALITY OF URINARY INCONTINENCE AND PROLAPSE TREATMENT (EQUIPT) STUDY: QUALITY INDICATOR DEVELOPMENT FOR PELVIC ORGAN PROLAPSE
Aqsa Khan, MD¹, Krista Kiyosaki², Victoria Scott³, Claudia Sevilla³, Sarah Connor, MPH¹, Carol Roth, RN, MPH⁴, Mark Litwin, MD, MPH⁵, Larissa Rodriguez, MD¹, Neil Wenger, MD⁵, Paul Shekelle, MD, PhD⁵ and Jennifer Anger, MD, MPH⁷
¹Department of Urology, University of California, Los Angeles, CA; ²University of Hawaii Medical School, Honolulu, HI; ³David Geffen School of Medicine, University of California, Los Angeles, CA; ⁴Southern California Evidence-Based Practice Center RAND Corporation, Los Angeles, CA; ⁵Department of Medicine, University of California, Los Angeles, CA; ⁶Department of Urology, Cedars-Sinai Medical Center, University of California, Los Angeles, CA
(Presented by: Aqsa Khan)
FRIDAY, MARCH 4, 2011

General Session located in the Frank Lloyd Wright Ballroom, Salon E unless otherwise noted.

Poster #M13  DEVELOPMENT OF A ROBOTIC SURGICAL TRAINING CURRICULUM FOR GYNECOLOGY AND UROLOGY RESIDENTS: ROBOTIC OBJECTIVE STRUCTURED ASSESSMENT OF TECHNICAL SKILLS (ROSATS)
Megan Tarr, MD¹, Elizabeth Mueller, MD, MSME², Anthony Polcari, MD¹, Sondra Summers, MD¹ and Kimberly Kenton, MD, MS¹
¹Loyola University Medical Center, Maywood, IL; ²Loyola University, Maywood, IL
(Presented by: Megan Tarr)

Poster #M14  A COMPARISON OF MIDURETHRAL SLING OUTCOMES WITH AND WITHOUT CONCOMITANT PROLAPSE REPAIR
Gwen Grimsby, MD, Mark Tyson, MD and Christopher Wolter, MD
Mayo Clinic Arizona
(Presented by: Gwen Grimsby)

Poster #M15  INTERMEDIATE TERM FOLLOW UP AFTER CYSTOCELE REPAIR USING PORCINE DERMIS GRAFT THROUGH TRANSOBTURATOR APPROACH
Ayman Mahdy, MD¹, Willy Davila, MD², Deborah Karp, MD² and Gamal Ghoniem, MD, FACS³
¹University of Arkansas for Medical Sciences; ²Urogynecology, Cleveland Clinic Florida; ³Female Urology, Cleveland Clinic Florida
(Presented by: Ayman Mahdy)

Poster #M16  FEASIBILITY AND SHORT-TERM OUTCOMES FOLLOWING THE USE OF THE UPHOLD VAGINAL SUPPORT SYSTEM FOR TREATMENT OF SYMPTOMATIC VAGINAL PROLAPSE
Joe Mobley, MD, MPH, Melanie Crites, DO and Gamal Ghoniem, MD
Section of Female Urology and Voiding Dysfunction, Cleveland Clinic Florida, Weston, FL
(Presented by: Joe Mobley)

Poster #M17  LONG-TERM FOLLOW-UP OF BOVINE DERMIS AS A BIOLOGIC SUBSTITUTE FOR AUTOLOGOUS TISSUE IN PUBOVAGINAL SLING SURGERY
Joshua Holstead, MD, B. Jill Williams, PhD and Alex Gomelsky, MD
LSUHSC-Shreveport
(Presented by: Joshua Holstead)

Poster #M18  MANAGEMENT OUTCOMES IN THE SEVERELY IMPAIRED PATIENT WITH MORIBUND OBESITY AND IATROGENIC INTRINSIC SPHINCTERIC DEFICIENCY
Kimberly Burgess, MD, Deborah Lightner, MD and Douglas Husmann, MD
Mayo Clinic Department of Urology, Rochester, MN
(Presented by: Kimberly Burgess)
Poster #M19  OBTURATOR FORAMEN DISSECTION FOR EXCISION OF TRANSOBTURATOR MESH  
W. Stuart Reynolds, MD, Laura Chang Kit, MD¹, Gregory T. Bales, MD² and Roger R. Dmochowski, MD¹  
¹Vanderbilt University Medical Center, Nashville, TN; ²University of Chicago Medical Center, Chicago, IL  
(Presented by: W. Stuart Reynolds)

Poster #M20*  OBSTETRIC FISTULA IN NIAMEY, NIGER: A RETROSPECTIVE REVIEW OF 700 PATIENTS  
Tracy Capes, MD¹, Charles Ascher-Walsh, MD¹, Lisa Rogo-Gupta, MD², Yungtai Lo, PhD¹ and Abdoulaye Idrissa, MD³  
¹Mount Sinai NY, NY; ²UCLA Los Angeles, CA; ³National Hospital Niamey, Niger  
(Presented by: Lisa Rogo-Gupta)  
*Not CME Accredited

NON-MODERATED

Poster #NM28  CYSTOCELE REPAIR WITH NON-FROZEN CADAVERIC FASCIA LATA: LONG-TERM RESULTS  
Maggie Vuturo, MD, Alexis Chesrow, MD and Gary Leach, MD  
Tower Urology, Los Angeles, CA  
(Presented by: Maggie Vuturo)

Poster #NM29  INITIAL EXPERIENCE WITH ELEVATE REPAIR SYSTEM FOR PELVIC ORGAN PROLAPSE  
Corey Johnson, MD¹, Ashley King, MD¹, Adam Klausner, MD¹ and David Rapp, MD¹²  
¹Virginia Commonwealth University School of Medicine, Richmond, VA; ²Virginia Urology Center for Incontinence and Pelvic Floor Reconstruction, Richmond, VA  
(Presented by: Corey Johnson)

Poster #NM30  PERIOPERATIVE EXPERIENCE WITH THE ELEVATE PROLAPSE REPAIR SYSTEM  
Dmitriy Nikolavsky, MD, Larry T. Sirls, MD, Kim Killinger, RN, MSN, Judith A. Boura, MS and Kenneth M. Peters, MD  
William Beaumont Hospital, Royal Oak, MI  
(Presented by: Dmitriy Nikolavsky)

Poster #NM31  AN ALTERNATIVE TO MESH: CYSTOCELE REPAIR USING POLYPROPYLENE SUTURES  
Ngoc-Bich Le, MD¹, Zachary C. Baxter, MD², Lisa Rogo-Gupta, MD¹, Una Lee, MD¹, Shelby Morrisroe, MD¹, Ja-Hong Kim, MD¹, Larissa Rodriguez, MD¹ and Shlomo Raz, MD¹  
¹UCLA, Los Angeles, CA; ²North Shore-Long Island Jewish, New Hyde Park, NY  
(Presented by: Ngoc-Bich Le)
FRIDAY, MARCH 4, 2011
General Session located in the Frank Lloyd Wright Ballroom, Salon E unless otherwise noted.

**Poster #NM32**
**SHORT-TERM OUTCOMES OF ROBOTIC-ASSISTED ABDOMINAL SACROCOLOPEXY FOR THE REPAIR FOR PELVIC ORGAN PROLAPSE**
Ryan Pickens, MD¹, Adam Stewart, MD², Joe Mobley, MD, MPH², Robert Elder, MD² and Wesley White, MD²
UTMCK, Knoxville, TN
(Presented by: Ryan Pickens)

**Poster #NM33**
**COLPOCLEISIS FOR ADVANCED PELVIC ORGAN PROLAPSE**
Michelle Koski, MD¹, Denise Chow, MD², Ahmet Bedestani, MD³, Joanna Togami, MD⁴, Ralph Chesson, MD⁵ and J. Christian Winters, MD²
¹Louisiana State University/Ochsner Clinic Foundation Departments of Urology, New Orleans, LA; ²LSU and Ochsner Departments of Urology; ³LSU Department of Gynecology; ⁴Ochsner, Department of Urology
(Presented by: Michelle Koski)

**Poster #NM34**
**SIMPLE CYSTECTOMY: OUTCOMES OF A NEW OPERATIVE TECHNIQUE**
Michael Rowley, MD, J. Quentin Clemens, MD, Jerilyn Latini, MD and Anne P. Cameron, MD
University of Michigan Health System, Ann Arbor, MI
(Presented by: Michael Rowley)

**Poster #NM35**
**MANAGEMENT OF FEMALE URETHRAL DISTRACTION INJURIES: A SYSTEMATIC REVIEW OF THE LITERATURE**
Cynthia Fok, MD¹, Elizabeth Mueller, MD, MS¹ and Jennifer Anger, MD, MPH²
¹Urology & Obstetrics/Gynecology, Loyola, Maywood, IL; ²Urology Cedars-Sinai and UCLA, Los Angeles, CA
(Presented by: Cynthia Fok)

**Poster #NM36**
**LONG-TERM EFFICACY OF REPEAT INCISION OF BLADDER NECK/EXTERNAL SPHINCTER IN PATIENTS WITH SPINAL CORD INJURY SUSTAINED PRIOR TO 1990**
Viet Tran, MD¹, Polina Reyblat, MD², Priyanka Kadam, Medical Student³, Cathia Vazquez, Medical Student³ and David Ginsberg, MD¹
¹USC Institute of Urology, Los Angeles, CA; ²Kaiser Permanente, Los Angeles, CA; ³USC, Los Angeles, CA
(Presented by: Viet Tran)

**Poster #NM37**
**ASSESSMENT OF VITAMIN B12 LEVEL AFTER AUGMENTATION ILEOCYSTOPLASTY IN PATIENTS WITH NEUROGENIC BLADDER DUE TO SPINAL CORD INJURY**
Viet Tran, MD¹, Vannita Simma-Chiang, MD¹, Polina Reyblat, MD² and David Ginsberg, MD¹
¹USC Institute of Urology, Los Angeles, CA; ²Kaiser Permanente, Los Angeles, CA
(Presented by: Viet Tran)
FRIDAY, MARCH 4, 2011
General Session located in the Frank Lloyd Wright Ballroom, Salon E unless otherwise noted.

Poster #NM38 INITIAL EXPERIENCE WITH THE ELEVATE® MESH SYSTEM FOR THE TREATMENT OF PELVIC ORGAN PROLAPSE
Shannon Stout, MD and Kurt McCammon, MD
EVMS, Norfolk, VA
(Presented by: Shannon Stout)

Poster #NM39 INITIAL OUTCOMES OF ELEVATE ANTERIOR® APICAL SYSTEM FOR REPAIR OF ANTERIOR AND APICAL VAGINAL PROLAPSE
Victor Grigoriev, MD¹, David Abramowitz, BS² and Joseph Candela, MD, MPH¹
¹Desert Urology Incontinence Center, Las Vegas, NV; ²Sackler School of Medicine at Tel Aviv University
(Presented by: Victor Grigoriev)

Poster #NM40 COITAL INCONTINENCE: RELATION TO DETRUSOR OVERACTIVITY AND STRESS INCONTINENCE
Hala Imam, MD, PhD
Gastroenterology Unit, Internal Medicine Department, Assiut University Hospital, Assiut, Egypt
(Presented by: Hala Imam)

Poster #NM41 URETHRAL DIVERTICULA IN WOMEN: THE UNIVERSITY OF MICHIGAN EXPERIENCE
Nina Casanova, MD¹, John DeLancey, MD², Edward McGuire, MD² and Anne Pelletier Cameron, MD²
¹University of Michigan; ²University of Michigan, Ann Arbor, MI
(Presented by: Nina Casanova)

10:00 a.m. – 10:30 a.m. Break – Visit the Exhibits

10:30 a.m. – 10:35 a.m. Announcements
J. Christian Winters, MD

10:35 a.m. – 11:00 a.m. Complex Lower GU Trauma and Its Aftermath
Richard A. Santucci, MD

11:00 a.m. – 11:30 a.m. Urethral Injectibles in 2011: An Overview of Current State of Practice
R. Duane Cespedes, MD
FRIDAY, MARCH 4, 2011
General Session located in the Frank Lloyd Wright Ballroom, Salon E unless otherwise noted.

11:45 a.m. – 12:45 p.m.  Industry Sponsored Lunch Symposium
Location: Frank Lloyd Wright Ballroom, Salons A&B

“Bladder Getting on Your Nerves?”
Speakers:  Karen Noblett, MD
           Suzette Sutherland, MD
           Paul Pettit, MD
           Chip Butrick, MD

Funding Provided By: Medtronic
This Medtronic sponsored lunch will include a panel led discussion with audience participation and explore the choice of second line OAB therapy and the role of SNM test stimulation.

1:00 p.m. – 2:30 p.m.  Case Presentations in Voiding Dysfunction and Incontinence
Moderator:  Eric S. Rovner, MD
Panelists:  Jerry G. Blaivas, MD
           Sender Herschorn, MD
           Shlomo Raz, MD
           Alan J. Wein, MD, PhD (Hon)
           Philippe Zimmern, MD

2:30 p.m. – 3:00 p.m.  Break

3:00 p.m. – 3:40 p.m.  ISPiN SESSION I
Bowel Sacral Neuromodulation
Moderator:  Raul C. Ordorica, MD
Panelists:  Klaus Maetzel, MD
           Anders Mellgren, MD

3:40 p.m. – 4:10 p.m.  Neuromodulation Grant Winner Presentations
Moderator:  Steven W. Siegel, MD
Presenters:  Don T. Bui, MD
            Bradley Gill
            Sunshine Murray, MD
ISPIN Podium Session
Moderators: Paul D. Pettit, MD
Magdy M. Hassouna, MD, PhD

Podium #27
NOCTURIA TREATED WITH SACRAL NEUROMODULATION
Charles R. Powell, MD¹, Joseph Zabell, MD², Elizabeth B. Takacs, MD² and Karl J. Kreder, MD²
¹Indiana University School of Medicine; ²University of Iowa, Iowa City, IA
(Presented by: Charles R. Powell)

Podium #28
SUCCESS OF OFFICE-BASED SACRAL NERVE STIMULATION TRIALS IN A LARGE COHORT OF MALE AND FEMALE COMPLEX PATIENTS
Maggie Vuturo, MD and Gary Leach, MD
Tower Urology, Los Angeles, CA
(Presented by: Maggie Vuturo)

Podium #29
A PILOT CLINICAL STUDY TO EVALUATE THE INITIAL FEASIBILITY OF NEUROMODULATION THERAPY IN TREATING PATIENTS WITH OVERACTIVE BLADDER VIA MAGNETIC STIMULATION OF THE POSTERIOR TIBIAL NERVE
Theodore Benderev, MD, Amit Rajguru, MD² and Daniel Burnett, MD
EMKinetics, Inc.
(Presented by: Theodore Benderev)

Podium #30*
SELECTIVE ACTIVATION OF FELINE PUDENDAL NERVE WITH A TRANSDERMAL AMPLITUDE-MODULATED SIGNAL (TAMS) USING SKIN SURFACE ELECTRODES TO INHIBIT BLADDER ACTIVITY
Bing Shen, VMD¹, Jicheng Wang, PhD, Jeyakumar Subbaroyan, PhD², James R. Roppolo, PhD¹, William C. de Groat, PhD¹ and Changfeng Tai, PhD¹
¹University of Pittsburgh, Pittsburgh, PA; ²Ethicon Endo-Surgery, Inc., Johnson and Johnson, Somerville, NJ
(Presented by: Jicheng Wang)
*Not CME Accredited

Podium #31
ONE-YEAR OUTCOME OF STAGED INTERSTIM IMPLANT IN THOSE WITH LESS THAN 4 ACTIVE LEADS BY SENSORY RESPONSE DOES NOT DIFFER IN THOSE WITH 4 ACTIVE LEADS
Jason Gilleran, MD¹, Humberto Martinez-Suarez, MD² and Kenneth Peters, MD³
¹MI; ²Columbus, OH; ³Royal Oak, MI
(Presented by: Jason Gilleran)
5:00 p.m. – 6:00 p.m. **BREAKOUT SESSIONS**

1. **Management of Stress Incontinence and Pelvic Organ Prolapse in Elderly Women: Non-Surgical and Surgical Approaches**  
   *Location: Frank Lloyd Wright Ballroom, Salons A&B*  
   Tomas L. Griebling, MD, MPH (Director)
   
   **Non-Surgical Care**  
   Deborah Erickson, MD

   **Surgical Care**  
   Gregory T. Bales, MD

2. **Advanced Urodynamics**  
   *Location: Frank Lloyd Wright Ballroom, Salons I&J*  
   Victor W. Nitti, MD (Director)  
   Harriette M. Scarpero, MD  
   Eric S. Rovner, MD

3. **Management of GU Strictures After the Treatment of Prostatic Disease**  
   *Location: Frank Lloyd Wright Ballroom, Salon E*  
   Richard A. Santucci, MD (Director)  
   Charles L. Secrest, MD  
   Sender Herschorn, MD

6:00 p.m. – 7:30 p.m. **Cocktail Hour and Award Presentations in Exhibit Hall**  

*Location: Frank Lloyd Wright Ballroom, Salon F*
Sunday, March 5, 2011

General Session located in the Frank Lloyd Wright Ballroom, Salon E unless otherwise noted.

7:00 a.m. – 10:30 a.m. Exhibit Hall Open
Location: Frank Lloyd Wright Ballroom, Salon F

7:00 a.m. – 12:00 p.m. Registration/Information Desk Hours
Location: Frank Lloyd Wright Foyer

7:00 a.m. – 12:00 p.m. Video Viewing in Speaker Ready Room
Location: Four Peaks

7:00 a.m. – 8:00 a.m. Continental Breakfast in Exhibit Hall
Location: Frank Lloyd Wright Ballroom, Salon F

GENERAL SESSION

CONCURRENT PODIUM/POSTER SESSIONS
8:00 p.m. – 9:30 p.m. Pelvic Organ Prolapse / Reconstruction Podium Session
Moderators: Elizabeth R. Mueller, MD
Ariana L. Smith, MD

Podium #32* ELEVATE ANTERIOR/APICAL: SAFETY AND EFFICACY IN SURGICAL TREATMENT OF PELVIC ORGAN PROLAPSE
Edward Stanford, MD, MS¹, Robert Moore, DO², Jan Paul Roovers, MD³, James Lukban, DO⁴, Eduardo Bataller, MD⁵ and Suzette Sutherland, MD⁶
¹Memphis, TN; ²Altanta, GA; ³Netherlands; ⁴West Virginia, US; ⁵Spain; ⁶MN, USA
(Presented by: Edward Stanford)

*Not CME Accredited

Podium #33 UNREALISTIC EXPECTATIONS FOR PELVIC ORGAN PROLAPSE FOLLOW-UP BASED ON A REVIEW OF LEVEL-I/II EVIDENCE DATA IN CONTEMPORARY LITERATURE
Rubiao Ou, MD¹, Xian-Jin Xie² and Philippe Zimmern, MD²
¹Guangzhou, China; ²UT Southwestern Medical Center, Dallas, TX
(Presented by: Philippe Zimmern)

Podium #34 PREDICTORS OF IMPROVEMENT IN LOWER URINARY TRACT SYMPTOMS AFTER SACROCOLOPEXY
Leslie Rickey, MD¹ and James Minor, PhD²
¹University of Maryland, Baltimore, MD; ²Baltimore, MD
(Presented by: Leslie Rickey)
Podium #35*  OUTCOMES OF OBSERVATION AS THERAPY FOR PELVIC ORGAN PROLAPSE: A STUDY IN NATURAL HISTORY OF PELVIC ORGAN PROLAPSE
Alienor Gilchrist, MD¹, Steven Swift, MD², William Campbell, MD², Margaret Steele, MD², Hema Brazell, MD² and Jonathon Foote, MD²
¹Department of Urology, Medical University of South Carolina, Charleston, SC; ²Department of Gynecology, Medical University of South Carolina, Charleston, SC
(Presented by: Alienor Gilchrist)

*Not CME Accredited

Podium #36  ANORECTAL AND BOWEL DYSFUNCTION ASSOCIATED WITH PELVIC ORGAN PROLAPSE (POP) IN EGYPTIAN WOMEN: PREVALENCE AND CORRELATION WITH MRI FINDINGS
Hala Imam, MD, PhD¹, Ahmed El-Azab, MD² and Hisham Imam, MD³
¹Gastroenterology Unit, Internal Medicine Department, Assiut University Hospital, Assiut, Egypt; ²Section of Female Urology and NeuroUrologyUrology Department, Assiut University Hospital, Assiut University, Assiut, Egypt; ³Diagnostic Radiology Department, Assiut University Hospital, Assiut, Egypt
(Presented by: Hala Imam)

Podium #37  LEVATOR CONTRACTION STRENGTH AS RISK FACTOR FOR VOIDING DYSFUNCTION FOLLOWING SURGICAL CORRECTION OF STRESS URINARY INCONTINENCE AND PELVIC ORGAN PROLAPSE
Mohamed Ghafar, MD¹, Michelle Koski, MD², Thomas Nolan, MD¹, Ralph Chesson, MD¹ and J. Christian Winters, MD²
¹Department of Obstetrics and Gynecology, Louisiana State University, New Orleans, LA; ²Department of Urology , Louisiana State University, New Orleans, LA
(Presented by: Mohamed Ghafar)

Podium #38  5-YEAR COST ANALYSIS OF INTRA-DETURUSOR INJECTION OF BOTULINUM TOXIN TYPE A AND AUGMENTATION CYSTOPLASTY FOR REFRACTORY NEUROGENIC DETRUSOR OVERACTIVITY
Priya Padmanabhan, MD, MPH¹, Harriette Scarpero, MD², Doug Milam, MD², Roger Dmochowski, MD² and David Penson, MD²
¹University of Kansas Medical Center, Kansas City, KS; ²Nashville, TN
(Presented by: Priya Padmanabhan)

Podium #39  OPEN RECONSTRUCTION OF VESICOURETHRAL ANASTAMOTIC STRicture FOLLOWING OPEN, LAPAROSCOPIC, AND ROBOTIC-ASSISTED RADICAL PROSTATECTOMY
David Hadley, MD and Brian Flynn, MD
University of Colorado Division of Urology, Aurora, CO
(Presented by: David Hadley)
SATURDAY, MARCH 5, 2011
General Session located in the Frank Lloyd Wright Ballroom, Salon E unless otherwise noted.

Podium #40  PATTERNS OF MANAGEMENT OF URETHRAL STRICTURE DISEASES IN THE VA SYSTEM
Claudia Sevilla¹, Victoria Scott¹, Mingming Wang, MPH², Elizabeth Yano, PhD, MSPH² and Jennifer Anger, MD, MPH³
¹UCLA Dept of Urology, Los Angeles, CA; ²VA Greater Los Angeles Healthcare System, Los Angeles, CA; ³Cedars-Sinai Medical Center and UCLA Department of Urology, Los Angeles, CA
(Presented by: Claudia Sevilla)

8:00 a.m. – 9:30 a.m.  Male Incontinence / Urodynamics Moderated/Non-Moderated Poster Session
Location: Frank Lloyd Wright Ballroom, Salons G&H
Moderators: Alvaro Lucioni, MD
Christopher E. Wolter, MD

MODERATED
Poster #M21  DECREASE OF MAXIMUM FLOW RATE DURING INTUBATED FLOW IS NOT ONLY DUE TO THE URETHRAL CATHETER IN SITU
Françoise Valentini MD, PhD¹, Dorothée Hennebelle MD², Gilberte Robain MD, PhD² and Pierre Nelson PhD²
¹ER6-UPMC (Paris 06) France; ²ER6-UPMC (Paris 06) Paris, France
(Presented by: Françoise Valentini)

Poster #M22  REDUCTION OF RADIATION DURING FLUORO URODYNAMICS: AN ANALYSIS OF A QUALITY ASSURANCE PROTOCOL LIMITING FLUOROSCOPIC IMAGES DURING FLUORO URODYNAMIC STUDIES
Courtney Lee, MD, Kevin Wunderlee, MS¹, Sandip Vasavada, MD² and Howard Goldman, MD²
¹Imaging Institute, Cleveland Clinic Foundation, Cleveland, OH; ²Glickman Urological and Kidney Institute, Cleveland Clinic Foundation, Cleveland, OH
(Presented by: Courtney Lee)

Poster #M23*  VOIDING DYSFUNCTION IN PATIENTS WITH NEUROMYELITIS OPTICA SPECTRUM DISORDERS
Cristiano Gomes, MD, Fabricio Carvalho, MD, Julio Bissoli, MD, Jose Bessa, Jr., MD, Samira Pereira, MD, Paulo Marchioli, MD, Dagoberto Callegaro, MD, Homero Bruschini, MD and Miguel Srougi, MD
Sao Paulo University, Medical School-Department of Urology, Sao Paulo, SP
(Presented by: Cristiano Gomes)

*Not CME Accredited
SATURDAY, MARCH 5, 2011
General Session located in the Frank Lloyd Wright Ballroom, Salon E unless otherwise noted.

Poster #M24  MANAGEMENT OF LOWER URINARY TRACT PATHOLOGY: A SURVEY OF AUGS MEMBERS
Catrina Crisp, MD, Apurva Pancholy, MD, Angela Fellner, PhD and Rachel Pauls, MD
Good Samaritan Hospital/TriHealth, Cincinnati, OH
(Presented by: Catrina Crisp)

Poster #M25  OUTCOMES OF REDUCTION CYSTOPLASTY IN MEN WITH IMPAIRED DETRUSOR CONTRACTILITY
Daniel Thorner DO¹, Jeffrey Weiss MD¹, Jerry Blaivas MD¹, Rajveer Purohit MD¹ and Johnson Tsui BS¹
¹SUNY Downstate College of Medicine, Brooklyn, NY; ²Institute for Bladder and Prostate Research, New York, NY; ³Weill Cornell Medical College, New York, NY
(Presented by: Daniel Thorner)

Poster #M26*  PATIENT SATISFACTION FOLLOWING SURGERY FOR POST-PROSTATECTOMY INCONTINENCE; A COMPARISON OF ARTIFICIAL URINARY SPHINCTERS VERSUS MALE SLINGS
Eva Fong, MD, Benjamin Brucker, Abdullah Demirtas, Sagar Shah, MD, Daniela Kaefer, BA, NIrit Rosenblum MD and Victor Nitti, MD
NYU
(Presented by: Benjamin Brucker)

*Not CME Accredited

Poster #M27  DULOXETINE FOR THE TREATMENT OF POST-PROSTATECTOMY STRESS URINARY INCONTINENCE
R. Corey O’Connor, MD, Amy Guise, MD, Jonathan Vincent, MD, Donald Neff, MD, Peter Langenstroer, MD, William See, MD and Michael Guralnick, MD
Medical College of Wisconsin, Milwaukee, WI
(Presented by: R. Corey O’Connor)

Poster #M28  THE ADVANCE™ MALE SLING IN PATIENTS WITH MODERATE TO SEVERE STRESS URINARY INCONTINENCE
Paul McAdams, MD, Edward Houser, MD, Jennifer Bepple, MD and Kurt McCammon, MD
Eastern Virginia Medical School, Norfolk, VA
(Presented by: Paul McAdams)

Poster #M29  THE ADVANCE TRANSOBTRUTATOR MALE SLING FOR POST-PROSTATECTOMY INCONTINENCE: CLINICAL RESULTS OF A PROSPECTIVE EVALUATION UTILIZING PATIENT-DRIVEN QUESTIONNAIRES
John Stoffel, MD and Arthur Mourtzinos, MD
Lahey Clinic Medical Center, Burlington, MA
(Presented by: Arthur Mourtzinos)
Poster #M30  COMORBID ERECTILE DYSFUNCTION IN MEN REQUIRING SURGICAL INTERVENTION FOR POST- PROSTATECTOMY URINARY INCONTINENCE
Ekene Enemchukwu, MD, MPH, Benjamin Whittam, MD, Todd Doran, PA-C, Melissa Kaufman, MD, PhD and Doug Milam, MD
Vanderbilt University Medical Center, Department of Urologic Surgery, Nashville, TN
(Presented by: Ekene Enemchukwu)

Poster #NM42  WHEN ARE VIDEO URODYNAMICS REALLY NECESSARY IN PATIENTS WITH SPINAL CORD INJURY? PREDICTORS OF POSITIVE FLUOROSCOPIC FINDINGS DURING URODYNAMIC TESTING
Sunshine Murray, MD, Benjamin Dillon, MD, Rashel Haerkorn, MD and Gary Lemack, MD
UT Southwestern, Dallas, TX
(Presented by: Sunshine Murray)

Poster #NM43  LOWER URINARY TRACT DYSFUNCTION AFTER DEEP BRAIN STIMULATION IN PATIENTS WITH PARKINSON’S DISEASE
Kelly Johnson, MD and Hari Tunuguntla, MD
UMDNJ/ Robert Wood Johnson University Hospital, New Brunswick, NJ
(Presented by: Kelly Johnson)

Poster #NM44  URODYNAMIC PREDICTORS OF LOWER URINARY TRACT SYMPTOM PROGRESSION IN MULTIPLE SCLEROSIS: DO SPECIFIC FINDINGS PREDICT THOSE DESTINED TO PROGRESS?
Benjamin Dillon, MD, Rashel Haerkorn, MD, Sunshine Murray, MD, Elliot Frohman, MD, Benjamin Greenberg, MD, Philippe Zimmern, MD and Gary Lemack, MD
UT Southwestern Medical Center, Dallas, TX
(Presented by: Benjamin Dillon)

Poster #NM45  DOES REPRODUCTION OF SYMPTOMS ON URODYNAMICS INFLUENCE PATIENT OUTCOMES AFTER TREATMENT?
Andrew Colhoun, BS, Colin Goudelocke, MD and Eric Rovner, MD
Medical University of South Carolina, Charleston, SC
(Presented by: Andrew Colhoun)

Poster #NM46  SYSTEMATIC REVIEW OF UROLOGICAL FOLLOW UP AFTER SPINAL CORD INJURY
Anne Cameron, MD¹, Katherine Schomer, MA² and Gianna Rodriguez, MD¹
¹University of Michigan, Ann Arbor, MI; ²University of Washington, Seattle, WA
(Presented by: Anne Cameron)
Poster #NM47  
**UTILITY OF ULTRASOUND AND URODYNAMICS IN CHILDREN FOLLOWING SPINAL CORD INJURY**  
Kelly Johnson, MD, Shilpa Lamba, MD and Joseph Barone, MD  
UMDNJ/ Robert Wood Johnson University Hospital, New Brunswick, NJ  
(Presented by: Kelly Johnson)

Poster #NM48  
**RACIAL DIFFERENCES IN BLADDER MANAGEMENT METHODS IN PATIENTS WITH SPINAL CORD INJURY/DISABILITY (SCI/D)**  
Ashley King, MD¹, Albert Petrossian, MD¹, Blake Anderson, MD¹, David Rapp, MD¹, B. Mayer Grob, MD¹², David Gater, MD, PhD¹² and Adam Klausner MD¹²  
¹Virginia Commonwealth University School of Medicine, Richmond, VA; ²McGuire Veterans Hospital, Richmond, VA  
(Presented by: Adam Klausner)

Poster #NM49  
**PATTERN OF LOWER URINARY TRACT DYSFUNCTION IN PATIENTS WITH DIABETES MELLITUS, MENTAL RETARDATION AND CEREBROVASCULAR ACCIDENTS**  
Kelly Johnson, MD and Hari Tunuguntla, MD  
UMDNJ/ Robert Wood Johnson University Hospital, New Brunswick, NJ  
(Presented by: Kelly Johnson)

Poster #NM50  
**WITHDRAWN**

Poster #NM51  
**OUTCOMES OF ARTIFICIAL URINARY SPHINCTER PROSTHESIS IMPLANTATION FOR TREATMENT OF STRESS URINARY INCONTINENCE IN PATIENTS WITH ILEAL NEobladder**  
Dominic Lee, MD, Peter Hinh, MD and O. Lenaine Westney, MD  
MD Anderson Cancer Center, Houston, TX  
(Presented by: Dominic Lee)

Poster #NM52  
**MALE SLINGS: A COMPARATIVE STUDY OF TWO TECHNIQUES**  
Melanie Crites, DO and Gamal Ghoniem, MD  
Cleveland Clinic Florida, Weston, FL  
(Presented by: Melanie Crites)

Poster #NM53  
**INFLUENCE OF PREOPERATIVE PELVIC FLOOR MUSCLE STRENGTH ON POST-PROSTATECTOMY INCONTINENCE**  
Mary Henderson, MD¹, Davina Petrakos, PhD¹, Erin Glace, PT² and Robert Given, MD¹  
¹Eastern Virginia Medical School, Norfolk, VA; ²Urology of Virginia, Norfolk, VA  
(Presented by: Mary Henderson)
General Session located in the Frank Lloyd Wright Ballroom, Salon E unless otherwise noted.

Poster #NM54  A NEW QUADRATIC SLING FOR MALE STRESS INCONTINENCE
Craig Comiter, MD¹, Eugene Rhee, MD² and Victor Nitti, MD³
¹Stanford University, Stanford, CA; ²Kaiser Permanente, San Diego, CA; ³NYU, New York, NY
(Presented by: Craig Comiter)

Poster #NM55  ADVANCE MALE SLING IN IRRADIATED PATIENTS WITH STRESS URINARY INCONTINENCE
Jack Zuckerman, MD, Britton Tisdale, MD and Kurt McCammon, MD
Eastern Virginia Medical School, Norfolk, VA
(Presented by: Jack Zuckerman)

Poster #NM56  SURGICAL MANAGEMENT OF URETHRAL COMPLICATIONS FOLLOWING ARTIFICIAL URINARY SPHINCTER EROSION
David Hadley, MD and Brian Flynn, MD
University of Colorado Division of Urology, Aurora, CO
(Presented by: David Hadley)

Poster #NM57  ANALYSIS OF FACTORS AFFECTING EARLY RECOVERY OF CONTINENCE AFTER ROBOT-ASSISTED LAPAROSCOPIC RADICAL PROSTATECTOMY
Jeongyun Jeong¹, Eun Choi¹, Dong Kang¹, Kelly Johnson, MD² and Isaac Kim, MD, PhD²
¹Cancer Institute of New Jersey, New Brunswick, NJ; ²UMDNJ/ Robert Wood Johnson University Hospital, New Brunswick, NJ
(Presented by: Kelly Johnson)

Poster #NM58  PRESENTATION AND MANAGEMENT OF COMPLICATIONS OF THE ADVANCE MALE SLING
John Stoffel, MD and Arthur Mourtzinos, MD
Lahey Clinic Medical Center, Burlington, MA
(Presented by: Arthur Mourtzinos)

9:30 a.m. – 9:40 a.m.  Lapides Award Presentation
Moderator: Ananias C. Diokno, MD

ACUTE ADMINISTRATION OF AMPA/KINATE BLOCKER COMBINED WITH DELAYED TRANSPLANTATION OF NEURONAL AND GLIAL RESTRICTED PRECURSORS IMPROVES LOWER URINARY TRACT FUNCTION IN SPINAL INJURED RATS
Takahiko Mitsui¹,², Birgit Neuhuber¹, Itzhak Fischer¹
¹Department of Neurobiology and Anatomy, Drexel University College of Medicine, Philadelphia, PA; ²Department of Urology, Hokkaido University, Graduate School of Medicine, Sapporo, Japan
(Presented by: Takahiko Mitsui)
9:40 a.m. – 10:00 a.m. Prize Essay Winner Presentations
Moderator: Gary E. Lemack, MD

Podium #41 FUNCTIONAL BRAIN ACTIVITY UNDERLYING IMPAIRED CONTINENCE CONTROL IN OLDER WOMEN WITH OAB
Stasa Tadic, MD, MS, Derek Griffiths, PhD, Werner Schaefer, DI, Andrew Murrin, BA, Becky Clarckson, PhD and Neil Resnick, MD
University of Pittsburgh, Division of Geriatric Medicine and Gerontology
(Presented by: Stasa Tadic)

Podium #42 LIPOSOMES ASSISTED BLADDER UPTAKE OF ANTISENSE OLIGONUCLEOTIDES AMELIORATE SYMPTOMS OF DETRUSOR OVERACTIVITY IN RAT MODEL
Vikas Tyagi, MD¹, Yoshio Sugino, MD², Naoki Yoshimura, MD, PhD², Michael Chancellor, MD¹ and Pradeep Tyagi, PhD¹
¹William Beaumont Hospital, Royal Oak, MI; ²University of Pittsburgh, Pittsburgh, PA
(Presented by: Vikas Tyagi)

ISPIN SESSION II
Moderator: Steven W. Siegel, MD

10:00 a.m. – 12:00 p.m. Chat Room: A Directed Open Forum on Current Topics in Neuromodulation

PNE vs. Staged
Steven W. Siegel, MD

Bilateral Stimulation
Christopher P. Smith, MD

Neurogenic Patients
Michele Spinelli, MD

PTNS
Scott MacDiarmid, MD

Botulin Toxin Type A vs. SNM
Angelo E. Gousse, MD

Clinical Neurostimulation Parameters
Norbert Kaula, PhD

Pediatric Neuromodulation
Yuri E. Reinberg, MD

12:00 p.m. Meeting Adjourns
ANNUAL BUSINESS MEETING AGENDA

Society for Urodynamics and Female Urology
Saturday, March 5, 2011
7:30 a.m. – 8:00 a.m.

Location: Frank Lloyd Wright Ballroom, Salon E

1. Call to Order – President, Victor W. Nitti, MD

2. Approval of 2010 minutes and thank you to program chairs – J. Christian Winters, MD

3. Treasurer’s Report – Eric S. Rovner, MD

4. Awards Committee Report – Roger R. Dmochowski, MD

5. Membership Committee Report – Alan J. Wein, MD, PhD

6. Old Business
   (a) Fellowship Update / Match

7. New Business
   (a) Announcement of 2012 meeting
   (b) Other

8. Adjourn
EVENING EVENTS

Wednesday, March 2, 2011
Welcome Reception
7:00 p.m. – 8:30 p.m.
Location: Frank Lloyd Wright Ballroom, Salon F
Enjoy cocktails and heavy hors d’oeuvres as you meet with Industry Partners in the exhibit hall.
Dress: Business

Friday, March 4, 2011
Awards Reception
6:00 p.m. – 7:30 p.m.
Location: Frank Lloyd Wright Ballroom, Salon F
Finish off the annual meeting with an evening of cocktails, mingling and award presentations in the exhibit hall.
Dress: Business

ABOUT PHOENIX

ABOUT PHOENIX, ARIZONA
The largest city in Arizona, Phoenix is a lively Southwestern city with modern charm and culture. There is a great deal to see and do in Phoenix Favorite tourist attractions include: the Arizona Science Center, the Heard Museum, the Desert Botanical Garden, Bank One Ballpark, The Phoenix Zoo, Phoenix Art Museum and the Phoenix Symphony, as well as a variety of other theater, sports, outdoor festivals and special events.

There are so many wonderful restaurants in the Phoenix area to choose from. Whether you feel like steak and potatoes, Mexican food, or you have a craving for seafood or Italian, there's sure to be a place you can enjoy nearby.

Weather and Dress
Phoenix weather in early March is usually warm and sunny, with average highs in the low to mid 70s and lows in the low 50s. Evenings can be cool, so a light sweater or jacket is suggested.
RESTAURANTS IN PHOENIX

Armadillo Grill
1904 E Camelback Road
(602) 287-0700
Armadillo Grill offers eclectic American cuisine in a fun atmosphere. From prix fixe meals to an extensive a'la carte menu that includes burgers, pasta, seafood, and sandwiches, there is something for everyone.

Alice Cooper's Town
101 E Jackson St. (@ 1st St.)
(602) 253-7337
If you thought by its name that Alice Cooper's Town is a theme restaurant, you were right. However, it is not about a rock star, but baseball. Cooperstown — Get it? Menus are lineups, and there are big-league and minor-league portions, and well as those for Sluggers and Little Leaguers. This is a restaurant that receives rave reviews from its patrons for a fun-filled atmosphere and good food at reasonable priced. Great place for family dinners.

Bamboo Grill
3049 W Agua Fria Freeway (@ Deer Valley Towne Center)
(623) 587-0800
Bamboo Grill is a chain of restaurants that serves Vietnamese food. The hungry guest will find a large variety of dishes, from potstickers to hot sake. There are also a few Thai dishes, and tofu and vegetarian meals for the health conscious. If the descriptions don’t make your mouth water, some of the names will: one specialty is called the Forest Fire!

Barbecue Company Grill & Cafe
4636 S 36th St. (@ Broadway)
(602) 243-3771
Primarily a catering company, the grill is open daily for lunch, for customers to sample the menu items, and offers a popular Wednesday buffet. Choose from a wide menu selection that includes choice Midwestern beef steaks, fish, ribs, and also flavorful chicken selections such as the Salsalita Chicken.

Dubliner Irish Pub & Rest
3841 E Thunderbird, #111-113
(602) 867-0984
The Irish are well renowned for being hospitable and accommodating, but what about an Irish pub & restaurant that offers not only Irish specialties but full and half racks of BBQ ribs? You'll not only feel as though you are in the heart of Dublin at the Dubliner Pub & Restaurant, you might also feel a little East Texas. What more could you ask for? Warm ambiance that doesn't sacrifice cuisine — that's the Dubliner Irish Pub & Restaurant.

Feeney's Restaurant
6314 N 12th St.
(602) 274-9700
This very popular Phoenix eatery offers a wide variety of selections including Greek specialties and American grill. Their combination platters, including meats and seafood, allow patrons to enjoy an assortment of their offerings all at once. Feeney's Restaurant provides plenty of appetizers, salads, fresh soups and desserts. Wine by the glass. Family friendly and casual.

Ichi Ban Japanese Rest & Sushi
2815 N Central Ave. (@ Thomas)
(602) 277-3559
If you've ever seen a Sushi chef in action you know it takes talent, creativity and a passion for turning seafood and rice into a work of art. Located in Phoenix, Arizona, Ichi Ban's Japanese Rest and Sushi employees master Sushi chefs who have what it takes to create the finest, Nigiri, Sashimi as well as a wide assortment of Sushi rolls. A full selection of appetizers, specials, various Teriyakis and Udon adorn the menu.

Morton's The Steakhouse
Shops at the Esplanade, 2501 E Camelback Rd.
(602) 955-9577
Morton's of Chicago aims to always exceed guests' expectations and expand their reputation as America's best steakhouse.

Paradise Bakery & Cafe
9649 - A Metro Pkwy West, Metrocenter Mall
(602) 371-1119
Casual dining at its best in a fun, upbeat atmosphere. Delicious cookies, muffins and other pastries are baked fresh all day long right on the premises. The employees take pride in the preparation of fresh tossed salads, made-to-order sandwiches and fresh baked items bursting with flavor yet preservative free. Many products are also low in fat with no artificial flavors or coloring and are very popular with health conscious customers. A wide variety of beverages are available including fresh brewed 100% Arabica "Coffees of Paradise"(tm) and a cool, creamy "Splendid Blended".

Saba's Mediterranean Cuisine
4747 East Bell Road, Suite #5
(602) 493-4831
Saba's offers an assortment of sinfully sensational and hearty dishes made from Old World recipes. Prepared with only the freshest ingredients, meats and vegetables, these dishes will satisfy even the most insatiable of appetites. As their special guest, you can expect prompt, courteous service and healthy cuisine.
INVITED SPEAKERS’ LECTURE SUMMARIES
MARK YOUR CALENDARS!

SUFU at the AUA 2011
May 14, 2011
Renaissance Washington, DC
Washington, DC

SUFU 2012 Annual Meeting
February 28 – March 3, 2012
The Roosevelt
New Orleans, LA

SUFU 2013 Annual Meeting
February 26 – March 2, 2013
Caesar’s Palace
Las Vegas, NV
FUNCTIONAL ASPECTS OF INTERSTITIAL CELLS OF CAJAL (ICC) IN BLADDER
Sang Don Koh, MD
Interstitial cells of Cajal (ICC) of the gastrointestinal (GI) tract have been studied extensively. Morphologic data suggested these cells might be pacemakers and mediators of neurotransmission due to close apposition to neurons and formation of gap junctions with smooth muscle cells. These findings stimulated functional investigations of the role of ICC in GI motility. Post-junctional neural responses are excitatory (mainly cholinergic) and inhibitory (purinergic and nitrergic) in GI smooth muscle, and cholinergic and nitrergic responses were decreased in \(W/W\) or \(S/\text{Sl}^d\) mice which lack ICC in specific regions.

Many reports have suggested that ICC and smooth muscle cells are also in close proximity in bladder, and we will review evidence for a role of ICC in neurotransmission in detrusor smooth muscles. ICC and cholinergic nerves appear in close contact using immunohistochemical methods, however there is little or no evidence for the same types of very close, synaptic-like contacts between nerve varicosities and cells that might be ICC in the bladder. Acetylcholine (ACh) released from parasympathetic excitatory neuron induces detrusor contraction. In mechanical experiments, exogenous application of carbachol (CCh) induced contraction and was inhibited by L-type and T-type Ca\(^{2+}\) channel blockers. CCh-induced contraction was also decreased the M3-receptor antagonist and Phospholipase C inhibitor. In addition, IP3- and ryanodine Ca\(^{2+}\)-store blockers also affects the CCh-induced contraction. These studies suggested that M3-PLC-IP3/ryanodine pathways are the main signaling mechanisms of CCh-induced contraction. Evoked excitatory junction potentials were not different in wild type and \(W/W\) detrusor muscles. However, there have been reports of increased purinergic component of excitation in \(W/W\) muscles. Cells identified as ICC isolated from detrusor muscles displayed a branched morphology and responded to muscarinic stimulation by firing Ca\(^{2+}\) waves. Patch clamp data demonstrated large conductance Ca\(^{2+}\)-activated K\(^+\) conductance and TEA- sensitive voltage-dependent outward currents (molecular nature is unknown). These cells have not been studied in sufficient detail to determine their functional role and relative differences in responses in comparison to smooth muscle cells.

A new interstitial cell type is of great interest currently. These cells are generally known as ‘fibroblast-like’. However, recent studies in GI muscles identify these cells by labeling with PDGFR\(_{\alpha}\) antibodies. PDGFR\(_{\alpha}\)+ cells express receptors for ATP and generate large amplitude responses to ATP. Cells of this class are also present in the bladder. A possible role for PDGFR\(_{\alpha}\)+ cells in neurotransmission in bladder will be discussed. (supported by NIH P20-RR18751).

INTERSTITIAL CELLS MODULATE BLADDER FUNCTION BY ACTIVATION OF CALCIUM SENSING RECEPTOR
Vivian Cristofaro, PhD
Morphologic and immunohistochemical evidence indicates the presence in the bladder of c-Kit and vimentin positive interstitial cells (ICs) with structure similar to the interstitial cells of Cajal in the gastrointestinal tract. Although several studies have examined their electrophysiologic properties,1,2 the mechanism by which bladder ICs regulate detrusor function remains to be elucidated. The distinct localization of ICs in the interstitial spaces of the suburothelium, in between bundles of bladder smooth muscle (BSM) and in the serosa provides a unique vantage point for these cells to detect the physiologic status of the surrounding milieu. In these restricted spaces occupied by ICs, fluctuations in extracellular Ca\(^{2+}\) or other ions continuously occur in response to cell activity, including neurotransmission, stretch and smooth muscle contraction. We propose that bladder ICs may sense local activity of neighboring cells, exemplified by changes in extracellular Ca\(^{2+}\), and accordingly enhance or attenuate BSM contraction. This particular feature of ICs is executed by the Calcium Sensing Receptor (CaSR), a G-protein coupled receptor originally identified in the parathyroid gland. Although the CaSR was initially thought to be expressed only in tissues explicitly involved in calcium homeostasis, this receptor has now been found in many other tissues that are not directly related to mineral ion balance (such as brain, neurons, eye, prostate, pituitary gland, stomach, heart). However its physiological importance in these organs remains unclear. In the bladder, the presence of the CaSR has not been previously investigated.
Data generated from our molecular, cellular and imaging studies demonstrated the gene and protein expression of CaSR in rat bladder tissue. The distribution of CaSR immunoreactivity appeared as fine fibers projecting throughout the suburothelium as well as between bundles of BSM and along the serosal surface. Further, using confocal microscopy, a consistent co-localization of CaSR immunoreactivity with c-Kit and vimentin antibodies (used as markers for bladder ICs) was detected in bladder tissue from rat, mouse, human and pig samples, thus confirming that CaSR is expressed and localized on bladder ICs in all the models investigated. In addition, CaSR and c-Kit co-localization was confirmed in primary bladder ICs enzymatically isolated from rat bladder mucosa.

The physiological contribution of ICs to the modulation of detrusor contractility was examined by manipulating the CaSR during in vitro experiments in rat bladder tissue. The amplitude and frequency of spontaneous activity (SA), as well as the contractile responses induced by electrical field stimulation (EFS), or carbachol (Cch), were measured before and after activation of the CaSR. A significant decrease of both the amplitude and the frequency of bladder SA, an attenuation of the contractile response induced by EFS, and a markedly reduced slope of contraction induced by Cch were detected after CaSR activation. Since the co-localization of CaSR with c-Kit is consistent with CaSR expression on bladder ICs, the functional data presented here indicate that activation of CaSR is associated with an IC-mediated inhibition of spontaneous or agonist-induced bladder contractions. To demonstrate that this response is specific to ICs, the experiments were repeated in the presence of a c-Kit receptor antagonist, an agent previously shown to reduce putative IC-mediated responses6,7. Under these conditions, the amplitude of SA and EFS-induced contractions, as well as the slope of contraction generated by Cch was significantly decreased, comparable to the effect of direct CaSR activation. Moreover, activation of CaSR in the presence of c-Kit receptor antagonist had no further effect on these responses, confirming that CaSR-mediated responses are generated by ICs.

Previous studies suggest that bladder ICs are altered under pathologic conditions. Since our data indicate that CaSR are localized on ICs, changes in expression of this receptor may have pathophysiological significance for bladder dysfunction. We demonstrated that CaSR expression appeared significantly up-regulated in different animal models of bladder overactivity — rats with experimentally induced bladder outlet obstruction, spontaneously hypertensive rats and rats with neurogenic detrusor overactivity secondary to spinal cord injury. These findings are consistent with the increased number of c-Kit positive ICs in overactive bladders from human and guinea pig compared to bladders with normal activity6. Taken together, the data presented suggest that alterations in CaSR located on c-Kit positive ICs may potentially induce aberrations in intercellular signal transduction, and thus lead to abnormal bladder contractility. The presence of CaSR on bladder ICs, as well as its functional role in physiologic and potentially pathophysiologic conditions, offers a highly complex integrative mechanism by which ICs have the capacity to finely regulate bladder function.

References

MECHANICAL HOMEOSTASIS IN THE CONTEXT OF PELVIC FLOOR FUNCTION
Steven Abramowitch, PhD
A critical function of the vagina and its supportive tissues (connective tissue and striated muscle) is to withstand the forces generated by intra-abdominal pressure, gravity, and inertial forces; thereby, providing structural support to the pelvic organs. To be a mechanically valid system, the forces in the striated muscle and the connective tissue must counterbalance the forces resulting from a combination of abdominal pressure, gravity, and inertial forces. These forces are transferred through the vagina both circumferential and longitudinally. Thus, injury to either the striated muscle or connective tissue will place a greater mechanical demand on the other, which immediately alters the demand on the vagina.

Altered forces, i.e. changes in mechanical homeostasis, are sensed by resident cells as changes in tissue stretch, consequently altering their protein expression and function. This phenomenon is well documented in other body systems and is generally referred to as “mechanosensitivity”. In fact, mechanical forces have been shown to be as potent as growth factors in this regard. Under non-pathologic conditions, tissues are adaptable and able to match their mechanical integrity to meet their demand —even if it is slightly above or below physiologic levels. However, when the demand is too extreme or present for too long, a degenerative response typically ensues. An analogous example is an ACL injury in the knee placing a greater mechanical demand on the cartilage, ultimately resulting in degeneration and osteoarthritis in this tissue that is adjacent to the original injury.

This presentation will describe these concepts and provide evidence supporting the potential importance of mechanical homeostasis in the context of pelvic floor function.

OVERVIEW AND INSIGHTS INTO MATRIX BIOLOGY IN THE URINARY BLADDER
Darius J. Bagli, MDCM
Over the past two decades, basic research findings have once and for all laid to rest the idea that the extracellular matrix (ECM) is purely a passive gel or glue that surrounds resident cells in tissues. It is now very clear that the ECM is a potent, biologically active tissue component able to orchestrate a wide variety of cell behaviors and phenotypes. The ECM participates in a wide variety of functions including cell signaling, as a repository for growth factors, as well as a major contributor to the viscoelastic and mechanical properties of tissues. The ECM is comprised of a wide variety of structural proteins, proteoglycans, glycosaminoglycans, as well as nonstructural molecules. One of the oldest and best-known roles of the ECM is to provide structure to tissues. Perhaps the best-known ECM component in this regard is the collagen family. The collagens form >20 different types that are highly tissue specific. In the bladder, the predominant members are the fibrillar collagens, type I and type III. Moreover, even the ratio of type I:III plays a role in both bladder development and the regulation of compliance. Furthermore, non-fibrillar collagens type XII and XIV are involved in regulating the integrity of the collagen superstructure, which likely plays a role in bladder dynamics as well.

A much more novel and less well understood role of collagen and other ECM proteins is their ability to regulate bladder smooth muscle growth. The bioactivity of ECM proteins is made possible through an elaborate series of cell surface receptors which transduce physico-mechanical as well as chemical information provided by the ECM. For example, we now understand that collagen integrity (normal versus damaged) exerts profoundly different influences on bladder smooth muscle growth. Damaged collagen, of the sort that likely accumulates under conditions of organ and bladder fibrosis, is a powerful mitogen or growth stimulus for bladder smooth muscle cells, and is suspected to contribute to bladder hypertrophy during excessive pressure/distension conditions. Moreover, collagen conformation is able to regulate the activation of signaling pathways within bladder smooth muscle cells that are crucial to maintaining proper cell differentiation.
Another recent realization is that as the various components of the ECM undergo remodeling during development, response to injury, and aging, various breakdown products and subcomponents of the ECM, themselves, are able to exert biological activity on surrounding cells. In the bladder, we are learning that the mechanical states that characterize bladder filling and emptying are able to trigger the activation of a canonical family of ECM regulatory proteins, the metalloproteinases (MMPs), which then are able to cleave and reshape the integrity of structural ECM proteins. The role of MMPs, is, however, much wider than their name suggests in that they are responsible for cleaving and activating a wide variety of other proteins and growth factors into active (or inactive) forms. The repertoire of such cleavage products is highly tissue specific, and indeed high throughput analysis of the breakdown repertoire can provide tissue specific degradomes (creating the new field of degradomics) that may provide insight into pathophysiologic mechanisms.

Thus, a reciprocal interplay begins to emerge between the effect of the ECM on cells, and that of cells on the ECM. In matrix biology, this is referred to as dynamic reciprocity. Understanding the molecular details of this relationship is providing a new avenue with which to influence structural and functional pathophysiology of the lower urinary tract. Equally exciting will be the opportunity to derive entirely new and urgently needed classes of pharmacotherapy for lower urinary tract disease.

OVERVIEW OF THE POTENTIAL ROLE AND REGULATION OF ELASTIN IN UROGENITAL DISEASE

Kanchan Chitaley, PhD

Elastin is a resilient connective tissue protein present in the extracellular matrix of most vertebrate tissues but is especially abundant in tissues that undergo repeated physical deformations. In the urogenital system, elastin plays a role in the proper function of the bladder, cavernosum, vaginal wall and urethra. Dysregulation of elastin deposition or fiber formation may underlie disease states ranging from pulmonary hypertension and aortic aneurysm to bladder dysfunction and vaginal prolapse.

Elastic fibers consist of ~90% enzymatically-crosslinked tropoelastin monomers. About 60% of the amino acids of tropoelastin are hydrophobic, conferring passive recoil, whereas the crosslinking domains provide strength and organization. Microfibrils constitute the remaining ~10% of elastic fibers. They are are complexes of large glycoproteins that include fibulins, fibrillins, and certain latent TGFβ binding proteins. Because microfibrils appear in the extracellular space before elastin, they are thought to serve as a scaffold for elastin polymerization.

Elastic fibers are extremely durable, with essentially no turnover in normal, non-cycling tissues over the life of the organism. In humans, deletion/mutations in the tropoelastin or microfibrillar (fibulin 5, fibrillin) genes are associated with various clinical pathologies including Cutis laxa, Marfan syndrome, Williams Beuren syndrome and supravalvular aortic stenosis. Genetic conditions or acquired stressors (i.e. smoking-induced emphysema) may degrade elastin, causing a tissue response that could result in proper, insufficient or hyper-restoration of elastin content and fiber assembly. The breakdown of elastin in disease, and the failure to repair elastic fibers adequately may be due to: 1) impaired transcription of the tropoelastin gene during development; 2) premature shut off of gene transcription due to injury/insult; 3) premature degradation of tropoelastin mRNA due to injury/insult; 4) elastin proteolysis due to injury/insult; and/or, 5) failure to reactivate gene transcription in response to injury/insult. In my presentation, I will outline these mechanisms and discuss their potential relevance in urogenital disease.

EFFECTS OF TRANSPLANTATION OF ADIPOSE-DERIVED STEM CELLS ON URINARY FUNCTION AND URETHRAL CONNECTIVE TISSUE OF A SUI RAT MODEL

Ching-Shwun Lin, PhD

Stress urinary incontinence (SUI) has been studied in a rat model that underwent delivery, vaginal distension, and ovariectomy (DVDO). Elastin stain showed that at 8 weeks post-treatment, the urethras of DVDO rats had fewer and shorter elastic fibers when compared to Delivery-only rats, and those of DVDO+Estrogen rats had fewer and shorter elastic fibers when compared to DVDO rats. RT-PCR analysis showed that elastin mRNA was expressed at low levels in Delivery-only rats and at increasingly higher levels in DVDO rats at 2, 4, and 8 weeks but at sharply lower levels in DVDO+Estrogen rats when compared to DVDO rats at 8 weeks.
To identify mechanisms responsible for the above-described phenomena, elastin gene expression/regulation was investigated in cultured urethral cells. RT-PCR analysis showed that urethral cells expressed increasingly higher levels of elastin mRNA in response to increasing concentrations of TGF-β1 up to 1 ng/ml. At this TGF-β1 concentration, urethral cells expressed significantly lower levels of elastin mRNA when treated with estrogen prior to or after TGF-β1 treatment. Furthermore, luciferase assay showed that both Smad1 and Smad3/4 responsive elements were activated by TGF-β1 and such activation was suppressed by estrogen.

To investigate the effects of treatment with adipose-derived stem cells (ADSC) on SUI and urethral elastin expression, transplantation of ADSC was performed one week after DVDO treatment. Four more weeks later, cystometric analysis showed that 8 out 10 rats in the control group had abnormal voiding whereas 4 of 12 (33.3%) and 2 of 6 (33.3%) rats in the Urethra-ADSC group and the Tail Vein-ADSC group, respectively, had abnormal voiding. In addition, histological analysis showed that ADSC-treated groups had significantly higher elastin content than the control group, and, within the ADSC-treated groups, rats with normal voiding pattern also had significantly higher elastin content than rats with voiding dysfunction. Concurrently, ADSC-treated, normal voiding rats had significantly higher smooth muscle content than control or ADSC-treated rats with voiding dysfunction.

The results of these studies suggest that (1) birth trauma may activate urethral elastin expression via TGF-β1 signaling, (2) estrogen may interfere with this signaling, leading to improper assembly of elastic fibers, and (3) transplantation of ADSC could mitigate the progression of SUI through preservation of elastic fibers.
NIH GRANT FUNDING: HOW TO GET THERE
Firouz Daneshgari, MD

This brief review addresses the question put forth: how a clinician or a scientist in the early phase of their career can become successful in obtaining peer-reviewed funding exemplified by grants from the NIH?

To address this question fully, I propose that we need to reexamine the current business model of establishment of ‘sustainable breakthrough research in biomedical sciences’. Among the key ingredients to this model are: a) a durable process of research productivity and b) development and growth of the investigators as the drivers of the process. The ‘Research Process” is composed of 4 key segments/steps:

1- Conceptualization
2- Implementation
3- Data Management
4- Publication

Deficiencies in knowledge of the requirements of each step or a lack of tools for execution of the steps often leads to an inability to achieve success. The demands of one’s career and personal life, could push the unprepared beginner to other choices in life; leaving the dream of becoming a successful and funded investigator as such, just a dream.

The path to success for development and growth of investigators can be divided into three stages:

The first stage is acquiring the ability to conceptualize and communicate one’s research ideas. The following initial ‘tools’ need to be gathered for successful production in this stage:

1- Willingness to proceed despite early setbacks.
   - No successful and independent investigator has reached that status without setbacks
   - This career path can only be obtained by those whose desire and commitments are strong enough to overcome and outlast setbacks and unsuccessful attempts

2- Learn the language and skill sets of the ‘other’ side:
   - For a clinician/surgeon (urologists/gynecologist), these include: being a superb clinician with excellent surgical skills and having the knowledge base of at least a post-doc fellow in your field of study
   - For the investigator in a Ph.D-track, this means learning the clinical aspects of the disease of interest
   - These early diversions in knowledge orientations will act as the key points in the future scientific road maps of their investigation

3- Learn and practice professional writing skills
   - Regardless of which track (M.D. or Ph.D.) one may be in; s/he needs to develop moderately advanced skill sets in professional writing
   - Gaining the necessary writing skills will allow formulation of research concepts and development of the final research protocol in an effective and efficient way
   - In the absence of this skill set, the ideas and innovations that could become the topics of informative research projects or the results of informative research projects will remain as such, and may never leave your brain, lab bench, or desk

At the end of this stage, it is expected that one can translate the research ideas into a scientifically reasonable research protocol; that would go through the next step of regulatory approval by the IRB or IACUC of the institutions.

The second stage is acquiring the ability to secure funding, time, and mentoring to implement your ideas. The abstracts by Drs. Anger and Chai address most of the issues in this stage. Some additional hints could include:

1- Establishment of a network of collaborators and mentors
   - This is a key element of success in either M.D. or Ph.D. track
- In this area, I would highly advise you to leave your comfort zone of known people and invest in building relationship with experts from outside your department. More often that not, senior and experts in other fields find a use for the ideas and areas of expertise of a junior investigator who is willing to work and produce results.

2- Look for areas of opportunities.
- The members of the SUFU are fortunate to work in areas where the common prevalence of lower urinary tract diseases such as urinary incontinence and female pelvic floor disorders; and aging of population with increase in risk factors such as obesity and diabetes; herald a widening area of research.

It is expected that at the end of this stage, one will have a fair understanding of funding opportunities at the NIH and other funding organization; and has secured time (by his own efforts, or by employment arrangements) to implement his research ideas and generate original data. By connecting the original data from implementation of research ideas to available funding mechanisms during the third stage, one will begin the path toward independent investigation.

The third stage focuses on communication.
1. This stage includes around the clock production of manuscripts, research proposals and grants until the production has surpassed the rejection rate!
2. Each element of a communication (articles, funded grants) would act as building block upon which the next blocks will lead to formation of a structure that will continue to protect the work of the investigator.

During the course of my career, I have found many funding sources for support of any research concept: from private Foundation Grants such as: American Diabetic Association; Juvenile Diabetes Foundation; National Kidney Foundation to our own AUA Foundation. In addition, there are numerous funding mechanisms by the Federal Government agencies including the NIH; DOD, CDC including the following:
- STIR-SBIR- for work on an innovative product with an industrial partner
- K awards- to secure your early engagements in research and develop the network of collaborators and mentors.
- R Grants- that would include small awards such as R03- $50,000; R-21s- $125-150,000. Per year for two years; R01- up to $500,000. Per year up to 5 year.

The goals for the 3rd stage are to set up and have access to an infrastructure that would provide continuous support for at least the next 3 years to allow the investigator to continue his/her endeavor at a stable and productive manner.

In most instances, sincere commitment to research, and relying on the early blocks of success should provide the needed ingredients toward becoming an independent investigator.

NIH GRANT FUNDING: CHALLENGES AND OPPORTUNITIES FOR THE ACADEMIC UROLOGIST

Toby C. Chai, MD

Academic urologists are expected to be creative and productive in research, medical education and/or clinical practice. In the research domain, obtaining peer-reviewed federal government funding is a requirement for academic rank advancement and tenure. Federal agencies that fund biomedical research include the Department of Veteran Affairs (VA), Department of Defense (DOD), National Science Foundation (NSF), Centers for Disease Control (CDC) and Agency for Healthcare Research and Quality (AHRQ), but the main source of funding is from the National Institutes of Health (NIH). While the growth rate of NIH research funding has flattened over the last several years (negative growth rate when factoring in inflation) making obtaining NIH grants even more difficult, academic urologists need to continue to compete for these scarce grants to improve their position amongst academic medical specialties. If academic urologists do not continue to apply for NIH grants, there will be a reduction in not only the amount of money allocated to urologic research, but also a potential loss of a urologic-specific research review panel (“study section”) within the review branch (Center for Scientific Review or CSR) of the NIH.

Given these challenges, are there any NIH funding opportunities left for academic urologists in the research arena? The answer is a definite yes. One must remember that urologists care for some of the most commonly encountered clinical problems in the US such as urinary incontinence (UI). Given that the elderly segment of the US population will increase dramatically in the next 25 years coupled with the fact that the prevalence of UI increases with age, by necessity, the NIH will need a long term UI research strategy to better understand epidemiology, pathophysiology, treatment and prevention of UI which would be expected to reduce both patient and societal burdens from this common disorder.

Research creativity in 2011 requires a multidisciplinary approach. Gone are the days where a single investigator can perform all of the research aims by himself and still be “cutting-edge”. Funded projects these days often require collaboration among multiple different scientific and clinical disciplines. Again, using UI as an example of a clinical...
problem to solve, one can envision a research project on UI requiring the collaboration between urologists, neuroscientists, geneticists, urogynecologists, physical therapists, cell biologists, smooth muscle physiologists, epidemiologists, biostatisticians, biomedical engineers, and possibly other disciplines as well. Collaborations with other disciplines are not challenges, but rather opportunities for synergy and for maximizing forward progress.

The path to obtaining successful urologic research funding has been established by those who have gone before us. In addition to desire, curiosity, and tenacity, appropriate training and mentorship are also required. There are different NIH grants that track with the research career of academic urologists. Typically these begin with a T32-NRSA fellowship grant which funds training, followed by a K award which promotes development of research careers utilizing strong mentoring. Ultimately an R01 award establishes the credentials of an independently funded investigator.

Academic urology will always have a need for those who pursue peer-reviewed research. The rewards reaped by those who are successful in this type of research are numerous. Most obvious is the ability to change, for the better, how urology is practiced. The stimulation of the mind, the ability to perform hypothesis testing, the learning of new ideas and techniques, and the development of scientific collaborations with colleagues, are additional benefits. Our subspecialty needs more young academic urologists to follow this career path.

NIH GRANT FUNDING: MAKING THE RIGHT START
Jennifer Anger, MD, MPH

Successful NIH funding is often based on a track record of previous successful funding. Given this, how does one get started on a successful funding track? For urologists, gynecologists, and basic scientists who wish to pursue an academic career in pelvic medicine, many funding opportunities are available at the fellowship and junior faculty level:

NIH Ruth L. Kirschstein National Research Service Awards (NRSA) for Postdoctoral Fellows: Both F32 (individual) and T32 (institutional) training awards exist. The purpose of this postdoctoral research training fellowship is to provide support to fellows with the potential to become productive, independent investigators in scientific health-related research fields relevant to the missions of participating NIH Institutes.

American Urological Association Foundation (AUAF) Awards
Research Scholars Program: Since 1975, the AUAF has provided over 460 scholarships and awards to fellows (MD and PhD) who are interested in pursuing a career in urologic research. Researchers have been awarded scholarships through a variety of programs and fellowships.

Pfizer/AUA Foundation Female Urology and Voiding Dysfunction Research Training Awards: The Research Training Awards track will allow mentors with established research programs in female urology and voiding dysfunction to submit proposals for established or to-be-named trainees.

Lower Urinary Tract Symptoms (LUTS) and Bladder Dysfunction Research Exploration Awards: The goal of these awards is to encourage research by MD and PhD researchers to advance the understanding of the basic mechanisms underlying the function of the lower urinary tract and the pathobiology underlying LUTS and bladder dysfunction. Investigators at the doctoral level are eligible to apply for up to $75,000 to support their research for an 18-month performance period.

AUAF/Rising Stars in Urology Research Award and AUAF/NIDDK/NCI Surgeon-Scientist Award: Applicants are Board-certified or -eligible urologists who have successfully competed for a new externally-funded, peer-reviewed career development award (i.e., K07/K08/K23 awards from NIH, or career development type grants from the Department of Defense, American Cancer Society or others). This program provides up to five years of supplemental salary support to career development awardees to ensure that their research salary compensation is competitive with other academic urology faculty.

AUAF Bridge Awards: The AUA Foundation offers bridge awards of up to $15,000 to assist AUA member investigators in continuing vital research efforts while awaiting new funding.

American Urogynecologic Society (AUGS) Foundation Awards
AUGS Foundation Research Grant: a two-year grant awarded to a fellow with a clinical patient-oriented research project
June Allyson Memorial Fund Research Award: a two-year grant awarded to a fellow with a laboratory-based research project
**Thomas Benson Award in Neuromodulation Grant**: awarded to fellows to support research or advanced training related to the clinical use of neuromodulation

**AUGS Foundation Surgical Grant**: a one-year award supported by an educational grant from American Medical Systems and awarded to a fellow or a junior faculty for research related to prolapse or urinary incontinence surgery

**AUGS Foundation/Astellas Research Grant**: a two-year grant available for junior faculty with a clinical/patient-oriented research, lab-based/basic science research, or educational research project

**NIH Career development awards (K series)** offer an excellent opportunity for training and salary support at the junior faculty level such that one’s research skills can be developed in a mentored environment over a 5-year period. They typically provide $75,000 per year of salary support, plus $25,000 per year of research expenses. The goal of the career development award period is to achieve the independence needed to become a funded investigator. Most K awards require 75% effort. However, some institutes, including the NIDDK, have a stipulation that surgeons may dedicate 50% effort in order to maintain surgical skills.

**Mentored Clinical Scientist Development Awards (K08)**: This program represents the continuation of a long-standing NIH program that provides support and “protected time” to individuals with a clinical doctoral degree for an intensive, supervised research career development experience in the fields of biomedical and behavioral research, including translational research.

**Mentored Patient-Oriented Career Development Awards (K23)**: The purpose of the K23 is to support the career development of investigators who have made a commitment to focus their research endeavors on patient-oriented research. This mechanism provides support for three to five years of supervised study and research for clinically trained professionals who have the potential to develop into productive, clinical investigators focusing on patient-oriented research.

**American Geriatrics Society Jahnigan Career Development Awards for Aging Research** provide two years of salary and research support for subspecialists at the faculty level committed to aging-related research.

**NIH Loan Repayment Awards**: If one is committed to at least two years of qualified research (at 50% effort), NIH may repay up to $35,000 of one’s student loan debt per year, including most undergraduate, graduate, and medical school loans. Areas of qualified research include clinical research, pediatric research, health disparities research, contraception and infertility research, and clinical research for individuals from disadvantaged backgrounds.

Several elements are needed to successfully compete for independent funding. The funding opportunities described above are only some of many means to begin the road to academic independence. There are many components to a successful grant application, including the qualifications of the PI, the research team, the actual proposal, and the research environment. One also needs:

**Good fortune!** Favorable reviews are often a function of the specific review committee assigned to the application. Often the NIH releases specific requests for applications (RFAs) that seek research on a specific topic. Aligning the goals of one’s application with those of the funding agency may enhance one’s “luck” with this process.

In addition, one needs time to develop research ideas and write protocols, grant applications, and manuscripts. Therefore, ideally one has:

**Protected research time.** Many academic urologists begin their career with the goal of becoming a clinician-scientist. However, a full-time clinical position without dedicated research time is not conducive to a successful research career. Ideally such time is provided by one’s institution until independent funding is secured. However, one needs to make every attempt to **use that time for research** whenever possible. This is often difficult for busy clinicians. To quote my mentor Dr. Mark Litwin, a pioneer in urological health services research, “Only you can protect your research time.”
The recent faddish cry of “personalized medicine” has led to a situation of trying to run at high speeds without rigorously implementing and consolidating the infrastructure of how healthcare can walk in this field, ie, validated genetics-based personalized healthcare practices. The now all-too-common cliche of personalizing for common diseases seems to have led to many instances of what we term the problem of misattributed equivalence\(^1\). Personalized medicine is viewed by many, even respected leaders in healthcare, to mean common variation for common disorders and pharmacogenomics, and to shun, even ignore, validated genetics to mean rare (aka “useless”) disorders. But personalized healthcare is not new: ABO blood typing is a superb example of widespread genetics-based personalized healthcare dating back to World War II, and continues having universal applicability and will fore centuries to come. Furthermore, consider a more recent example: common variation (eg, SNP) associations for breast cancer, often misattributed as etiologies for common disorders, accounts for 1.5-3% of all breast cancers whereas BRCA1/2 (considered “rare”) alone accounts for 10% of all breast cancers, with 6 other Mendelian breast cancer predisposition genes which should add up to even a higher proportion of all comers with breast cancer.

In taking a very practical point of view, we all want to use genetic and genomic information to benefit the patient. Despite all good intent, how successful have we been? Our entire healthcare system saw 3.5 million visits (1.5 million new visits) in 2008. We know from decades’ worth of clinical epidemiologic and clinical genetic studies that an average of 10% of all diseases have a high penetrance Mendelian genetic cause(s) and perhaps 20-50% more have a genomic component. Even at its most conservative, our healthcare system should have referred 150,000 individuals for genetic consultation. In reality, only 1,600 new referrals to genetics clinics were seen, without wait times or access being an issue, that year (ie, 2008). At the national level, these figures are identical. Levy et al (2009) surveyed 35,000 healthy individuals by taking cancer family histories. By family history alone, 350 appeared to be at risk for hereditary breast and ovarian cancer syndrome due to germline BRCA1/2 mutations, yet only 35 discussed their concern about family history with their healthcare providers, and only 4 reached appropriate BRCA1/2 testing\(^2\). Even more alarming, it is unknown how many received appropriate pre- and post-test genetic counseling, considered the standard of care. Thus, in a field, clinical cancer genetics, where evidence-based management can be changed by genetic information, only 1% of those who require such 21\(^{st}\) century genetics-informed personalized clinical management are even identified and referred to genetics professionals. Indeed, “The Agony and the Ecstasy” (with apologies to both Michelangelo and Irving Stone)!

In this session, we will review:
+ Reactive and proactive medicine
+ Current perspectives from health industry think tank organizations
+ Breath of personalized healthcare
+ Practice of validated genetics for personalizing patient care
+ Direct-to-consumer personal genome scanning
+ Family health history risk assessments compared to personal genome scan-based risk assessments
+ An educational experiment in the setting of direct-to-consumer personal genome scanning
+ What next?

References
The RICE study is a multi-year NIDDK-sponsored epidemiology study designed to estimate the prevalence of Bladder Pain Syndrome/Interstitial Cystitis symptoms among U.S. women and to describe the impact of the condition. As part of this study we screened over 146,000 households for the presence of a woman with bladder symptoms and identified about 3,400 women who met symptom criteria. RICE was designed to address the following questions:

- What are the symptoms of BPS/IC and how can they be ascertained in epidemiology studies?
- How prevalent are BPS/IC symptoms among community women? How does that vary by demographic characteristics? How many women have them?
- What are the characteristics of community women who report symptoms and how do they compare with women diagnosed with IC who are typically studied in specialty practices?
- To what extent are symptomatic community women seeking care for symptoms and who is providing their care?
- What kinds of diagnoses and treatments are they receiving?
- To what extent are they engaging in self-care?
- What are the rates of co-occurrence of mental health conditions among women with BPS/IC symptoms, including anxiety, panic attacks, depression, and suicidal ideation?
- What are the rates of co-occurrence of conditions such as fibromyalgia, chronic fatigue, IBS, and migraine and what fraction of women report none of these conditions?
- In multi-symptomatic women, which came first – bladder symptoms or other kinds of symptoms?
- What are the impacts of BPS/IC on workforce participation, sexual functioning, and self-reported quality of life?
MAPP NETWORK OVERVIEW

J. Quentin Clemens, MD, FACS, MSCI

MAPP is an acronym for the Multidisciplinary Approach to the Study of Chronic Pelvic Pain (MAPP) Research Network. The network was funded by the National Institutes of Diabetes and Digestive and Kidney Diseases (NIDDK) for the period 2008-2013. The MAPP network is focused on the study of urologic pelvic pain syndromes, including interstitial cystitis/painful bladder syndrome (IC/PBS), and chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS). The MAPP research effort is unique in that it conducts highly collaborative and multidisciplinary studies from a broadened systemic perspective, including the possible associations between IC/PBS and CP/CPPS and other pain-based disorders. This is a major shift from the traditional organ-specific focus of previous studies. The MAPP Network also involves a wide breadth of researchers from varied disciplines, including some not previously involved in the study of urologic chronic pain syndromes.

The MAPP Research Network Discovery Sites include:
- Northwestern University, Chicago, IL
- University of California at Los Angeles, Los Angeles, CA
- University of Iowa, Iowa City, IA
- University of Michigan, Ann Arbor, MI
- University of Washington, Seattle, WA
- Washington University, St. Louis, MO

Additional network projects are located at:
- Stanford University, Stanford, CA
- Children’s Hospital Boston/Harvard Medical School, Boston, MA
- Queen’s University, Kingston, Ontario, Canada

The MAPP Research Network Core Sites include:
- Data Coordinating Core (DCC): University of Pennsylvania, Philadelphia, PA
- Tissue Analysis and Technology Core (TATC): University of Colorado in Denver, Denver, CO

MAPP Goals & Objectives

The goals of the MAPP Research Network are to advance our understanding of:
- Syndrome phenotypes (i.e., characteristics attributed to a syndrome).
- Syndrome etiology (i.e., fundamental underlying causes of a syndrome).
- Natural history (i.e., how a syndrome develops and changes over time), including biologic, genetic, and behavioral risk factors associated with a syndrome.

Another important objective of this program is to better understand the biologic and behavioral relationships between IC/PBS, CP/CPPS and potentially-related chronic pain syndromes. Related chronic pain syndromes of primary interest are fibromyalgia, irritable bowel syndrome, and chronic fatigue syndrome. The MAPP Network is undertaking multidisciplinary, multisite, and highly interactive basic, translational, and clinical science research studies. These studies use new and novel approaches to investigate questions of significant clinical relevance. All efforts are expected to provide findings useful for designing future clinical studies of syndrome prevention and/or treatment. The study of IC/PBS and CP/CPPS as systemic syndromes (i.e., expanding the study of these disorders beyond the lower urinary tract) and the use of human study materials (e.g., biological specimens) are also important objectives of the program.

MAPP Research Focus Areas

The MAPP Network is studying IC/PBS and CP/CPPS, as well as their potential relationship with other pain-centered disorders, through a variety of complementary scientific approaches:
**Epidemiology of Disease/ Phenotyping.** This area of research examines how and why patients develop disease and how their disease changes over time. This area also looks at genetic, behavioral/lifestyle, environmental, and other factors as contributors to disease. Of note is the goal to develop participant groupings (phenotypes) that represent specific categories of urologic chronic pelvic pain patients. This may serve to enhance attempts to target treatment to different participants based on their unique disease profiles.

**Neuroimaging/ Neurobiology.** Investigators are using MRI technology to identify differences in morphometry and neural activity between patients with urologic chronic pelvic pain and healthy controls, and to compare these data with those from patients with non-urologic pain syndromes.

**Biomarkers.** A variety of specimens (blood, urine, cheek swabs) are being collected. The goal is to identify potential biomarkers that help to describe the causes and symptoms of urologic pain syndromes, to assess longitudinal changes in relation to urologic symptoms, to examine how these biomarkers are affected by the presence of non-urologic pain conditions.

**Organ Cross-Talk/ Pain Pathways.** Investigators are using animal models of IC/PBS and CP/CPPS as well as human studies to examine neural and functional interactions between various pelvic organs.

**Infectious Etiology.** Contemporary, highly sensitive assays are being utilized to examine the role of infection (bacteriuria, viruria, other infectious agents) as an underlying etiology for IC/PBS or CP/CPPS symptoms.

---

**CENTRAL SENSITIZATION AND INTERSTITIAL CYSTITIS – ANIMAL STUDIES & CLINICAL CORRELATES**

**H. Henry Lai, MD**

Interstitial cystitis (IC) patients suffer from chronic, debilitating bladder and/or pelvic pain of unknown etiology. Traditional research approaches have focused on the bladder as the etiology of IC pain. Clinical observations and animal studies suggested that sensitization of the pain neuraxis may also contribute to chronic IC pain. In this presentation, we shall discuss how central nervous system pain sensitization processes contribute to the development of chronic bladder pain. Specifically, the molecular mechanisms that underlie spinal central sensitization (CS) in an animal model of bladder pain will be examined.

Transmission of nociceptive (painful) signals from the bladder to the brain occurs through second order neurons in the spinal cord. Inflammation of the peripheral organ can sensitize the nociceptors to fire at a lower threshold. This is called peripheral sensitization. After chronic noxious stimulation of the periphery, spinal second order neurons also undergo specific molecular changes which result in hyperexcitability of the spinal nociceptive neurons. This process is called spinal central sensitization (CS). As a result, the “gain” of the spinal pain relay station is re-set to a higher level. Spinal processing of nociceptive signals coming from the bladder is altered such that mildly noxious stimuli are coded more intensely (hyperalgesia), and innocuous stimuli are coded as noxious (allodynia). In addition, adjacent somatic and visceral organs (e.g. the pelvic floor, bowel) that send afferents to the hyperexcited spinal neurons also develop secondary hyperalgesia and allodynia. As a result, the pain receptive field and hyperalgesia/allodynia is expanded to these organs even though they do not have pathology. Spinal CS is also modulated by descending (excitatory and inhibitory) inputs from the medulla, thus allowing higher centers to dial up or down the “gain” of the spinal pain relay station.

On the molecular level, spinal CS involves specific changes in intracellular kinase and ion channel activities on a shorter time scale, and alterations in protein expression and synaptic connection on a longer time scale. As a result, CS and the chronic pain that resulted from it may persist long after the peripheral insults (e.g. bacterial cystitis) have resolved. The hyperexcited state of spinal nociceptive neurons may also be maintained by tonic input from the periphery (e.g. from minimal bladder inflammation). Using bladder distention and/or inflammation to evoke bladder pain, and visceromotor response (VMR) to measure of bladder pain, we have shown in a mouse model that activation of ERK1/2 (extracellular signal-regulated kinase) signaling in lumbosacral spinal neurons is associated with the development of bladder hyperalgesia. Functional blockade of spinal ERK1/2 signaling with intrathecal inhibitors significantly attenuated the distention-evoked VMR and the bladder hyperalgesia. Activated ERK1/2 may phosphorylate ion channels (e.g. Kv4.2 channels, NMDA receptors) and enhance the excitability of spinal nociceptive neurons (i.e. CS). Phospho-ERK may also translocate to the nucleus, activate transcriptional factors, and alter the transcription of specific genes (e.g. c-fos, NK1, TrkB), thus providing a molecular basis of long-standing spinal pain sensitization.

**Funding:** National Institutes of Health, MAPP Research Network
NEUROIMAGING AND NEUROBIOLOGY TRANSMAPP PROJECTS
Timothy J. Ness MD PhD

Six participating centers:
- Northwestern University
- Stanford University
- Univ. Alabama at Birmingham (Wash. U. satellite)
- University of California Los Angeles
- Univ. Michigan
- University Washington

Project I: Structural and Resting State Neuroimaging TransMAPP Study
- Examining patients with IC/CPPS, healthy controls, positive controls
- Obtaining structural brain MRIs and performing morphometric analysis
- Obtaining “functional” brain MRIs as DTI/resting state analysis
- Data consolidated and grouped through LONI at UCLA

Project II: Functional Neurobiology TransMAPP Study
- Specialization of functional measures at individual sites to determine what is “different” in IC/CPPS subjects vs.
  healthy and/or positive controls
  - BOLD fMRI, ASL fMRI
  - Other reflex measures (e.g., eyeblink, startle effects)
  - Emotional and cognitive modulators
  - Psychophysics, effect of conditioning stimuli
  - Drug studies

Will give specific example of ASL (arterial spin label) fMRI studies at UAB
I. The Boston Area Community Health Study: A Unique Resource for Urology
The BACH Survey is the largest prospective epidemiologic study of urologic symptoms in the world, which was designed to address major knowledge gaps in male and female urology. BACH is a population-based longitudinal survey of racially and ethnically diverse men and women from Boston, MA. A total of 5502 (3201 women) subjects were enrolled at baseline (2002-05) and data collection for the first BACH follow-up visit (BACH II) was completed in July 2010. A total of 4145 BACH subjects (2535 women) had subsequent follow up visits (>80% response rate).
BACH's key design features include:
- Large sample size permitting subgroup analyses;
- Use of population-based probability sampling to ensure generalizability of results;
- Prospective data collection;
- Enrollment of both men and women;
- Inclusion of subjects spanning a broad age range (30-79 years at baseline);
- Racial/ethnic and socioeconomic diversity of study subjects;
- Symptom-based rather than variable diagnosis-based definitions of urologic symptoms;
- In-home data collection for serum sampling and anthropometric measurements.

This paper includes highlights and key findings of the BACH Survey: (1) prevalence and risk factors for four common urological conditions in women; (2) quality of life consequences and help-seeking for urologic conditions in women; (3) natural history of urologic symptoms, including progression and remission; (4) the role of lifestyle factors and upstream mechanisms; and (5) public health implications. The BACH Survey team is led by John McKinlay, PhD, Principal Investigator and Director, New England Research Institutes, Inc., and includes expert involvement from a large and highly qualified investigative team.

II. Urologic Symptoms in Women: Which Women are Most Affected?
Urinary symptoms affect women of all ages and race/ethnicities. As shown in Table 1, 18.8% of women reported moderate to severe LUTS at baseline; 10.9% had weekly or daily urinary incontinence (UI); 20.8% were classified as overactive bladder (OAB); and 2.4% as having painful bladder syndrome (PBS). Rates of improvement of about 20% were seen for the more common urologic clusters or symptom patterns, particularly for those women whom who reported more frequent or severe symptoms at baseline. Also shown is that symptom progression occurred in approximately 20% of women in symptoms of OAB, UI and LUTS (6% in PBS), compared with similar percentages who report a lessening or remission of symptoms over time. Analyses conducted by BACH investigators have shown that age, comorbidities and lifestyle factors are all key determinants of progression and remission of urologic symptoms in women.

### Table 1: Prevalence, Remission, Progression (%) of LUTS, UI, PBS, and OAB

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Prevalence Baseline</th>
<th>Follow-up</th>
<th>Progression</th>
<th>Remission</th>
</tr>
</thead>
<tbody>
<tr>
<td>LUTS</td>
<td>18.8</td>
<td>21.0</td>
<td>19.7</td>
<td>17.6</td>
</tr>
<tr>
<td>UI</td>
<td>10.9</td>
<td>12.8</td>
<td>18.8</td>
<td>17.4</td>
</tr>
<tr>
<td>PBS</td>
<td>2.4</td>
<td>3.0</td>
<td>6.0</td>
<td>5.2</td>
</tr>
<tr>
<td>OAB</td>
<td>20.8</td>
<td>18.2</td>
<td>21.7</td>
<td>25.7</td>
</tr>
</tbody>
</table>

III. Role of Lifestyle Factors
Weight loss over the 5 years was strongly associated with LUTS improvement or remission in our sample of women. As shown in Table 2, women who decreased in their level of BMI from the highest category (30+) to the lowest category (<25) had a much lower prevalence of LUTS at follow up. Women with BMI levels >30 at both baseline and follow up visits (stable, obese) had a three times higher prevalence of LUTS (30.4%) compared to non-obese women (10.7%) at follow up. As expected, higher physical activity levels were associated with a significantly lower risk of urologic symptoms or distress. There is increasing evidence overall of the role of modifiable risk factors, as measured in BACH, in the prevalence and incidence of urologic symptoms in women. These findings have important public health and clinical implications.
Table 2: Prevalence of LUTS, UI, PBS, OAB (%) in BACH women at baseline (B) or follow-up (F) as a function of BMI

<table>
<thead>
<tr>
<th>BMI</th>
<th>LUTS</th>
<th>UI</th>
<th>PBS</th>
<th>OAB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>B</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>&lt;25</td>
<td>&lt;25</td>
<td>11.5</td>
<td>10.7</td>
<td>6.8</td>
</tr>
<tr>
<td>25-30</td>
<td>19.5</td>
<td>22.9</td>
<td>7.1</td>
<td>13.1</td>
</tr>
<tr>
<td>30+</td>
<td>18.1</td>
<td>18.1</td>
<td>2.8</td>
<td>15.0</td>
</tr>
<tr>
<td>25-30</td>
<td>&lt;25</td>
<td>20.5</td>
<td>8.6</td>
<td>6.8</td>
</tr>
<tr>
<td>30+</td>
<td>14.9</td>
<td>16.9</td>
<td>8.9</td>
<td>12.8</td>
</tr>
<tr>
<td>30+</td>
<td>&lt;25</td>
<td>21.4</td>
<td>23.9</td>
<td>7.9</td>
</tr>
<tr>
<td>25-30</td>
<td>16.9</td>
<td>27.0</td>
<td>21.2</td>
<td>6.6</td>
</tr>
<tr>
<td>30+</td>
<td>26.0</td>
<td>30.4</td>
<td>15.7</td>
<td>18.9</td>
</tr>
</tbody>
</table>

IV. Future Prevalence of Urologic Diseases and Symptoms: Implications of BACH

With the growing epidemic of obesity in men and women, we can anticipate steady increases in the prevalence of urologic problems in women, many of which will require medical or lifestyle intervention. Based on BACH estimates, we see 30%-40% anticipated increase in the prevalence of most urologic conditions by 2025 (See Table 3). Attention is urgently needed to lifestyle and public health implications of these trends.

References:
2. Litman HJ, McKinlay JB. BJU Int. 2007; 100: 820-5.

Table 3: Population Trends in Urologic Conditions in Women (Source: Litman & McKinlay, 2007)

<table>
<thead>
<tr>
<th>Prevalence in women, millions</th>
<th>Increase</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom</td>
<td>2000</td>
<td>2025</td>
</tr>
<tr>
<td>LUTS</td>
<td>15.34</td>
<td>20.584</td>
</tr>
<tr>
<td>Urine leakage (UI)</td>
<td>8.571</td>
<td>11.832</td>
</tr>
<tr>
<td>Painful Bladder</td>
<td>2.209</td>
<td>2.585</td>
</tr>
<tr>
<td>At least one of the</td>
<td>19.20</td>
<td>25.775</td>
</tr>
</tbody>
</table>

Supported by Award Number U01DK056842 from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK).
Many clinical and basic science investigators make discoveries in their laboratories that could possibly benefit millions of patients. However, progressing discoveries from the lab and into patients is an expensive, tedious, and lengthy process that requires the scientist to become a “champion” of their idea and invest considerable time and energy (if not money) into the discovery’s development. Too many good ideas never make it beyond publication in a journal, at which time their financial value drops to zero if no one has protected the “intellectual property” with a patent application prior to publication.

Patent protection is an absolute requirement to interest anyone in investing the time and energy necessary to test the idea’s benefit and safety for “real life” application in patients, because most discoveries can be expected to fail during the development process. However, those discoveries that find useful application in patients provide a tremendous feeling of accomplishment and, quite possibly, financial reward for the scientist.

The objective of this panel session is to encourage scientists to commercialize their discoveries, lay out the basic roadmap from the “idea” stage to the commercial development stage, and highlight the major roadblocks that might be encountered. This objective will be approached by having 3 scientists, who had the courage to nurture their discoveries on the long, slow road from the lab to clinical application, provide a brief (10-15 minutes) description of their personal experience associated with their journey.

Because each idea is likely to have many different paths to clinical application and there is no “cook book” didactic way to teach commercialization, the panel decided that the remaining time (40 - 55 minutes) will be spent answering questions raised by the audience and discussing topics of interest as raised by the audience. Because none of the panel are lawyers, nothing said during the session should be construed as legal advice.

The 3 scientists and their respective titles are below...

- **“Bridging the Abyss Between Academic Research and Biotech Startup”**
  - Dr. Michael Chancellor
    - Director of Neurourology Research, Beaumont Hospital, Royal Oak
    - Professor of Urology, Oakland University William Beaumont School of Medicine

- **“University / VA Regulatory Hurdles and Conflicts for IP Development from an Academician’s (Nonlegal) Perspective”**
  - Dr. Susan Keay
    - Professor of Medicine, University of Maryland School of Medicine
    - Staff Physician, Veterans Administration Maryland Health Care System

- **“Value Creation in Urology”**
  - Dr. Gerald Timm
    - President and Founder, GT Urological, LLC
    - Professor of Urologic Surgery, Medical School, U of MN
    - Associate Director for External Relations, Institute for Engineering in Medicine, U of MN
UNIVERSITY / VA REGULATORY HURDLES AND CONFLICTS FOR IP DEVELOPMENT FROM AN ACADEMICIAN’S (NONLEGAL) PERSPECTIVE
Susan Keay, MD PhD

For several years, investigators at U.S. medical schools have been encouraged to perform translational research with a goal toward development of diagnostics and therapeutics for human disease (“bench top to bedside”). Toward this same goal, technology development offices have been created at most academic medical centers to assist with the protection and licensing of intellectual property (IP). Conflict of interest offices have also been created at medical centers to assist with the identification and/or management of conflict that may develop for the investigator as an employee of the academic medical center and as a developer of IP that is licensed by a commercial entity. In addition, investigators who have part-time or full-time appointments at VA facilities, and/or whose laboratories are housed on federal property, must also work within the rules of the federal government regarding research, disclosure, patenting, licensing, conflict of interest, and revenue sharing (royalties).

In this talk, I’ll present my experience with intellectual property development as both a University and VA investigator. The process of disclosure to both entities will be outlined, and certain obstacles that must be overcome for the development of intellectual property that is jointly owned by the VA and a university affiliate will be presented. In addition, general regulatory issues that have been presented to VA investigators concerning their interaction with commercial parties will be discussed. It is hoped that an awareness of these issues will assist other university/VA investigators with bringing their discoveries to clinical application.
The panel assembled is comprised of experts in their respective fields related to bladder physiology. They will each present their research findings in these areas, as related to possibly connection to OAB syndrome. The hypothetical causes for OAB that will be discussed in this panel include central neural control of the bladder, bladder urothelial afferent signaling, focal and regional bladder instability, and detrusor smooth muscle factors.

Because OAB treatment in the clinics currently relies heavily on symptoms and not necessarily on biology, could better understanding of pathophysiology result in ability to stratify OAB-complaints into different etiologies? Can we ascribe different OAB phenotypes based on causality which will result in better treatments? Or are the causes of OAB sufficiently multifactorial that no one specific target can be effective? The ultimate goal in management, treatment and prevention of OAB should be based on biologic causality.
Overactive bladder (OAB) is a clinically prevalent, heterogeneous symptom syndrome, treated empirically with variable success, partly due to poor understanding of its underlying pathophysiology. The complaint of urgency is a central symptom of OAB, often but not always associated with detrusor overactivity (DO). The involuntary character of DO and the emotional aspect of urgency are both indicative of CNS involvement. Yet, the CNS, an integral part of continence control, has been understudied in relation to patients’ reports and to clinical evaluation, functional status or effect of OAB treatment.

fMRI is a non-invasive method to assess regional brain activity. Because it is easy to combine it with various tasks and paradigms related to cognitive function, fMRI has greatly improved knowledge of CNS function. For research on bladder control and continence, fMRI is usually combined with urodynamic measurements, allowing synchronous monitoring of bladder function. Using various paradigms during the storage and voiding phases (e.g. bladder filling, emptying, squeezing of the pelvic floor muscles) fMRI studies in the last two decades have increased our knowledge of the complex brain activity involved in the micturition cycle and continence control and have outlined a ‘brain-bladder control network’.

There are 3 ways that fMRI studies can contribute to better understanding of OAB: 1) by gathering information about CNS involvement in the phases of the micturition cycle and continence control – functional neuroanatomy; 2) by characterizing brain activity during patient-reported symptoms (e.g. urgency) - clinical neuroanatomy (neural correlates); and 3) by defining the regional brain activity associated with different functional outcomes in subjects with similar clinical presentation (e.g. brain activity during DO and incontinent episodes) – imaging biomarkers for clinical and/or physiological phenotypes. Point 3) is the most relevant to today’s panel discussion.

1) Functional neuroanatomy of the micturition cycle
Brain activity related to urine storage encompasses the whole brain and relates to regions involved in different cognitive functions. For example, during bladder filling afferent information from the bladder is relayed to the insula – a region involved in somatosensory awareness of many organ systems. The insula is connected with regions in the prefrontal cortex and limbic system, providing for complex emotional and cognitive processing of the sensations and motor activity associated with bladder filling.

2) Clinical neuroanatomy – the brain activity underlying patient-reported symptoms
Urgency is a major symptom in many patients with OAB. fMRI studies of urgency (provoked by fast filling of a well filled bladder, but without concurrent DO) describe a specific pattern of brain activity: activation in certain regions and deactivation in others. Activation is present in regions of sensory awareness (e.g. insula), emotional processing (e.g. dorsal anterior cingulate cortex, dACC), and regulation of smooth-muscle and pelvic-floor muscle activity (supplementary motor area [SMA] and adjacent regions). In addition, activation and deactivation in the dorsolateral and ventromedial prefrontal cortex indicate intense involvement of the highest cognitive and executive centers in the brain. Coordinated activity in all these regions suggests that urgency is the outcome of complex neural processing of bladder afferents that involves retrieval of unpleasant information that enhances motivation to void, together with an effort to suppress bladder activity and maintain continence. Thus, the sensation of urgency is much more complex than a mere ‘feeling,’ as originally believed or defined.

3) Brain imaging biomarkers for clinical and/or physiological phenotypes
As pointed out above, OAB is a symptomatic diagnosis that includes physiologically heterogeneous groups of subjects. For example, subjects with OAB may or may not exhibit DO on urodynamic exam: those showing DO differ also in other ways from those who do not, as they show less tolerance to bladder filling. Our preliminary imaging study (presented as an essay during this meeting) further suggests that subjects with OAB who develop DO and incontinence in the scanning session differ from those who remain continence, with no DO, during scanning. Those with DO show greater activation in the SMA and adjacent regions during urgency – prior to the onset of DO, even more so during actual DO, and also during any subsequent incontinence episode. In this group, furthermore, the response of this region to bladder filling is greater even if the bladder is nearly empty. Thus, subjects may have different functional outcomes (DO vs. no DO) and correspondingly different patterns of brain activity, in spite of similar clinical symptoms.
Together these observations suggest a possible OAB phenotype in which DO is easy to elicit and there is abnormally strong activation of the SMA and adjacent dACC. We expect to find other phenotypes with similar symptoms but different brain responses. SMA/dACC activation is thus a potential biomarker of phenotypic status. Moreover, since SMA/dACC activation indicates urgency, it may be used as an objective marker of response to treatment aimed at reducing urgency.

One practical limitation on the applicability of these results is that at present the activation differences of interest can be reliably measured only in groups of 6 or more subjects. Further refinement of technique is required before individual patients can be reliably categorized. Nevertheless, brain imaging studies combined with urodynamic monitoring are promising both clinically – to help identify phenotypes that may require specific treatments – and for research – to provide markers of disease that may be used to assess response to treatment.
The bladder urothelium has been viewed to be a passive membrane. However, it is becoming increasingly appreciated that the urothelium actively participates in sensory functions. Data accumulated over the last several years now indicate that urothelial cells display a number of properties similar to sensory neurons (nociceptors/mechanoreceptors), and that both types of cells use diverse signal-transduction mechanisms to detect physiological stimuli. The release of chemical mediators from urothelial cells suggests that these cells exhibit specialized sensory and signaling properties that could allow reciprocal communication with neighboring urothelial cells as well as nerves in the bladder wall. Substances released from urothelial cells can alter the excitability of bladder afferent nerves acutely and chronically; these observations appear to be of particular importance in chronic bladder conditions and in the aging bladder. For example, augmented release of transmitters such as ATP or acetylcholine as well as alterations in neurotrophic factors within the mucosa have been reported in a number of bladder disorders. Increased NGF also has been identified in the urine of patients with overactivity and thus has been proposed as a potential biomarker for overactive bladder (OAB) syndrome. These changes could lead to sensitization of a variety of targets, such as TRPV1, within the urothelium and sensory neurons. Altered expression of the capsaicin receptor TRPV1 in bladder urothelium has been shown in patients with detrusor overactivity suggesting a therapeutic potential of TRPV1 agonists/antagonists in the treatment of syndromes including OAB. We examined the function of cholinergic and TRPV1 receptors in bladder urothelial cells (BUCs) from patients diagnosed with OAB as compared to asymptomatic controls. OAB BUC cultures exhibited increased sensitivity to capsaicin (~3 fold increase in ATP release) but no significant difference in ATP release to either acetylcholine or mechanical stimuli as compared to asymptomatic controls. In addition, the increased response to capsaicin correlates with increased expression of TRPV1. Though antimuscarinic drugs are the most commonly used treatment for OAB, these generally do not fully control urgency and have a high incidence of side effects. Our findings show that BUCs from OAB patients exhibit increased TRPV1 expression and a capsaicin-hypersensitivity resulting in augmented release of ATP. The increased release of urothelial-derived ATP could ‘amplify’ signaling between and within urothelial cells and nearby afferent nerves — resulting in urgency. Taken together, it is conceivable that the effectiveness of some agents currently used in the treatment of bladder disorders may involve urothelial receptors and/or release mechanisms. While traditional therapies for urinary bladder pain have primarily focused on neuronal targets, recent findings suggest that targeting urothelial sensory molecules and/or release mechanisms (such as agents that disrupt exocytosis and transmitter release such as botulinum toxins) could be an alternative for the development of pharmacological agents for the treatment of bladder dysfunction.
It has been known since the late 1800s that the bladder, like other visceral smooth muscle, exhibits autonomous motility. However, efforts to make use of this knowledge and apply it toward understanding the normal physiology and pathophysiology of the lower urinary tract have been relatively few in number. Those that have pursued elucidation of the mechanisms involved in non-voiding bladder motility have made great strides in understanding both the interactions of non-neuronal cell types with other non-neuronal cell types within the bladder and the interactions of bladder non-neuronal cells with the autonomic nervous system. Moreover, the insights gleaned from such research may ultimately explain the origins of urgency and detrusor overactivity, thereby allowing us to better design approaches to treat these contributors of overactive bladder.

This presentation will begin with a brief description of how the interlinking non-neuronal cell network, together with its autonomic neuronal overlay of influence, creates micromotions in the bladder wall and thereby affects the final afferent outflow from the entire bladder as a sensory transducing unit. These micromotions set a background of afferent noise which affects how bladder afferent signals are interpreted by the central nervous system (CNS). High levels of afferent noise may set an elevated baseline from which normal volume mechanoreceptor signals are amplified resulting in sensations of urgency, or, conversely, it may provide a mask through which normal afferent signals of bladder volume suddenly break through as an immediate signal of fullness and, therefore, urgency. The second part of the presentation will describe how these same networks might also function to support normal bladder filling and emptying by coordination of signals arising from the distal ureter/trigone region and from the parasympathetic nervous system, respectively. Finally, a description will be given of autonomous motility in humans and how these physiological mechanisms may play a role in lower urinary tract (LUT) function and dysfunction in humans.
During the bladder-filling phase, the detrusor smooth muscle (DSM) accommodates to increasing volumes of urine, providing low pressure bladder storage capacity. During voiding, the DSM contracts forcefully to expel urine. DSM exhibits spontaneous action potentials that are associated with the phasic nature of spontaneous bladder contractions. The spontaneous electrical and mechanical activity of isolated DSM strips has been shown to be myogenic in origin because it is not eliminated by neurotransmitter receptor antagonists or tetrodotoxin, a neuronal Na⁺ channel blocker. In many patients, overactive bladder (OAB) symptoms are associated with detrusor overactivity (DO), which is characterized with abnormally increased spontaneous contractions.

During DO, the DSM properties are altered, compromising normal bladder function. In patients with diabetes mellitus or with bladder outflow obstruction, the bladders are enlarged and there is considerable hypertrophy along with changes in the physiological properties of the DSM cells (Andersson and Wein, 2004). Partial denervation of DSM is another factor contributing to DO. This is commonly seen in bladders with voiding dysfunction leading to decreased nerve-evoked contractions and to increased DSM excitability, which contributes to the OAB symptoms. In OAB patients, partial denervation is seen in ageing bladders, unstable bladders associated with outflow obstruction, neuropathy, and in people with idiopathic OAB (Turner and Brading, 1997). A pathophysiological increase in the DSM cell-to-cell electrical coupling is another possible mechanism involved in DO (Turner and Brading, 1997). Changes in DSM cholinergic and/or adrenergic receptor density have also been implicated in the etiology of DO (Andersson and Wein, 2004). As key regulators of DSM membrane excitability, various K⁺ channels control the opening and closing of the voltage-gated Ca²⁺ channels, and thus DSM contractility. Therefore, it is believed that mutation or defects in DSM K⁺ channels or their regulatory mechanisms underlie certain forms of DO. Recent studies from our laboratory have identified the large conductance voltage- and Ca²⁺-activated K⁺ (BK) channel as a key element in determining the excitability and contractility of human DSM (Chen et al., 2009). Further studies also revealed that the human DSM BK channel activity is reduced in patients with neurogenic DO which leads to increased DSM contractility (Hristov et al., 2010). In agreement with our studies, recent findings in benign prostatic hyperplasia patients with DO and in a partial bladder outlet obstruction rabbit model suggested that downregulation of BK channel contributes to DO (Chang et al., 2010).

Unfortunately, the tremendous amount of basic science data on the mechanism of DO collected in the past 2–3 decades has not been translated yet into any significantly improved clinical phenotyping or diagnostic tools for DO. There are three major approaches for collecting data from OAB patients: 1) symptoms; 2) urodynamics; and 3) laboratory studies of isolated DSM tissues. However, we are very limited on what we can measure in determining DO. From a practical point of view, it is important to know which of the clinical symptoms result from a change in DSM properties. Symptoms are most commonly based on the American Urological Association symptom score system but cannot conclusively identify DO. Urodynamics are not highly sensitive or specific for identifying DO in individuals with urgency, frequency, and other irritative lower urinary tract symptoms. A significant portion of the patients without DO on conventional urodynamics will demonstrate such findings on ambulatory urodynamics. However, ambulatory urodynamics are expensive, uncomfortable for the patient, and are rarely clinically used in the US. Studies on isolated human DSM tissues are limited by logistics and ethical concerns. For all these reasons, most of the DO studies have been done on animal models that do not always completely correlate to humans.

In the past 35 years, the pharmacological basis of OAB treatments has remained the use of anti-muscarinic agents, which inhibit DSM contractions directly. However, they have limited effectiveness and many side effects, such as dry mouth, constipation, tachycardia, and changes in mental status which limit dosing (Andersson and Wein, 2004). An understanding of the ion channels and receptors that regulate DSM contraction and relaxation is crucial to developing new drugs for OAB and DO treatment. Two novel classes of potential pharmacological targets for DO treatment have emerged in recent years— β3-adrenoreceptors and K⁺ channels, the BK channel in particular. Combined evidence supports the concept that BK channel activation can be a desirable feature for the control of bladder function, including pathophysiological conditions of DO regardless of the underlying cause. Our laboratory recently reported that the functional coupling of β3-adrenoreceptors to BK channel activity plays a key role in the inhibitory mechanism of DSM contractions (Hristov et al., 2008). Therefore, selective β3-adrenoreceptor agonists or drug-induced BK channel opening...
may represent novel opportunities for pharmacological treatment of OAB patients with DO. BK channel gene therapy may also prove useful in restoring normal bladder function in patients with DO.

References
This lecture will summarize existent information related to pain-related (nociceptive) sensations associated with the urinary tract and nearby organs. After a brief discussion related to human sensory events and gross anatomy, the sensory pathways associated with bladder sensation will be described from the periphery to central structures. The following topics will be discussed in a sequential fashion:

- Clinical Pain and Psychophysical Reports
- Gross Anatomy of Urogenital Pain
  - Dual Innervation - Thoracolumbar & Sacral
  - Developmental Issues
- Urothelial-Primary Afferent Interactions
- Populations of Primary Afferent Neurons
- Spinal Dorsal Horn Processing
- Ascending Spinal Pathways
- Supraspinal Processing Sites
- Peripheral Processing and Non-spinal Pathways for Sensation
- Modulators – Inflammation, Stress, other
IC Painful Bladder Syndrome
Overview of Diagnosis and Treatment of IC/PBS
Deborah R. Erickson, MD
Thursday, March 3, 2011 • 8:20 a.m. – 9:35 a.m.

I. Expect AUA Guidelines in 2011. This presentation is based on my literature review and experience, not the guidelines. Learning objectives for this presentation are:
A. Describe how diagnostic criteria have evolved
B. Discuss pros and cons of cystoscopy, distention, urodynamics and K sensitivity test
C. Compare and contrast treatment of patients with vs. without Hunner lesions

II. Evolution of IC diagnostic criteria and nomenclature
A. Early descriptions focused on bladder ulcers
B. Seminal papers identified two types of IC:
   1. With bladder ulcers (now called Hunner lesions)
   2. No ulcers, but glomerulations after bladder distention
C. Glomerulations later found neither sensitive nor specific for clinical IC
D. Evolution of Nomenclature ("interstitial cystitis" not scientifically accurate)
   1. 1988: NIDDK research criteria (for research; too strict for clinical use)
   2. 2002: Painful bladder syndrome by ICS: Suprapubic pain related to bladder filling, [with] other symptoms such as ↑ daytime and night-time frequency, in the absence of proven urinary infection or other obvious pathology
   3. 2008: Bladder pain syndrome by ESSIC: Chronic (> 6 months) pelvic pain, pressure, or discomfort perceived to be related to urinary bladder, with at least one other urinary symptom such as persistent urge to void or frequency. Also, ESSIC provided a long list of confusable diseases to exclude

III. Cystoscopy pros: identify bladder cancer, stones or Hunner lesions. Cons are discomfort, risk of infection, expense, and low incidence of significant findings

IV. Bladder distention pros and cons
A. Main pro: symptoms may improve (usually < 6 months, can’t predict ahead of time)
   1. Any improvement: 50-60%
   2. Excellent improvement: 12-16%
B. Cons: Most patients get worse for 1-2 weeks, expense, risks of anesthesia, infection, small chance of bladder rupture or necrosis

V. Urodynamics pros and cons: good debate in "opposing views," J Urol, July 2010 p15-7
A. Pros: helps rule out other disorders (e.g. obstruction, detrusor overactivity) and may gain information by placing local anesthetic through catheter at end of study
B. Cons:
   1. Expense, risk of infection, pain (especially with vulvodynia, pelvic floor spasm)
   2. Low incidence of other disorders in typical female PBS/BPS patient
   3. Some of the other disorders can be found noninvasively
   4. May have urodynamic artifacts due to pain
VI. Potassium sensitivity test: not a standard diagnostic test for IC and not mentioned in ESSIC recommendations. Good "opposing views" debate in J Urol, August 2009, p431-4
A. Pro: may identify epithelial dysfunction, but little practical significance because it does not predict success with PPS or heparin/lidocaine.
B. Cons: risks infection or severe prolonged pain, also not helpful in diagnosing IC
   1. PST negative in about 25% of IC patients who met NIDDK criteria
   2. Not specific to IC (positive in other disorders)
   3. Doesn’t help in diagnosis for patient with typical IC symptoms

VII. How Hunner lesions (HL) affect diagnosis and treatment
A. Diagnosis
   1. With HL: easy diagnosis, lesion(s) seen on cystoscopy
   2. Without HL: no well-defined objective test available, so must rely on history, exam, urinalysis, culture, other tests as indicated and clinical judgment
B. Treatment with HL
   1. Sx usually resolve if treat discrete ulcers by TUR, laser or steroid injection
   2. Anti-inflammatory treatments (HL are areas of severe inflammation)
      a. In theory, should work better for patients with vs. without HL, but no formal reports on this
      b. Bladder instillation (DMSO + steroid seems best, but no formal trials)
      c. Cyclosporine A more effective than PPS in randomized trial, which included 15 pts with HL and 49 without.
C. Treatment without HL (a chronic pain syndrome with many proposed causes)
   1. Numerous conservative, oral and intravesical treatments are used
   2. The ICA has good advice on diet & other self-help measures (www.ichelp.org)
   3. Start with the least risky treatments
   4. Combined treatments are often required
   5. Remember there may be pain generators outside the bladder
   6. For many patients, a crucial component is to decrease stress (or decrease the effect of stress on the body)
   7. Remember placebo and nocebo effects (for example review see reference 20)
      a. Explain Sx and treatment mechanisms (↑ expectation of success)
      b. Give patient increased sense of control
      c. Convey that you care
      d. Have a reliable person to return calls and treat flares promptly

REFERENCES
1. Hanno PM, J Urol 1999
4. Irwin P, J Urol 2005
5. Tissot WD, J Urol 2004
6. Tamaki M J Urol 2004
7. Cole EE, Neurourol Urodyn 2005
8. Hanno PM, Semin Urol 1991
10. Teichman JMH, J Urol 1999
11. Parsons CL, Urology 2002
12. Butrick CW, Int Urogynecol J 2009
20. Erickson DR, J Urol March 2009
In studies to determine the possible causes of IC/PBS, we and others have determined that certain properties of bladder epithelial cells appear to be abnormal in IC/PBS patients both in bladder tissue and explanted cells, suggesting an intrinsic epithelial cell defect. Studies from our lab specifically have shown that explanted IC/PBS epithelial cells have 1) profoundly decreased rates of cell proliferation, 2) altered production of certain growth factors including decreased heparin-binding epidermal growth factor-like growth factor (HB-EGF) and increased epidermal growth factor (EGF), 3) altered expression of bladder epithelial differentiation protein markers (including increased E-cadherin and decreased vimentin), and 4) decreased expression of tight junction proteins (including zonula occludens 1 (ZO-1) and occludin) with increased monolayer permeability, as compared to controls.

Our laboratory also discovered and characterized a novel antiproliferative factor (APF) that is present in the urine of approximately 95% of patients who fulfilled the previously used NIDDK criteria for IC. APF is a small sialoglycopeptide (Neu5Acα2-3Galβ1-3GalNAcα-O-TVPAAVVVA) whose peptide backbone bears 100% homology to a segment from the 6th transmembrane portion of Frizzled 8 (Frz8); its functional receptor in bladder epithelial cells is CKAP4. APF, which we determined is secreted by bladder epithelial cells from IC/PBS patients, causes abnormalities in normal bladder epithelial cells that mimic changes seen in IC/PBS cells, including profoundly inhibited cell proliferation, altered epithelial growth factor production [including significantly decreased heparin-binding epidermal growth factor-like growth factor (HB-EGF) and increased epidermal growth factor (EGF)], specifically altered bladder epithelial differentiation marker gene expression, and decreased tight junction formation with increased bladder epithelial paracellular permeability. Because decreased urine levels of HB-EGF; increased urine levels of EGF; bladder epithelial thinning, ulceration, or leakiness; and abnormal expression of some of the same bladder epithelial proteins (including E-cadherin and ZO-1), have all been described previously in IC/PBS patients in vivo, APF may play a role in the pathogenesis of IC/PBS for those patients who fulfill the modified NIDDK criteria for IC.

Although APF was discovered while attempting to determine the pathogenesis of IC rather than while looking for a biomarker for IC or IC/PBS, previous blinded studies of urine samples from IC patients and controls (including patients with over 12 other urogenital disorders) indicated that it may also be fairly specific, and therefore a potential biomarker, for this disease. Data from those studies will be reviewed, and obstacles we have encountered in the development of a diagnostic test for IC based on APF will be discussed.
For over 15 years, the focus of the Cleveland Clinic Urothelial Biology Laboratory has been on developing and accumulating data to test the hypothesis that Interstitial Cystitis represents a genetic predisposition of the uroepithelium to undergo apoptotic ulcerative transformation in response to inflammation or cellular stress instead of producing a regenerative response through urothelial proliferation. Overtime this genetic spectrum of imbalance favoring apoptotic urothelial loss to proliferative replacement appears to progress from findings of early urothelial barrier cell dysfunction to chronic ulcerations and exposure of underlying afferent pain fibers.

This presentation will cover the translational evidence of clinical and basic science confirmation of a uroepithelial apoptotic predisposition in IC patients. Furthermore, we will explore clinical and basic science observations that continue to support this hypothesis and would suggest more in-depth studies are warranted as they relate to the following research questions:

- Have clinical trials of IC therapies excluded confounding variables that may have precluded observations of a beneficial therapeutic outcome? Such examples would be existing Ureaplasma and Mycoplasma infections of the lower GU tract in IC patients or NSAIDs or salicylate (ASA, Urised, Cystex, etc.) formulations uses by IC patients on clinical trials that inhibit prostaglandin synthesis (PGE), the major growth factor for regulating uroepithelial proliferation.

- Why do “acute urothelial injury therapies” such as hydrodistention, fulguration, caustic instillation therapies or BCG appear to have good short term effects, but lack durable responses? Are the inducible acute injury responses by the iatrogenic interventions above activating short-term proliferative healing responses, but failing to induce long term regeneration of functional uroepithelium in genetically predisposed apoptotic cells? Are we confounding the effects of these interventions by allowing the use of uroepithelial cell growth inhibitors: perioperative NSAIDs (intra-operative ketorolac/Toradol), steroids (airway and reflux management), ASA, etc.?

- Are clinicians aware of the growing data showing NSAIDs-related IC since 1994? Are they aware that the estimated population of IC (1% of the population) is being exposed to increasing amounts of NSAIDs throughout all stages of the human life cycle?

- What is the mechanism of NSAIDs-related IC – if the mechanism is PGE inhibition, should we also study salicylates and steroids as they are inhibitors and modulators of prostaglandin synthesis? If we are treating TCCA or preventing epithelial proliferative diseases (FAPP, Colon CA) with NSAIDs and salicylates, should we not limit their use in non-epithelial proliferative conditions such as IC?

- Since urothelium has a limited proliferative index based on telomere loss, does IC urothelium have a limited lifespan as measured by telomeric length? Would urothelial stem cells be the ultimate replacement therapy?

- Are the peri-IC symptoms a result of systemic epithelial dysfunctions, i.e., serositis instead of endometritis, IBD, synovial epithelial cell dysfunction of the joints, allergic hypersensitivities of airway and APCs of the immune system?

- Would an IC treatment program include NSAIDs, salicylates or steroid avoidance while including some form of uroepithelial proliferative agent such as PGE therapy? What is the risk? How long would it take the bladder to reach a healing or regenerative state that would reduce symptoms? Is there an uroepithelial stage of IC that precludes autologous healing?

- Why do IC databases of patients reveal non-existent or minimal rates of epithelial cancers compared to controls? Is their predisposition to apoptosis rather than proliferative expansion cytoprotective against all epithelial cancers? Is APF not only a biomarker for IC, but the magic bullet for epithelial cell malignancies?
- Do the IC database cancer findings support IC as a systemic epithelial condition rather than an isolated uroepithelial condition? Is APF only derived from uroepithelium; is it measurable in the blood after bladder removal? What happens to the bladder urothelium in IC patients who undergo a urinary diversion with bladder preservation?

IC Trivia:

When was Aspirin Invented?
Glad you asked...
Aspirin in the name given to the compound acetylsalicylic acid, originally credited to the French scientist, Charles Gerhardt in the late 1800's. However, it was Felix Hoffman, a German scientist, who is later created when rediscovering it and obtaining a patent for it's more common uses.

So when was the first reported cases of IC?
Glad you asked...
See you at the presentation.
Sling procedures were first described in the early 1900s for the treatment of stress urinary incontinence. The modern sling was introduced to the urologic community in 1978 by Drs. McGuire and Lytton. Although they initially left a piece of fascia attached on one end they later used a detached piece of fascia, 8 -10 cm, with nylon sutures forming the remainder of the sling. Initially slings were advocated for complicated cases; patients who had failed multiple procedures such as Kelly plications, needle suspensions or retropubic bladder neck suspensions and for patients with recognized intrinsic sphincter dysfunction. A number of publications in the last half of the 90's helped to fuel the use of the sling as the main surgical procedure for stress incontinence. The AUA guidelines for the surgical treatment of female stress urinary incontinence in 1997 showed that slings were far superior to needle suspensions. New developments in sling technology, some of them now obsolete, proved to any practicing urologist that they could easily learn to do a sling and that they could have initial good results. The pubovaginal fascial sling should be part of our armamentarium for the treatment of SUI. It is still needed for the patient where sling tension is beneficial or in the patient where synthetics should be avoided because of infection or post reconstruction. Today have a plethora of choices of sling materials and techniques, many of them marketed to patients, and the question is then raised; which sling for which patient, and what will be our standard sling in the coming years.

During this debate, each presenter will give a short presentation on their assigned sling. Cases will then be presented with each participant being asked which sling they would use and why. To conclude each presenter will review when they would not do their sling and make their final case why their sling will become the standard.
With over a decade of accumulated outcomes and safety data as well as widespread experience the retropubic synthetic mid-urethral sling can now be considered one of the “Gold Standard” procedures for the treatment of female stress urinary incontinence. Studies have followed patients for as long as almost 12 years and have demonstrated continued success over that length of time. Serious complications with retropubic slings are extremely rare. These slings are truly minimally invasive and are easily performed in most patients under IV sedation and local anesthesia with the majority of patients voiding normally and discharged home within 2 hours of surgery. Over the last few years other minimally invasive slings have been introduced that are placed via a transobturator or purely vaginal approach. To date the longevity of follow-up for these slings has been shorter, none have demonstrated superiority to the retropubic approach and in certain patients there is data that they may be inferior. Specifically, there is evidence that patients with low valsava leak point pressures as well as those undergoing repeat slings may have inferior outcomes with a transobturator sling than with a retropubic one.

These and other issues will be explored during the presentation to make the case that retropubic slings are here to stay.
The past several decades have witnessed tremendous changes and advances in the field of pelvic floor medicine. Innumerable new techniques have been developed to address stress urinary incontinence (SUI). Amongst these techniques are transobturator (TO) slings which, upon initial introduction, seemed beyond belief to many pelvic floor surgeons. Interestingly, however, the TO approach rapidly caught on and has become a very popular choice for the properly selected patient.

TO slings have been shown to be a safe alternative to a retropubic (RP) midurethral synthetic sling. By avoiding the RP passage, they minimize the risks associated with this approach. For the properly selected, truly index patient with genuine SUI, TO slings are an excellent, minimally invasive, and efficacious approach to offer. In addition to avoiding the RP trajectory, the TO approach appears to be well-tolerated in patients who have a component of urinary urgency, a symptom that traditionally precluded patients from undergoing an anti-continence procedure. Long-term data are admittedly still lacking, but early and intermediate follow up suggest that TO slings have the potential to be a “gold standard” contender for the standard sling by 2015.
Since the introduction of the mid-urethral sling in 1996, various technique modifications have been developed to improve safety and minimize invasiveness of the procedures. Single-incision mini-slings were introduced as ultra-minimally invasive solutions. Building on the retropubic (RP) and transobturator (TOT) platform of efficacy and ease of use, the mini-sling was designed to potentially reduce mesh from traversing any major muscles, reduce risk of organ injury, reduce procedure time and hopefully achieve a better patient experience (i.e. no external incisions, local anesthesia, minimize post-operative pain, and office based therapy). Because of the success of RP and TOT, the first Mini-sling was designed to be placed either in the retropubic or transobturator pathway. Early results were mixed and not consistently reproducible due to multiple factors including fixation technique, surgeon learning curve, and appropriate tensioning techniques. Since their first introduction in 2006, several mini-slings have emerged (see Table 1). Each mini-sling is made of type 1 polypropylene but has a unique sling length, trajectory pathway, delivery device, fixation method and fixation location. Although the selection of patients for mini-slings is evolving; most surgeons reserved mini-slings for SUI patients without prior anti-incontinence surgery. Early data is promising that these new mini-slings can provide successful mid-urethral support with less dissection, less procedure time, and less attendant morbidity of leg muscle or obturator nerve adverse events. Available data regarding the different single incision mini-slings will be described in this lecture.

Table 1. Midurethral Slings

<table>
<thead>
<tr>
<th>Retropubic</th>
<th>Manufacturer</th>
<th>Approach</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVT</td>
<td>Ethicon Women’s Health</td>
<td>Transvaginal</td>
<td>1997</td>
</tr>
<tr>
<td>Sparc</td>
<td>American Medical Systems</td>
<td>Suprapubic</td>
<td>2001</td>
</tr>
<tr>
<td>TVT with abdominal guides</td>
<td>Ethicon Women’s Health</td>
<td>Suprapubic</td>
<td>2002</td>
</tr>
<tr>
<td>Advantage</td>
<td>Boston Scientific</td>
<td>Transvaginal</td>
<td>2003</td>
</tr>
<tr>
<td>Lynx</td>
<td>Boston Scientific</td>
<td>Suprapubic</td>
<td>2004</td>
</tr>
<tr>
<td>Supris-SP</td>
<td>Coloplast</td>
<td>Suprapubic</td>
<td>2006</td>
</tr>
<tr>
<td>Align –RP</td>
<td>Bard Urologic</td>
<td>Transvaginal</td>
<td>2007</td>
</tr>
<tr>
<td>Align-SP</td>
<td>Bard Urologic</td>
<td>Suprapubic</td>
<td>2007</td>
</tr>
<tr>
<td>Transobturator</td>
<td></td>
<td>Outside-In</td>
<td></td>
</tr>
<tr>
<td>Monarc</td>
<td>American Medical Systems</td>
<td>Outside-In</td>
<td>2002</td>
</tr>
<tr>
<td>Obtryx</td>
<td>Boston Scientific</td>
<td>Outside-In</td>
<td>2004</td>
</tr>
<tr>
<td>TVT-O</td>
<td>Ethicon Women’s Health</td>
<td>Inside-Out</td>
<td>2004</td>
</tr>
<tr>
<td>Aris</td>
<td>Coloplast</td>
<td>Outside-In</td>
<td>2005</td>
</tr>
<tr>
<td>Align-TO</td>
<td>Bard Urologic</td>
<td>Outside-In</td>
<td>2007</td>
</tr>
<tr>
<td>Mini-Single incision</td>
<td></td>
<td>Vaginal</td>
<td></td>
</tr>
<tr>
<td>TVT-Secur</td>
<td>Ethicon Women’s Health</td>
<td>Vaginal</td>
<td>2006</td>
</tr>
<tr>
<td>Needleless System</td>
<td>Neometic International</td>
<td>Vaginal</td>
<td>2007</td>
</tr>
<tr>
<td>MiniArc</td>
<td>American Medical Systems</td>
<td>Vaginal</td>
<td>2007</td>
</tr>
<tr>
<td>Solyx SIS System</td>
<td>Boston Scientific</td>
<td>Vaginal</td>
<td>2008</td>
</tr>
<tr>
<td>Ajust</td>
<td>Bard Urologic</td>
<td>Vaginal</td>
<td>2009</td>
</tr>
</tbody>
</table>
Spinal cord injury is one of the most devastating injuries that can occur. The majority of patients are left with lifelong disabilities and require lifelong follow-up to detect and treat problems related to the injury and its effect on bodily function. The majority of patients are left with neurogenic bladder dysfunction and require assistance of one form or another to manage the bladder. Renal failure used to be the leading cause of death in these patients but improvements in bladder management, antibiotic therapy and routine urinary follow-up have markedly reduced this and allowed the majority of patients to have near-normal life expectancy. Alterations in sensory perception mean that these patients do not have the usual symptoms with urinary tract pathology and hence require routine evaluation even when asymptomatic.

Our routine annual evaluation used to consist of excretory urography, serum creatinine, voiding cystourethrograms, and urodynamics. In 1977, we began to evaluate the use of renal scans (I-131 orthoiodohippurate renal scintigraphy) to measure effective renal plasma flow which allows a sensitive measure of glomerular-tubular function and transit through the urinary tract. We utilized I-131 orthoiodohippurate until 1990 when a technetium isotope became available. Since that time, we have used 99m Tc-mercaptoacetyl triglycine (MAG 3). Several studies have been performed showing adequate equivalence between the isotopes for renography with the superior imaging characteristics of technetium. Initially, we added the renal scan to the routine evaluation and compared the results with the standard evaluation to determine its sensitivity and specificity. In 1981, we published the initial paper comparing the renal scan (Comprehensive Renal Scintillation Procedure) to the excretory urogram and found that we did not miss significant abnormalities with the renal scan. The advantages to the patient included no bowel preparation, no overnight fasting, no allergic reactions, and minimal radiation exposure for repeated examinations.

Since the renal scan proved to be a sensitive indicator of renal function and transit, we eventually limited our annual evaluation to a plain radiograph (KUB) to detect asymptomatic stones and a renal scan. Patients who had significant abnormalities on the renal scan were brought back for more extensive evaluation including renal ultrasound, excretory urography, or computerized tomography to evaluate the upper tract and video-urodynamics to evaluate bladder function and detect vesicoureteral reflux. Vesicoureteral reflux, urinary infection and urinary obstruction cause early effects on renal tubular function and hence may be detected earlier by the renal scan if functionally significant. We were then able to detect functionally significant alterations in the urinary tract and alter bladder management if necessary. Long-term follow-up of large numbers of spinal injured patients has shown that changes in bladder management are usually made over time for a variety of reasons.

In 1997, we published results of long-term follow-up of patients injured between 1969 and 1994. These patients all had multiple studies over time but not necessarily every year. We had a total of 1,114 persons in the study with 18% women. Patients had a variety of bladder management methods including intermittent catheterization, indwelling catheters or suprapubic tubes, condom catheter drainage, spontaneous or assisted voiding, and urinary diversion. Bladder management was altered if necessary when there were adverse effects on the upper urinary tract. Average follow-up for these patients was 17 years post-injury. This study showed overall excellent maintenance of renal function regardless of the bladder management method. Effective renal plasma flow peaks for women in the late teens and men in the early thirties so there is a normal decline with aging. None of these patients showed a greater than expected decline in renal function over the time followed. Patients who are not followed regularly or do not manage their urinary tract as instructed have greater risk of complications and hence the need for surgical intervention or alteration in the bladder management method.
When the guidelines for urological management in spinal cord injury were published, there were no specific recommendations for frequency of follow-up since there had been no systematic study of follow-up intervals. Our procedure has been to follow patients less frequently after several years if they are on stable bladder management and not having clinical problems. These patients are often seen biannually or even every three years. This option might be selected by the patient even if we had attempted follow-up. We previously showed that these patients usually maintain satisfactory function even with irregular follow-up. The majority of patients who develop significant urinary problems are usually the ones who do adhere to a prescribed management program.

UAB and Spain Rehabilitation Center have been one of the early members of the Model Systems of Care for Spinal Cord Injury. This data has been derived from the National Spinal Cord Injury Statistical Center and the Database at Spain Rehabilitation Center. Numerous investigators have contributed greatly to this effort and to the betterment of life for spinal injured individuals.
Panel Discussion: Male Stress Urinary Incontinence
What We Know and What We Don’t Know About Male SUI

William Jaffe, MD

Thursday, March 3, 2011 • 3:30 pm – 4:35 p.m.

I. Epidemiology
The actual incidence of post-prostatectomy incontinence (PPI) is difficult to determine precisely. Reported rates are dependent on definitions of incontinence, whether objective or subjective measures are used, who is conducting the study, composition of the study group and other factors. It is clear, however, that prostate cancer surgeons report lower rates of incontinence than if the patients are queried by an independent observer. Surgeon reported rates of incontinence are typically in the mid to high single digits [1,2,3]. An American College of Surgeons study in 1994 of over 2000 patients who had undergone open radical prostatectomy showed that only 58% of patients reported complete recovery of continence, and 4% of patients wore more than 2 pads per day [4]. The Prostate Cancer Outcomes Study surveyed 1300 men 24 months after surgery; 40% of patients reported occasional leakage and 9% said it was a “moderate to big problem”. 14 to 16% of patients were incontinent 5 years after treatment [5].

Incontinence is most prevalent immediately after catheter removal. The most dramatic improvement typically occurs during the first 3 to 6 months after surgery, and patients can continue to see improvements in their level of continence up to 12 to 18 months after surgery, or even longer [6]. Depending on definitions of continence, 60-70% of patients will gain continence by 6 months and 80-90% by 12 months. There is ample evidence that both pre-operative and post-operative biofeedback assisted pelvic floor training can hasten the return of continence and improve overall continence rates [7,8].

II. Etiology
Evolving descriptions of the male urethral sphincter have appeared in the literature over the years. A thorough understanding of the anatomy and neuroanatomy of the distal sphincter mechanism and the relationship to the prostatic apex is critical in potentially reducing the rates of incontinence. We do not yet fully understand whether PPI is caused by damage to the sphincter muscle itself, damage to the nerves, blood supply, or support structures. An excellent review of our current understanding can be found in the manuscript by Walz and is beyond the scope of this discussion [9].

Pre-operative risk factors for incontinence include age, BMI, prostate size, membranous urethral length, previous TURP, medical co-morbidities and previous history of incontinence or lower urinary tract symptoms. A history of pelvic radiation prior to surgery can negatively affect return of continence [12]. There is surprisingly little literature regarding adjuvant or salvage radiation therapy and the risk of PPI. Surgical technique is thought to play a significant role in incontinence outcomes, and nerve sparing seems to be protective of continence in most but not all studies [10]. Other factors that may be risk factors for PPI include surgical blood loss, tumor volume/stage, urinary extravasation and bladder neck preservation/reconstruction techniques. Anastamotic stricture is certainly associated with PPI but the cause-effect relationship is not clear. Higher volume surgeons tend to have better outcomes with respect to incontinence [11].

Robotic-assisted laparoscopic prostatectomy has been marketed as helping to provide superior outcomes versus traditional surgery with respect to PPI. However the literature is replete with studies both supporting and refuting this claim. There are, of course, no randomized trials comparing the techniques, and most of the studies are single surgeon or single institution prospective or retrospective trials. Hu’s analysis of the SEER-Medicare database suggested higher rates of PPI in patients who had undergone minimally invasive surgery and received a great deal of press [11].

III. Evaluation
There is little standardization of the evaluation of the male patient with PPI. The 2008 International Consultation on Incontinence (ICI) published their guidelines in 2010 from the 2008 meeting [13]. They recommended a minimum evaluation of a history, physical exam, urinalysis and post-void residual. Invasive testing including cystourethroscopy and urodynamics is optional depending on the particular circumstance. They noted that studies have not shown that urodynamic testing predicts outcomes after artificial urinary sphincter (AUS) implantation. Other common parts of the evaluation include voiding diaries and pad weight tests.
IV. Artificial Urinary Sphincter

The AUS was developed over 30 years ago and thus there is a significant body of literature regarding outcomes. Dr. Boone’s group published their experience in 2007; the manuscript also reviews continence outcomes and complications from other large series [14]. Overall continence rates are 70-90%, in their group of 218 men mean post-operative pad use was 1.1 per day and 69% of patients used one or zero pads. Implant infection occurred in 5.5%, cuff erosion in 6%, urethral atrophy in 9.6% and surgical revision in 27%. Median device durability was 89.4 months. There was a trend toward more infections and atrophy in patients with a history of radiation that did not reach statistical significance. Continence outcomes were similar in these two groups.

There is much less information, however, to guide us regarding revision surgery. The most common complication is urethral atrophy; this is commonly seen several years after the initial surgery and presents with increasing incontinence. If there is device malfunction or fluid leak, the whole system is generally replaced. If cuff erosion is found, the device is explanted and then a new device is re-implanted in a delayed fashion. However there is no consensus on how to manage atrophy. Management options including placing a smaller cuff in the same location, adding a tandem cuff to the existing cuff (either proximal or distal depending on availability), increasing the pressure-regulating balloon (typically from a 61-70 cm H2O to a 71-80 cm H2O balloon), or replacing the entire device with the cuff at a new location. In a study of 119 AUS revisions, Webster’s group performed revisions due to non-mechanical failure in 119 patients for a total of 159 procedures [15]. The entire device was replaced in 75, the cuff alone in 67, the control pump in 6 and the reservoir in 4. In all cases where the cuff was replaced, 33% of the time it was placed distal to the original cuff, 11% were placed proximally, and 52% were placed at the original location. Tandem cuffs were placed in 6% and transcorporal cuffs were used in 20%. The cuff was downsized in 56% of cases and upsized in 13%. No information was published with respect to outcomes with these different techniques. It is incumbent on the implanter to understand the choices available at the time of revision and the advantages and disadvantages of each approach.

Two surgical approaches for AUS implantation have been described: the traditional perineal/inguinal approach and the single incision transverse scrotal approach. The benefits of the latter technique include less pain, better cosmesis, purported shorter operative times and ease of urethral dissection. There has been concern, however, that optimal proximal cuff location is not possible with this approach and this could lead to poorer coaptation of the urethra and less favorable outcomes. This was addressed in a multi-center study by Henry et al published in 2009 [16]. The complete dry rate in the transverse scrotal group was 27.4% versus 44.1% in the perineal group. Surgical revisions (tandem cuff addition) were also significantly higher in the transverse scrotal group. The recent addition of a smaller 3.5 cm cuff may ultimately lead to better outcomes in more distally placed cuffs but there is no evidence for this currently.

V. The Male Perineal Sling

The male perineal sling (AdVance, InVance) has emerged as a viable alternative to the AUS in treating PPI. Comiter published his results with the InVance sling in 48 patients with average follow-up of 4 years. 65% of patients were cured and 15% were improved. Average pad use decreased from 4.5 to 1.0 pad per day [17]. Several other similar series subsequently followed although usually with slightly lower success rates. Over the last several years, InVance has largely been replaced by the trans-obturator AdVance sling. Anecdotally, surgeons were concerned with the infrequent but troublesome complications of the bone-anchored sling including chronic perineal pain and screw dislodgement. Success rates with AdVance including dry or significantly improved are approximately 75% [18,19]. The most common complication is transient urinary retention which can occur in 10-20% of patients and almost always resolves in the first week. Mesh infection, erosion and need for sling transection are rare (1%) [20]. Previous stricture disease, higher 24 hour pad weights (>200g) and previous radiotherapy may predict poorer outcomes [19].

The mechanism of action of AdVance male sling is unknown. The inventors of the sling describe a proximal repositioning of the dorsal surface of the bulbar urethra. The force of action is parallel to the lumen of the urethra (i.e. not compressive). This purports to return the sphincter mechanism to the pre-prostatectomy location and restore anatomic support [21]. There is some urodynamic evidence that unlike prior bulbourethral sling procedures, the AdVance sling is not compressive [22]. McCammon’s group studied 13 patients with urodynamics before and 6 months after sling placement and found little change in voiding pressures, flow rates and post-void residuals. The true mechanism of action of the AdVance sling is still, however, a matter of speculation and debate. More study is needed regarding optimum surgical technique, patient selection factors, longer-term success rates and complications.
VI. The Future

There is a clear need for better and safer therapies for men that suffer from PPI. Current treatments generally do not guarantee “dryness” and have varying degrees of side effects and complications. The role of robotic-assisted prostatectomy with increased magnification and fine-motor control may ultimately lead to lower incontinence rates but this remains to be seen. Various techniques have been described purportedly to decrease the incidence of PPI (e.g. Rocco stitch) but none have been standardized or been proven to improve surgical outcomes.

One potential therapy that changes the paradigm of how we treat PPI is the use of muscle-derived adult stem cells injected into the rhabdosphincter. Mitterberger et al published a series of 63 patients PPI who were injected with autologous cultured fibroblasts and myoblasts [23]. They reported that at one-year follow-up 41 of the patients were continent and did not wear pads. It should be noted that the fibroblasts were suspended in collagen (Contigen) before injection and there was no sham control group. It should also be noted that the amount of collagen used is typically less than what is used in urethral bulking procedures, and their reported success rate is significantly higher than what is typically seen after bulking with Contigen. These results have not been validated by other centers although a similar procedure has been studied with success in women with stress incontinence.

Scope of problem
- High rate of urinary incontinence after RP (up to 48%)
- High rate of UI after TURP following definitive treatment for prostate cancer (RT, etc)
- Roughly half seek treatment
- Multiple factors proposed to impact subsequent urinary continence

Factors associated with urinary continence after prostatectomy can be broken up into demographic, disease-specific, technique specific/intraoperative, or post-operative

Demographic factors
- Age
- BMI
- Prostate volume
- Previous TURP
- Medical comorbidities
- Previous LUTS
- Membranous urethral length

Disease (prostate cancer) specific
- Nerve sparing surgery
- Previous RT
- Grade, stage, PSA NOT thought to be associated with post-op urinary continence

Technique (RP) specific
- Surgeon experience
- Open versus MIS
- Anastomotic technique/stricture
- Urethral fixation
- Puboprostatic sparing
- Bladder neck preservation
- Reconstruction of periurethral tissue
- Intraoperative slings

Post-operative maneuvers
- Pelvic floor muscle exercises
- Biofeedback

Conclusion – multiple factors impact subsequent return of urinary continence after RP
- Some modifiable
- Most are not
Panel Discussion: Male Stress Urinary Incontinence
Current State-of-the-Art for Male Anti-Incontinence Procedures
Kurt A. McCammon, MD
Thursday, March 3, 2011 • 3:30 pm. – 4:35 p.m.

Review of the former surgical treatment options

Berry Sling
- Acrylic or silicone block
- Mechanism of Action: Compression
- Success 33-45%

Kaufman
- Ovoid silicone gel–filled prosthesis with Dacron straps
- Mechanism of action: Upward compression
- Good initial results

Schaeffer
- Synthetic bolsters
- Mechanism of Action: Upward compression

Current surgical options for PPI

Injectables

Obstructive slings:

InVance
- Silicone – coated polyester sling
- Mechanism of Action: Compression of urethra
- Success 35 – 70%

Virtue
- 4 armed polypropylene sling
- Mechanism of Action: Compression of urethra, mobility

Non-Obstructive slings

AdVance
- Trans-obturator sling
- Mechanism of Action: re-supporting/elevating external sphincter
- Success rates 85 – 90 % in appropriately selected patients

AUS
- Around since 1986
- Success rates: up to 94%
- New modifications

I Stop TOMS
- Trans Obturator Male Sling
- Compressive sling
- ATOMS
  - Adjustable male sling

Other options
- ProAct/Argus Slings

Future

Next Generation Slings
Determine the true etiology of PPIf
After an appropriate diagnostic workup is completed, surgical intervention is indicated for the treatment of stress urinary incontinence in males who fail conservative medical management. Patient selection criteria are critical to both the objective and subjective success of any anti-incontinence procedure. Contraindications to potential surgical interventions include certain anatomic abnormalities, chronic immunosuppression, poor tissue quality of the urethra, and voiding dysfunction related to decreased bladder compliance or low volume idiopathic detrusor overactivity. In the case of an artificial urinary sphincter, the loss of cognitive function or an inability to operate the device should also be viewed as a contraindication to surgical therapy. Patients with a history of pelvic irradiation, previous surgical procedures for bladder or urethral dysfunction, and previous or simultaneous placement of a penile prosthesis may pose diagnostic dilemmas as well. Recent modifications of the male perineal sling resulting in short-term success rates have added to the armamentarium of urologists for the treatment of male stress urinary incontinence.
This intent of this session is to provide an introduction to basic urodynamics for all providers especially residents and fellows and is sequenced so that attendees can then follow with the breakout session on complex urodynamics which is scheduled for the next day.

This breakout session will provide a concise review of basic urodynamics including: uroflow, pressure relationships, use of EMG and use of fluoroscopy. We will also discuss preparation prior to the Urodynamic study. Because this is a significant amount of information to cover within a short time frame, we will therefore use clinical case scenarios to cover many of the topics as well as to illustrate basic urodynamic principles.

List of topics to be covered
Brief overview
Male LUTS (obstruction vs non-obstruction vs DO)
Female SUI (including low and high leak point pressures)
Female DO
NGB poor compliance
NGB DESD
Female Obstruction (prolapse or s/p sling)

Recommended References:

I. Definition
Pelvic floor tension myalgia can be defined as conditions involving over-activity and “spasm” of the pelvic floor muscles, most specifically the levator ani complex (pubococcygeus, ileococcygeus and puborectalis), which potentially leads to shortening of the pelvic floor musculature. Various terms have been used to describe this condition including high tone pelvic floor dysfunction, levator ani syndrome and hypertonic pelvic floor disorder which may cause some confusion in understanding the literature.

II. Etiologies
- Trauma (physical & psychological)
  - Childbirth
  - Surgery
  - Sports injury
  - Sexual abuse
  - Other
- Psychological
- Behavioral
- Biomechanical
- Visceral pain disorders
  - Endometriosis
  - Painful bladder syndrome
  - Irritable bowel syndrome
  - Fibromyalgia
- Idiopathic

III. Presentation/Signs & Symptoms
Pelvic floor tension myalgia may present as a myriad of conditions including bladder and bowel dysfunction, sexual pain, chronic pelvic pain and orthopedic dysfunction. This may be misleading to the practitioner and patient as often times the pelvic floor is not considered in the differential diagnosis. Common conditions include:
- Bladder dysfunction
  - Overactive bladder
  - Urinary retention
  - Painful bladder syndrome
- Bowel dysfunction
  - Outlet constipation
  - Anismus
  - Non-relaxing puborectalis
• Sexual dysfunction
  o Dyspareunia
  o Vaginismus
  o Vestibulodynia/vulvodynia

• Orthopedic dysfunction
  o Coccydynia
  o Sacroiliac joint dysfunction
  o Pelvic girdle dysfunction

IV. Diagnosis
• History
• Systematic evaluation of the pelvic floor musculature
• Electromyography
• Imaging/Lab testing

V. Treatment
• Manual physical therapy (trigger point therapy, connective tissue mobilization, myofascial release, muscle energy techniques)
• Biofeedback
• Modalities (microcurrent, laser therapy)
• Pharmacological therapy
• Trigger point injection
• Botox injection
• Neuromodulation
• Nutrition
• Stress response management
• Muscle train realignment (tai chi, qi gong, yoga)
• Acupuncture
• Chiropractic
• Psycho-emotional therapies (EMDR, Cellular Memory Reprogramming)

VI. Case Studies
PRO
The standard approach to pelvic organ prolapse surgery has been hysterectomy by one of three routes (vaginal, abdominal or laparoscopic) in addition to correction of cystocele, rectocele, enterocoele, stress incontinence and vault suspension to prevent future prolapse recurrence. In the last decade, many surgeons have begun to offer uterine-sparing techniques recognizing that uterine prolapse is the result of, not the cause of, pelvic organ prolapse. Furthermore, hysterectomy leads to further lateral separation and disruption of the uterosacral and cardinal ligaments, which are the critical supporting ligaments in the pelvis contributing to pelvic floor laxity and organ prolapse. The dissection associated with hysterectomy can lead to neuropathy and further compromise pelvic floor muscular function. Complications associated with hysterectomy are increased blood loss, ureteral injury, urinary incontinence, loss of sexual function and vaginal shortening. All of these aforementioned factors have led to increasing emphasis on patient safety, effectiveness of various prolapse surgeries and a critical evaluation of the risks and benefits of hysterectomy versus uterine-sparing surgery.

In this portion of the debate, the indications for uterine-sparing prolapse surgery, techniques, published short and long-term outcomes as well as the anatomic basis for uterine preservation will be discussed. Video will also be utilized to illustrate techniques.

CON
The addition of hysterectomy at the time of pelvic organ prolapse repair in the setting of uterovaginal prolapse is a fairly standard procedure. The primary rationale for this is based on several factors including: improved ability to support the apex well for vaginal depth, removal of the “weight” of the uterus to minimize on apical descent post-operatively, poor history and track record of previous uterine support procedures, and limited data showing adverse events associated with hysterectomy in the setting of prolapse.

The operative procedure entails usually a three step approach which includes initial transection of the cardinal/uterosacral ligament complex, ligation of the uterine vessels and then finally the removal of the fundus with ligation of the tubo-ovarian ligaments and tubes. Routinely performing oophorectomy is increasingly being criticized and is not necessary in the majority of cases.

Hysterectomy performed vaginally (as it is in most cases of prolapse) allows for simultaneous correction of anterior, posterior and apical segments as well as (selectively) urinary incontinence. The complication profile of this surgery will be discussed as well as data on this procedure in relation to uterine sparing surgery and use of transvaginal mesh systems in an attempt to spare the need for hysterectomy.
Should doctors routinely use intraoperative stents to decrease the chance of injury to the ureter during hysterectomy?

1. No it doesn’t help to decrease injury.

- Studies have shown this does not help decrease ureter injuries in gynecological surgery\(^1\) and pelvic general surgery\(^2\).
- A single study of 317 patients found preoperative ureteral catheters helpful for a variety of open and laparoscopic gynecologic surgeries. Complications were low in this series\(^21\).
- A single study in general surgery showed that non-lighted stents were considered “helpful by the surgeon” in only 27% of cases of pelvic surgery\(^3\). Ureteral injury still occurred in 1.6% despite stents.
- Not recommended in general\(^4\).
  i. HOWEVER, while stent don’t completely avoid injury they may increase their recognition intraoperatively.
     While stented patients still have a ureteral injury rate of 2% during complex pelvic surgery (general surgery series), all were discovered intraoperatively while usually only 23% discovered intraoperatively\(^5\).
  ii. Stents may actually may increase rate of ureteral injury! (ok 1 study)\(^6\).
  iii. Stents can cause serious complications.
     - renal shutdown in 2.5%\(^3\)-57% of those with bilateral stents, from ureteral edema

2. Other techniques that may be used to help identify the ureter
   a. Lighted fiberoptic stents.
      Although lighted fiberoptic ureteral catheters have been shown to help with identification of the ureter during laparoscopy\(^8\),\(^9\), they can cause ureteral swelling resulting in kidney obstruction and are not widely used in open cases. Even though advocated in laparoscopy, they had side effects such as gross hematuria in 98% and renal shutdown in 6%\(^8\).
   b. Intravenous indigo carmine.
      A technique of injecting indigo carmine dye into the bloodstream, then confirming that it is excreted out of each ureter orifice (by cystoscopy) has been described, and advocated as a “double check” against ureteral ligation during LAPAROSCOPIC but not open hysterectomy\(^10\).

3. Maneuvers to avoid ureteral injury
   a. Open inspection
      i. Widely used in practice and widely advocated in the literature\(^11\)-15.
      ii. Some say it increases possibility of ureteral devascularization\(^20\).
   b. Meticulous control of bleeding (to improve visualization)\(^11\),\(^14\).
   c. Palpation\(^16\), but may not be reliable\(^4\).
   d. Post op routine IVP is not recommended\(^17\)-19.

Could be an uncommon ureteral blood supply variant cause ureteral ischemia after even properly performed hysterectomy?

1. This might make the ureter more susceptible to injury without any specific injury on part of the surgeon.
   a. The distal ureteral blood supply is variable\(^{Daniel, 1952 \#1223}\).
   b. In X% (10%?) of cases, the uterine artery (which must be taken to remove the uterus) may carry a disproportionate share of the blood supply to the ureter (theoretical). In one study, such inadvertent ureteral devascularization occurred in as many as 40% of cadavers studied after ligation of the uterine artery (Br J Urol. 1952 Dec;24(4):334-43. The blood supply of the human ureter in relation to ureterocolic anastomosis\(^{DANIEL O, SHACKMAN R.}\))
Citations
Urethral Injectibles in 2011: An Overview of Current State of Practice

R. Duane Cespedes, MD

Friday, March 4, 2011 • 11:00 a.m. – 11:30 a.m.

Introduction
Recently there has been some debate whether the continued use of injection therapy is necessary with the proliferation of increasingly minimally invasive anti-incontinence sling procedures. In fact, there has been little data published in the last few on injection therapy. As good as the newer slings have been shown to be, a sling is not the ideal procedure for all women with SUI. It should be understood that these therapies are complementary, with each procedure useful for a different group of patients. As the population ages and more elderly patients seek treatment for SUI to maintain their active lifestyle, the demand for office-based treatments will increase, highlighting the importance of injection therapy in the incontinence specialist's armamentarium. Injection therapy for stress urinary incontinence (SUI) is a minimally invasive, office based procedure that can be used as a primary therapy or as an adjunctive/salvage therapy to the more invasive anti-incontinence sling procedures. When performing injection therapy, as with any procedure, proper patient selection and the establishment of optimal treatment delivery is crucial for therapeutic success, patient satisfaction, and minimizing costs.

Patient Selection
Proper patient selection is the key to patient satisfaction and therapeutic success. Patients who are good candidates for injection therapy include those who:

- Are poor surgical candidates due to medical conditions
- Are elderly and at higher risk for retention after sling procedures
- Must be maintained on anticoagulation therapy at all times
- Desire non-surgical therapy using only local anesthesia
- Are unable to follow the post-operative activity limitations required after anti-incontinence procedures.
- Desire more children in the future
- Desire temporary continence for a specific sporting event/marathon
- Who have mild persistent SUI after an anti-incontinence procedure
- Who have SUI and poor bladder emptying

Additionally, injection therapy can also be useful as a therapeutic trial in patients with mixed incontinence. A ‘trial’ injection procedure can be given to see if the stress component can be treated without exacerbating the urge symptoms and in some cases, injection therapy will improve both conditions.

The ideal female candidate for injection therapy is one with intrinsic sphincter deficiency (ISD), minimal urethral mobility, and normal detrusor function. Clinically, these patients are often elderly with an overactive bladder. Although injection therapy is equally effective in younger patients with urethral hypermobility and SUI, they are not the best candidates because of the requirement for long-term re-injections. Slings are clearly a better option in this group.

Proper patient selection and enhanced patient satisfaction requires a discussion of the unique properties of injection therapy. The patient should understand that injection therapy is a process, not a one time procedure and that in most cases, 2 or even 3 clinic injections at least 4 weeks apart may be required to achieve continence. They should also be aware that even after continence is attained, periodic re-injections, approximately 1 year apart, will be necessary to maintain continence. All bulking agents work by expanding the tissue, and this is ideally done slowly to minimize tissue disruption. Over time, all injectables lose some efficacy by “flattening out”, likely due to the active contraction and relaxation process of the sphincter forcing the material laterally. Unlike Coaptite, Macroplastique and Durasphere, collagen is also slowly reabsorbed over years, contributing to the need for re-injections.
Bulking Agents

The ideal bulking agent should be biocompatible, non-antigenic, non-mobile, non-migrating, non-infectious, and cost effective. To be clinically successful, the agent should retain its bulking characteristics for a long period of time without degrading and have few side effects. To be clinically useful, it should be easy to prepare, easy to inject, and should not be painful to inject to allow clinic injections using local anesthesia. Lastly, if the procedure is unsuccessful, it should not make subsequent surgical procedures more difficult. Unfortunately, no currently available bulking agent meets all of these requirements. Currently, there are 4 injectable agents approved for the treatment of SUI in the US: Glutaraldehyde cross-linked (GAX) bovine collagen, carbon coated beads (Durasphere EXP), polydimethylsiloxane microimplants (Macroplastique) and calcium hydroxylapatite spheres (Coaptite).

Results

Multiple studies have reported good results using injection therapy in selected patients. Monga and colleagues reported a 68% subjective cure rate and 48% objective cure rate at 24 months post-collagen injection. This group was also the first to report a sustained decrease in the symptoms of urge incontinence. Most studies have been performed in women with intrinsic sphincter deficiency (ISD) and have reported initial success rates between 50-95%. Several studies have also demonstrated that patients with ISD and urethral hypermobility have similar success rates using collagen. Steele and colleagues injected 40 patients with collagen, reporting a subjective dry rate of 76% in the hypermobile group compared to 46% of the non-mobile group. It is clear that many patients with hypermobility can be successfully treated using injectables; however, most of these patients are younger and have pelvic prolapse in other areas. Therefore, a combined sling procedure and prolapse repair is preferable in this group. In a series of 58 elderly women treated with collagen and followed for a mean of 24 months, Winters and colleagues reported a long-term success rate of 60.3% and average interval to reinjection of 8 months, using a mean of 1.9 injections and 14.6 mL of material. Durasphere has been shown to have comparable results to collagen injection with one study demonstrating a 31% dry and 66% improved rate at 12 months using a mean 1.7 injections and 7.6 mL of material. Mayer and colleagues demonstrated that at 1 year postinjection, 63% of patients injected with Coaptite versus 57% of collagen patients showed sustained improvement of one Stamey grade or more. Lastly, Macroplastique was recently shown to have a higher cure rate at 1 year than collagen injection (61% versus 48%).

Complications

Overall, injection therapy has few side effects and most are minor. Particle migration has been extensively evaluated and at the present time, there are no reports of collagen or Coaptite particles migrating. Durasphere has been shown to migrate locally but no morbidity has ever been demonstrated from particle migration. More severe adverse events including tissue necrosis at the site of injection and periurethral abscesses are rare. Although urethral bleeding after the injection is possible, we have always maintained patients on their anticoagulation therapy during injection therapy and have never encountered significant hematuria or bleeding.

Conclusions

As with any procedure, the results obtained with injectable agents greatly depends on patient selection, expertise in performing the procedure, and the use of specialized equipment. Patient satisfaction depends on understanding the treatment options and, if injection therapy is selected, knowing that multiple injections will be necessary with periodic reinjections after dryness is achieved to restore continence. When performed in the clinic using local anesthesia, injectable agents give patients who are poor surgical candidates or are on anticoagulant therapy the opportunity to improve continence at minimal expense. Overall, injection therapy for stress incontinence is easy to perform, minimally morbid, convenient for the patient, and remains very cost-effective, especially when performed in the outpatient office setting.

References

This session will highlight the various methods of diagnosing and managing the wide array of conditions seen in Female Pelvic Medicine and Reconstruction. A variety of scenarios, including urinary incontinence, neurogenic voiding dysfunction and reconstruction cases will be presented to the senior expert panel. A lively and interactive discussion between the panelists is anticipated.
Since the introduction of sacral nerve stimulation (SNS) in the field of colon and rectal surgery in 1994, the application of the therapy has grown steadily. Several indications are established and implemented in the current treatment guidelines, others are at an early stage or still preliminary.

Fecal incontinence was the first indication used for SNS in bowel dysfunction. Initially, the therapy was confined to patients with a functionally deficient, but morphologically intact, anal sphincter complex. The technique, adapted from the field of urology, involves a phase of temporary test stimulation to identify patients who can benefit from permanent stimulation with an implantable device. A positive test phase was shown to be highly predictive of the outcome of chronic stimulation with a permanently implanted neurostimulation device. Subsequently, the indications for SNS have been expanded, through a pragmatic “trial-and-error” approach, to include patients with various pathophysiologic and pathomorphologic causes of fecal incontinence, not just the highly selected group with distinct morphologic and physiologic conditions.

The pragmatic “trial-and-error” has been clinically successful: SNS results in significant symptom improvement or release in the majority of patients. The clinical results are reproducible and recent long term data confirm that its clinical efficacy is sustainable.

SNS has become an essential part of the current surgical treatment algorithm for faecal incontinence. It has become the treatment of choice in patients with a morphologically intact sphincter and can be considered in patients with a limited lesion of the sphincteric complex.

Based on its ease of use and its predictive value the test stimulation evolved to be an excellent tool in exploring new indication for SNS and has facilitated its use in colon and rectal surgery. Today, the spectrum of use of SNS is no longer confined to its initial application in fecal incontinence and the indications have expanded to other colorectal conditions. Compared with the application for fecal incontinence, the experience with SNS for constipation is still limited. SNS can be considered as a treatment option for intractable constipation, especially before more invasive, irreversible surgical options are applied. The use of SNS for irritable bowel syndrome is still in its infancy, but preliminary data indicate that it carries some therapeutic potential. The more recent applications of SNS need to be reproduced in a broader setting.

SNS has evolved rapidly since its official launch onto the European market in 2000. Today in Europe, approximately the same number of SNS devices are implanted for bowel dysfunction as for urinary dysfunction. In the United States, SNS is still awaiting FDA approval. A large multicenter trial, including 120 implanted patients, has been carried out. The three year outcome data were recently presented, demonstrating good or excellent outcome in 70-80% of patients and sustained effects throughout the evaluation period.
URINARY BIOMARKERS IN IC/PBS PATIENTS BEFORE AND AFTER TREATMENT WITH INTERSTIM®
Bui D., Tyagi P., Peters K., Chancellor M.
Interstitial Cystitis/Painful Bladder Syndrome (IC/PBS) is a chronic, potentially debilitating disease that is defined by "the complaint of suprapubic pain related to bladder filling, accompanied by other symptoms such as increased daytime and night-time frequency, in the absence of proven urinary infection or other obvious pathology". Sacral electrical stimulation (InterStim®) has shown to be an effective treatment in decreasing symptoms associated with IC/PBS, although its true mechanism of action is unknown. It is thought to alleviate urinary urgency/frequency and manage pain by stimulating myelinated afferents to activate segmental inhibitory circuits. The debate on the role of inflammatory pathways underlying IC/PBS symptoms is still inconclusive.

Studies have reported that symptom severity in animal models of IC/PBS correlated with increased expression of as platelet derived growth factor (PDGF) in the suburothelium (Saban, et al., 2001; van de Merwe, et al., 2003) and we have noted elevated levels of PDGF and other cytokines in urine obtained from IC/PBS patients (Tyagi et al 2009). We proposed that temporal changes in the urine levels of these chemokines and growth factors can provide information on IC/PBS disease progression and the modulatory effect of InterStim®. A previous study showed concomitant decrease in symptoms with urinary levels of anti proliferativefactor and epidermal growth factor after percutaneous sacral nerve stimulation (Chai et al, 2000). Urine biomarkers can provide information about the state of bladder as a whole compared to limited site-specific information from tissue biopsy (Smaldone, et al, 2009).

Our planned approach will test candidate urine biomarkers of inflammation (mononuclear cell infiltration/ mast cell activation) (macrophage inflammatory protein MCP-1 and RANTES,) and angiogenesis/ fibrosis (VEGF- vascular endothelial growth factor and PDGF). We will explore the role of CXC chemokines that are chemotactic for neutrophils (e.g. GRO-α/CXCL1), and for lymphocytes (IP-10/CXCL10) secreted by activated mononuclear cells (Moser, et al., 1991).

Table 1: Urine levels of Biomarkers in InterStim® Treated Patients Before And After Treatment

<table>
<thead>
<tr>
<th>Biomarker</th>
<th>Baseline (n=13)</th>
<th>4 weeks (n=7)</th>
<th>12 weeks (n=4)</th>
<th>24 weeks ( n=2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP-10(CXCL-10)</td>
<td>212.38± 95.45</td>
<td>93.38 ± 31.7</td>
<td>94.22 ± 43.6</td>
<td>120.01± 43.43</td>
</tr>
<tr>
<td>VEGF</td>
<td>45.8 ± 21.2</td>
<td>27.18 ± 13.48</td>
<td>23.77 ±5.26</td>
<td>33.9 ± 7.0</td>
</tr>
<tr>
<td>PDGF</td>
<td>168.05± 101.97</td>
<td>49.49 ± 24.8</td>
<td>49.22 ± 13.43</td>
<td>127.72 ± 81.19</td>
</tr>
<tr>
<td>GRO-α(CXCL-1)</td>
<td>55.62 ± 18.74</td>
<td>15.56 ± 4.08</td>
<td>22.44 ± 11.77</td>
<td>51.21 ± 14.70</td>
</tr>
<tr>
<td>IL-1ra</td>
<td>916.73 ± 375.09</td>
<td>358.64 ± 145.12</td>
<td>641.76± 262.19</td>
<td>502.57 ± 263.96</td>
</tr>
<tr>
<td>RANTES</td>
<td>18.25 ± 3.71</td>
<td>15.20 ± 4.33</td>
<td>41.63 ± 24.43</td>
<td>16.97 ± 0.09</td>
</tr>
<tr>
<td>MCP-1</td>
<td>485.24± 149.69</td>
<td>488.7± 197.56</td>
<td>893.09±489.18</td>
<td>528.06 ± 220.68</td>
</tr>
</tbody>
</table>

Values expressed as Mean ± SEM; levels of IP-10, GRO-α, PDGF, and VEGF declined with treatment but did not reach significance yet (Kruskal-wallis Analysis of variance)
Urine is non-invasive, easily obtained medium that can reflect the biological environment. Urinary proteomics would be a helpful tool in the diagnosis and follow-up of IC/PBS. Our study is to see if there is a change in urinary protein characteristics before and after sacral electrical stimulation, and correlates this with clinical symptomatic relief. Inclusion criteria for patients was 18-69 years old who have had clinical symptoms of urinary urgency, frequency, and bladder pain for 6 months. Patients must have had clinical symptoms of IC/PBS for at least 3 of the 6 months immediately before the first visit. Exclusion factors include pelvic mass, pelvic prolapse, urinary retention, and pelvic malignancies. Prior to undergoing Interstim implantation, patients are offered a chance to participate in our study. A total of 10 patients had their urine collected at baseline and at 4, 12, and 24 weeks after the initiation of Interstim therapy. All participants will complete the Interstitial Cystitis Symptom and Problem Questionnaire (O'Leary-Sant) at baseline and each follow up visit. IC/PBS patients included in the study will have an O'Leary-Sant composite score of 20 or higher at baseline. The midstream urine samples were analyzed using a Bioplex system based on Luminex platform. The Bioplex system is able to quantify several different markers on a 96 well plate. This is based upon the reaction of an intended reactant and its conjugation with a specific color-coded bead. The cytokines that we will be observing is based upon prior studies that we suspect will be altered by the inflammatory changes of IC/PBS. We expect a difference in the levels of cytokines/chemokines measured before start of treatment with InterStim® and at least one time point (4, 12, or 24 weeks) after treatment.

References

EDUCATING CLINICIANS ON THE PRINCIPLES OF NEUROSTIMULATION
Bradley Gill
Introduction:

Prescription Analogy
Medication Neurostimulation
Dose Amplitude
Administration Pulse Width
Frequency Frequency

What Drives or Defines The Following?
Surgeon Preference
Physician Choice
Standard Treatment

Relevant Literature is Sparse
Knowledge Drives Treatment Selection


Cite studies showing knowledge, attitude, and belief influence treatment choice.
Physician predictors of decision making may be related to anecdotal or traditional teaching

Likely to be longer graduated from med school and older
Lack up-to-date knowledge (however 1950s studies on URIs)
Citing study noting knowledge of current practice degrades

Psychiatrists used SSRIs more than primary care 5-6 years after their market release
Attributed to better knowledge by psychiatrists despite well known safety and effectiveness

Understanding Impacts Treatment Efficacy
86% felt most patients were undermedicated
49% felt their own practices were fair, poor, or very poorly controlled
52% Cited Inadequate Knowledge as a top barrier to pain control
52% reported poor medical school training
27% reported poor residency training
89% did not use NSAIDs in initial bone metastases treatment showing lack of understanding

Comfort Influences Perceived Outcomes
Clinicians often equate competence with confidence, patients do too
Overconfidence can be corrected with proper knowledge

Preference Biases Clinical Research
Physicians may decline randomization of patients or overrule and determine treatment

Study:
Observation: (joke about engineering and OR pimping) lack of fundamental neurostimulation knowledge
Hypothesis: improving basic knowledge will increase comfort and ability

Methods:
Educational Video
Neurophysiology
Electrical Neurostimulation
Programming Parameters
Device Troubleshooting

Baseline Assessment
Medtronic Representative Survey
Clinician Quiz and Opinion Survey

Video Distribution
SUFU Website and Mailing
SUFU Attendees

Follow-Up Assessment
Clinician Quiz and Opinion Survey
Medtronic Representative Survey

Strengths and Limitations:
Limitations
Selection bias
Inability for statistical comparison

Strengths
Initial insight into area
New educational tool
Potential catalyst for improvement in SNS

Results:
Baseline to Follow-Up Changes
Medtronic Representative Survey
Clinician Quiz and Opinion Survey
Requests for Use as Teaching Tool (Number #)

Conclusions:
Knowledge Improved
Understanding Improved
Comfort Improved
Likelihood of Use Unchanged

Future Directions:
Improved Knowledge Can Increase Productivity
  Better communication facilitating more efficient implants
  More rapid device troubleshooting shortening office visits
Improved Knowledge Facilitates Improved Efficacy, Safety, and Satisfaction
  Better device management improves effectiveness
  Improved troubleshooting can prevent unnecessary surgery
  Stronger command of knowledge and the above can better satisfy patients
Improved Knowledge Can Improve the Treatment Itself
  Better understanding can facilitate more fundamental research
  New pathways to optimize treatment based upon programming
  New means of maximizing battery life and minimizing waste

Thanks:
  SUFU
  Medtronic
  CCF Media Productions

Discussion:

**COMPARISON OF INTERMITTENT AND CONTINUOUS SACRAL NERVE STIMULATION AFTER PLACEMENT OF SACRAL NEUROMODULATOR FOR URGENCY INCONTINENCE**

**Sunshine Murray MD, Gary E. Lemack MD**

We present preliminary findings of an ongoing study being performed at UTSW designed to compare the effectiveness of intermittent sacral neuromodulation with that of the traditional continuous sacral neuromodulation using the Interstim® device.

Patients who elect to undergo sacral neuromodulation for treatment of urgency incontinence who meet inclusion criteria and consent to participate are randomized to intermittent or continuous neuromodulation to be performed for 6 weeks. After the initial 6 weeks, patients crossover to the alternate arm to serve as their own controls for an additional 6 weeks. All patients complete 3 day voiding diaries and validated symptom questionnaires preoperatively, at crossover and at completion of the study. The primary outcome is change in urgency incontinence episodes over 72 hours (based on the voiding diaries) after continuous versus intermittent sacral nerve stimulation, with secondary outcome measures of change in questionnaire scores (OAB-Q, UDI-6, UPS and I-QOL).
BREAKOUT SESSIONS

1. Management of Stress Incontinence and Pelvic Organ Prolapse in Elderly Women: Non-Surgical and Surgical Approaches

Non-Surgical Care

Deborah Erickson, MD

Friday, March 4, 2011 • 5:00 p.m. – 6:00 p.m.

I. Learning Objectives
   A. For a given patient, select appropriate nonsurgical SUI treatments including weight loss, pelvic muscle exercise (PME), drug therapy, and support or occlusive devices
   B. For a given patient, select nonsurgical POP treatments including PME and pessary

II. Weight loss: 3 RCTs all included stress, urge and mixed UI. Losing 5-10% of body weight (by exercise + some type of diet) consistently improved continence and QOL

III. PME can be done at home with written instruction or vaginal weights, or in office with teaching by vaginal palpation of biofeedback.
   A. To choose method for a given patient, consider:
      1. Is it feasible?
         a. Home: must be correct without supervision
         b. Office: must be able to make multiple visits
      2. Is it likely to improve this patient’s continence?
      3. Cost
   B. Numerous studies have asked whether weights and/or biofeedback are more effective than exercise alone. Results vary. Reasons for variability include:
      1. Patient’s baseline ability to do exercises
      2. Intensity of training in biofeedback and “control” groups
      3. Underlying pathology (some are not amenable to exercise)
   C. Practical implementation
      1. If poor baseline ability, need some type of feedback for teaching
      2. If do at home with written instruction, good references are Staying Dry by Kathryn Burgio, and information from the National Association for Continence
      3. Prices for vaginal weights vary from about $60 to about $120
      4. In office with biofeedback: Medicare requires failure of at-home treatment first
      5. Increased strength is not enough: also teach “The Knack”
         a. Pelvic floor muscles are somatic; they can’t stay contracted constantly
         b. The Knack = contract pelvic floor muscles before cough

IV. Drugs for stress incontinence. All are off-label use for incontinence.
   A. Purpose: stimulate urethral alpha-adrenergic receptors
   B. Drug categories:
      1. Sympathomimetic amines
         a. Phenylpropanolamine no longer available (↑ stroke risk)
         b. Pseudoephedrine: might also ↑ stroke risk but no formal studies
      2. Norepinephrine reuptake inhibitors
         a. Duloxetine was better than placebo in several trials, but incontinence application was withdrawn due to ↑ risk suicidal thoughts. An option if the patient is appropriate to use it for depression, fibromyalgia, etc.
         b. Imipramine improved symptoms and urethral closure pressure in uncontrolled studies but no controlled trials published. No specific studies on stroke risk, but can ↑ fall risk, especially in the elderly
V. Vaginal or urethral devices for SUI (reference 7 is a good review)
   A. Vaginal devices: tampon, contraceptive diaphragm or commercial products such as
      pessary with urethral support bar, or IncoStress (in UK). RCTs include:
      1. Super tampon equal or better than pessary for urine loss with exercise^8
      2. ATLAS study: behavior therapy, pessary or both. At 12 months, all 3 arms
         had similar outcomes^9
   B. Many urethral devices described over the years; FemSoft has active web site
   C. “In practice, their acceptance has been low...They may increase quality of life for
      patients who are medically unfit for surgery or who do not desire an operation. The
      “nuisance factor” associated with device care is the major barrier.... The devices
      may be ideal for women with only exercise-induced incontinence”^7

VI. Pelvic floor muscle exercise (PME) for POP: two relevant randomized trials with controls vs.
      physical therapy (PT) plus home exercise with diary^10,11
   A. Hagen: Baseline POP-Q stage I or II
      1. Controls got written instructions only
      2. PME: PT appointments weeks 0, 2, 6, 11 &16. Home exercise 6 sets a day.
         Set = up to 10 maximum contractions held up to 10 sec, 4 sec rest between
         each contraction, then 1 minute rest, then 10 fast contractions in a row
      3. 5 of 11 in PME group, but 0 of 9 controls, improved at least one POP-Q stage
   B. Brækken: Baseline POP-Q stage I to III
      1. Controls taught the Knack and lifestyle changes, but no PT followup
      2. PME: PT weekly x 3 months, then q 2 weeks x 3 months. Home exercise 3
         sets a day. Set = 8–12 close to maximum contractions
      3. 4 of 50 controls improved at least one POP-Q stage
      4. PME improvement: 11 of 58 overall, 0 of 8 with baseline stage I, 6 of 36 with baseline stage II, 5 of 14 with baseline stage III

VII. Pessary for POP
   A. Basic ideas
      1. Patient must be able to remove and replace, or come to clinic regularly
      2. Estrogen cream is useful adjunct
      3. Risks: discharge, ulceration, fistula, may unmask bladder or bowel symptoms
      4. Some patient characteristics might associate with failure, but still OK to try
   B. Basic fitting
      1. Usually start with ring
      2. Be sure you can sweep your finger between pessary and vaginal wall, ask her
         to sit, stand, bend over, Valsalva, and void with pessary in place.
      3. If ring does not work, try others; Gelhorn is common next step
   C. References 12 and 13 are superb articles with practical advice and clinical pearls

4 Miller JM, JAGS 1998 and Int Urogynecol J 2008
7 Pollak JT and Davila GW: Device Therapy for Stress Incontinence, in:
8 Nygaard I, J Reprod Med 1995
9 Richter HE, Ob Gyn 2010
In the Advanced Urodynamics breakout session we will cover several areas related to challenging urodynamic diagnoses and treatment decisions based on urodynamic findings. The entire session will consist of a case presentation format with a presenter and panelists’ commentary. There will be no didactic component to the session and an understanding of basic urodynamics will be assumed. In addition, participation from the attendees of the session is encouraged and expected. Time will be reserved for questions and presentations of case scenarios from attendees of the session.

Cases will highlight some of the following diagnostic and treatment challenges:
1. Impaired compliance with impaired contractility
2. Assessing outlet obstruction in the face of high pressure, phasic detrusor overactivity
3. Equivocal bladder outlet obstruction in the face of a large bladder diverticulum
4. Persistent BOO after seemingly appropriate treatment – urodynamic artifact or real finding?
5. Mixed incontinence scenarios – surgery in the face of DO and/or impaired compliance in a male and a female
6. Failure of urodynamics to recreate symptoms
7. Prolapse and LUTS – is urodynamics helpful?
I. Nomenclature
   a. "Bladder neck contracture" there is still exists an anatomic bladder neck: scarring down of bladder neck with scar that usually occurs after TURP (transurethral resection prostate)
   b. "Anastomotic stricture" there is previous surgical removal of the bladder neck: usually occurs after RP (radical prostatectomy)
   c. "Urethral stricture" is a true stricture of the urethra (not the bladder neck or anastomosis of the urethra to the bladder)

II. Bladder neck contracture
   a. Risk after conformal XRT (x-ray therapy) 0.4-3%
      i. Up to 6% in previous TURP patients (compare 3% no previous TURP)
      ii. Pre treatment TURP increases both bladder neck contracture AND urethral stricture from 6-15%
      iii. TWO previous TURPS = 18% risk of either complication
      iv. (Urethral strictures are a different entity, but they occur up in up to 6%)
   b. Risk after brachytherapy and XRT with no prior TURP 9/5510 (0.2%)
      i. Risk is much higher if they have TURP before (75%) or AFTER (69%)
      ii. Appears 33 months after treatment (median, no previous TURP)
      iii. Appears earlier in those who got TURP before or after (15, 24 months)
   c. Risk after brachytherapy 0.5-2.5%
      i. 3/3 required suprapubic diversion in one reliable series (Ragde, Interstitial Iodine-125 radiation without adjuvant therapy….. Cancer, 1997)
      ii. Post treatment TURP increases risk
      iii. (Urethral strictures are a different entity, but they occur in 2-12%).
         1. Urethral stricture is caused by urethral overdosing (Merrick et al, The dosimetry of prostate brachy-induced urethral strictures. In J Rad Onc Biol Phys, 2002)
      iv. Appears mean 26 months after brachy, and all occur within 44 months
   d. Risk after IMRT (intensity modulated radiation therapy): unknown
      i. 0.5% “urethral stricture” (BNC not reported)
   e. Risk after radical prostatectomy then treated by IMRT
      i. 6% “urethral stricture” (BNC not reported)

III. Anastomotic stricture (after radical prostatectomy)
   a. Open radical prostatectomy up to 13% (Abraham et al. Patient centered outcomes in prostate cancer treatment…. JU, 2010)
   b. After expert robotic radical prostatectomy: 0.5% (Tan et al., Optimizing vesicourethral anastomosis healing after robot…. J Endourology, 2010)
   c. Compare 5.5% risk after open radical retropubic to 3.8% risk after perineal approach (Gillizer et al., Single center comparison of anastomotic strictures….Urology, 2010)
IV. Anastomotic stricture causes: Many theories
a. Predisposing
   i. Gleason score (doubles risk)
   ii. Previous TURP
   iii. Extracapsular extension
   iv. Obesity (harder surgery)
   v. Age >70 years
   vi. Cigarette use
b. Surgical technique
   i. Intraoperative blood loss (triples risk)
   ii. Running vs interrupted? (no effect) (Gillitzer, Single center comparison of anastomotic strictures.... UROLOGY, 2010)
   iii. Mucosal eversion?
   iv. Bladder neck sparing? (no effect)
   v. Overnarrowed anastomosis
   vi. Hematoma disrupting anastomosis
c. Urinary extravasation
   i. Yes in some studies, no in others (but may be confounding since those with prolonged leak also have prolonged catheterization)
   ii. Not related to drain output (Hanson et al. Postoperative drain output as a predictor.... Int Urol Nephrol 2008)
d. Acute urinary retention after Foley removal a particular risk (8 fold increase)
   i. AND......retention treated by suprapubic tube has a much higher subsequent stricture rate (33%) than those treated by Foley (4%).

V. Treatment of anastomotic stricture
a. Cold knife or holmium incision
   i. 16-40% failure for first cut (Surya, Anastomotic strictures following... JU, 1990)
   ii. Reported 8-15mm between distal stricture and proximal sphincter so it should be always possible to preserve sphincter (Popken, Anastomotic strictures after radical prostatectomy. Eur Urol, 1998)
   iii. Success rate falls with subsequent tries
   iv. Hopeless after 6-8 failures?
b. Circumferential resection
   i. Highly associated with incontinence in the literature (17-85%) but not in our practice nor in many published reports
   ii. “No statistically significant difference in continence status was found between patients with AS (anastomotic stricture) after 12 mo from the last treatment (78% continent) and patients with no clinical and instrumental evidence of AS after 12 mo from RRP (86% continent) (p = 0.22).” (Gainnarini et al. Cold knife incision of anastomotic strictures.... European Urol, 2008)
   iii. 100% success claim in 39 patients followed for 14-74 months? (Brodak et al., Bipolar transurethral resection of anastomotic strictures after radical prostatectomy; j Endourology 2010).
   iv. 73% success using varied techniques followed for 12-136 months (Gillitzer, Single center comparison of anastomotic strictures.... UROLOGY, 2010)
   v. Many possible sources of energy: KTP laser (“greenlight”), monopolar, bipolar
c. Primary open surgical repair
   i. 3/3 successful (Elliott et al, Management of severe urethral complications of prostate cancer therapy. JU. 2006.)
### PNE vs. Staged

<table>
<thead>
<tr>
<th></th>
<th>Staged Implant</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Least Invasive</td>
<td>A surgery</td>
<td>PNE more patient friendly</td>
</tr>
<tr>
<td>Least Costly</td>
<td>Higher Cost</td>
<td>PNE more payer friendly</td>
</tr>
<tr>
<td>Highest physician reimbursement</td>
<td>Less reimbursement</td>
<td>PNE more physician friendly</td>
</tr>
<tr>
<td>Bilateral</td>
<td>Unilateral</td>
<td>Bilateral increases success?</td>
</tr>
<tr>
<td>Fluoro not routine</td>
<td>Fluoro routine</td>
<td>Fluoro improves success</td>
</tr>
<tr>
<td>Monopolar lead</td>
<td>Quadripolar lead</td>
<td>Quadripolar improves success</td>
</tr>
<tr>
<td>Lead must be replaced</td>
<td>WYSIWYG</td>
<td>SI more sensitive and specific</td>
</tr>
<tr>
<td>Can do staged if unsuccessful</td>
<td>Can repeat</td>
<td>SI 25% more likely successful</td>
</tr>
<tr>
<td>Less time with external lead</td>
<td>More time</td>
<td>PNE less risk of infection</td>
</tr>
<tr>
<td>Less time with lead</td>
<td>More time</td>
<td>SI higher true positive</td>
</tr>
<tr>
<td>If +, can do lead/IPG at once</td>
<td>Two stages</td>
<td>Less cost to system, better use of MD/Patient time</td>
</tr>
<tr>
<td>Convert rate 50%</td>
<td>75%</td>
<td>SI more sensitive</td>
</tr>
<tr>
<td>Long-term success</td>
<td>Long term success</td>
<td>“Conversion rate” not the same as success</td>
</tr>
<tr>
<td>False positive requires multiple surgeries</td>
<td>Can require revisions and multiple surgeries</td>
<td></td>
</tr>
</tbody>
</table>
A. Rationale
   a. Basic Science Experiments

B. Clinical Results
   a. Voiding dysfunction
   b. Fecal Incontinence
   c. Pain Syndromes

C. My Approach
   a. Indications
   b. Results

D. Future Directions
The use of neurostimulation in urology has a long history that began forty years ago with the direct stimulation of sacral roots in spinal cord complete lesions, and we are able to attempt to restore “pelvic floor function” by means of electrical stimulation.

Sacral neuromodulation is an effective, minimally invasive urologic technique for treatment of urinary urge incontinence, idiopathic voiding dysfunction, and retention. Sacral neuromodulation activates or “resets” the somatic afferent input that is important in modulating sensory processing and the micturition reflex pathway in the spinal cord. The introduction of sacral nerve stimulation in the last 20 years has meant a revolution in the treatment of main bladder symptoms due to an imbalance in neural control.

In 2003 we introduced a new sacral neuromodulation lead for percutaneous implantation which includes a self-blocking electrode and requires only a simple placement procedure under local anesthesia.

This procedure permits a 2-stage approach to full percutaneous implantation thus permitting a long screening period which permits effective patient selection.

Sacral Neuromodulation (SNM) is well established as a method of treating various types of voiding dysfunctions and most of the experience with this therapy has derived from treating urge-incontinence, non obstructive retention and urgency frequency, and the original FDA approval was obtained for those indications only. During the last few years, physicians have tried applying SNS therapy to neurogenic patients reporting varying degrees of success. Neurogenic patients are, however, a fairly heterogeneous group exhibiting a variety of disorders of the pelvic floor, often including colorectal and sexual as well as voiding dysfunctions. Physicians are faced with substantial challenges in trying to resolve the complex disorders in these patients, particularly those with incomplete lesions where sacral anterior root stimulation (SARS) is not an option and where other therapeutic options are unable to restore a physiological micturition cycle.

As the pudendal nerve is one of the major nerves which innervates the pelvic floor muscles, the external urethral and anal sphincters and the pelvic organs, there have been several attempts to stimulate this nerve all aimed at achieving a beneficial effect on multiple impaired pelvic functions.

In 2002 study on a new therapy option was introduced with the objective of stimulating the pudendal nerve in a chronic setting and recording clinical changes.

The pudendal nerve is formed by sacral roots from S2 to S4 (derives its fibers from the second, third and fourth sacral nerves), enters the ischiorectal fossa after passing behind the sacrospinous ligament and travels through the Alcock’s canal (a sheath of the obturator fascia) where it gives rise to three branches: the inferior rectal, perineal and dorsal nerves.

Stimulation of the pudendal nerve has afferent and efferent effects as the pudendal nerve supplies the motor innervation to the urethral sphincter and pelvic floor muscles and carries sensory fibers from the penis, urethra, anus and pelvic floor muscles.

Pudendal nerve stimulation and electrode placement is carried out using neurophysiological monitoring to guide the lead into the Alcock’s canal as close as possible to the pudendal nerve. A St. Mark’s ground pad is placed on one leg of the patient and the St. Mark’s electrode is fixed to the surgeon’s glove. The EAS is easy to explore with the patient in a lithotomic position. To assess electromyographic (EMG) activity of the EAS a needle electrode is inserted into the muscle ipsilaterally to the side of implant. Intravaginal or intrarectal pudendal nerve stimulation is then performed near the ischial spine by means of the St. Mark’s electrode (mounted on the tip of the surgeon’s index finger) while the CMAP is recorded via the EMG electrode placed into the EAS. Several PTML responses and CMAPs are then recorded. By adjusting the finger position the best motor evoked response (defined by maximal amplitude, regular shape, shorter latency) is identified, recorded and memorized and then forms the reference potential response (RPR).
Percutaneous pudendal implant can be performed with a perineal or transgluteal approach. With the patient in Lithotomic or prone position under local anesthesia, a 20 gauge insulated needle is inserted perpendicularly above the ischial tuberosity and then guided by neurophysiologic monitoring to reach the recto-ischial fossa until it is located below and behind the ischial spine in the Alcock’s canal. Once the needle is in the correct position the tined lead is inserted.

Currently the posterior approach is preferred in that it permits the localization of the ischial spine in the prone position by simply drawing two intersecting lines, one horizontally from the greater trocanther and the second vertically from the tip of the ischial tuberosity.

Fluoroscopy is also an effective tool to help the surgeon to identify the ischial spine.

At the end of the procedure the needle is removed and the tined lead placed definitively. Electrical stimulation is applied to confirm the correct position.

Neuromodulation for the Masses

There is a new disease in town

Health providers worldwide are well aware that the treatment of OAB is behavioral modification and antimuscarinic agents with the goal of relieving symptoms and balancing drug treatment efficacy with side effects and costs. Unfortunately for a number of reasons many patients do not reach their treatment goal and suffer from a new disease not yet defined by experts, and in many cases is seldom talked about by patients and health care providers. This disease is called “refractory OAB” and to which I have coined the term “ROAB”, a condition that up to now has been hovering below the radar of many caregivers and industry. Well guess what, things are about to change!

Who has ROAB?

Simply stated- millions do! In fact, I believe that ROAB is more prevalent than OAB that is currently effectively managed by medical therapy. Let’s face it, more than 50% of patients with OAB do not respond favorably to the medications we prescribe.

ROAB includes those OAB sufferers who:

- Do not respond to antimuscarinics in spite of trying multiple agents
- Cannot tolerate antimuscarinics
- Cannot afford antimuscarinics
- Have contraindications to taking antimuscarinics
- Do not want to take medication

ROAB are those patients who keep coming back and reporting that they are still leaking or voiding frequently and that the expensive medication you prescribed is not helping. In addition, ROAB are those who did not respond to the two weeks of samples given to them by their physician and who simply do not return thinking they cannot be helped and unfortunately surrender to their condition.

How do we treat ROAB?

The good news is that there is now a new treatment for ROAB called Urgent® PC. As of January 1, 2011 Urgent® PC, or percutaneous tibial nerve stimulation (PTNS), is now available and reimbursed as an in-office procedure for patients with refractory OAB. Although Urgent® PC is not a panacea, it does benefit many patients with ROAB giving them hope and dignity.

Neuromodulation for the masses

Although sacral nerve stimulation (Interstim®, Medtronic, Inc., Fridley, MN) is an FDA-approved and effective neuromodulation therapy for refractory OAB it simply has not filled the void in treating the millions of patients with ROAB. In spite of its proven effectiveness most urologists do not perform Interstim®, don’t refer to those who do, and the procedure may be perceived as too invasive or expensive, especially in the elderly and in those who are frail or have a number of medical co-morbidities. Botulinum toxin (Botox®) injected directly into the detrusor muscle endoscopically is an effective neuromodulation treatment for refractory OAB but its use in clinical practice is currently limited by its lack of FDA-approval.

Though it may appear harsh, beyond the scope of practice of incontinence experts the routine use of neuromodulation as a treatment of lower urinary tract symptoms has not been available to most patients. In contrast, with the advent of Urgent® PC, I predict that the majority of urologists and uro-gynecologists will now begin offering PTNS to patients with OAB. For this reason I have reflected that Urgent® PC is not just launching in-office neuromodulation, it functionally is launching neuromodulation to the masses of physicians and patients who otherwise are not treating or are not being treated for ROAB, respectively.
What is PTNS?

PTNS is a minimally invasive neuromodulation system designed to deliver retrograde electrical stimulation to the sacral nerve plexus through percutaneous electrical stimulation of the posterior tibial nerve. The posterior tibial nerve contains mixed sensory-motor nerve fibers that originate from L4 through S3 which modulate the innervation to the bladder, urinary sphincter and pelvic floor. The specific mechanism of action of neuromodulation is unclear, although theories include improved blood flow or change in neurochemical balance affecting bladder sensory innervation. It has been postulated that neuromodulation may have a direct effect on the detrusor or a central effect on the micturition centers of the brain.

Using a battery powered, hand-held stimulator and a 34 gauge needle electrode, the tibial nerve is accessed and stimulated. Patients receive a 30-minute weekly treatment in the office for twelve weeks. Patients treated with PTNS may begin to see changes in their voiding parameters after 4 – 6 treatments. Treatment responders require additional therapy at individually defined treatment intervals for sustained relief of OAB symptoms.

Clinical effectiveness of PTNS

The data which supports the efficacy of Urgent® PC will be presented. The robustness of the data is supported by:

- the consistency of the efficacy data
- the objective efficacy as measured by urodynamics
- the comparative data to extended-release tolterodine
- the level one evidence demonstrated by the PTNS vs. SHAM study
- the long-term effectiveness of PTNS

Therapeutic algorithm

A therapeutic algorithm from a continence center that for many years has liberally utilized sacral nerve stimulation, PTNS, and botulinum toxin will be presented.

Conclusions

PTNS offers patients with ROAB a minimally invasive, office-based procedure that is safe, effective, and is an important addition to the therapeutic armamentarium. PTNS raises the bar and you simply cannot deliver the same level of efficacy without it. I believe that in-office neuromodulation is here to stay and that one-day we will look back in time and wonder how we ever practiced without it.
Overview
- Both therapies are viable options for patients with refractory urge urinary incontinence and OAB-dry symptoms.
- Although often treating the same condition, these therapies should not be viewed as equivalent.
- Will discuss advantages, disadvantages and appropriate use of each therapy.

Sacral Neuromodulation (SNM)
- FDA approved therapy for treatment in non-neurogenic urge urinary incontinence, urinary frequency and non-obstructive urinary retention.
- Mechanism of Action
  - Exact mechanism is unknown
  - Modulation of S3 nerve likely acts via a central mechanism
  - Targets reflex centers in spinal cord and pons
  - Modulates the reflexes which influence the bladder, pelvic floor and urethral sphincter

  Technique
  - Staged versus PNE approach
  - Minimally invasive outpatient procedure requiring only local anesthesia and mild sedation
  - Potential for in-office procedure
  - Short-term testing period of 3-7 days
  - Immediately reversible if non-efficacious and can proceed with further treatments
  - Requires adjustment of settings during testing phase and after implant

- Benefits of SNM
  - ~80% of improving urinary symptoms by 50%
  - Treats entire pelvic floor
    - Treats concomitant bowel symptoms (approved in Europe for both bowel and bladder symptoms)
    - Sexual function
  - Restores function- treats non-obstructive urinary retention
  - Device can last 10 years with a continuous treatment
  - Proven long-term efficacy
  - Re-operation rates of 20-30%
  - Covered by most insurance plans and Medicare

- Cons of SNM
  - MRI usage post-implant is a relative contra-indication
  - Less useful in neurogenic patients. Not FDA approved in neurogenic voiding dysfunction.
  - Must be willing and able to operate the device
    - Need for reprogramming
  - Discomfort at IPG site can lead to explant or revision.
  - Cost (short-term vs. long-term)
Botulinum Toxin

- Non-FDA approved therapy
- Poor insurance coverage
- Applications
  - Neurogenic OAB, idiopathic OAB, detrusor sphincter dyssnergia, interstitial cystitis, BPH
- Mechanism of Action
  - End-organ therapy
  - Acts via local and temporary chemodenervation
  - Cleaves SNAP-25
  - End result is lack of acetylcholine binding to post-synaptic receptor
- Technique
  - Office based procedure using local anesthesia and flexible cystoscope
  - Dose?
    - Dose finding studies underway
    - Neurogenic vs. non-neurogenic
  - Injection template
    - Not standardized
    - Trigone vs. trigone sparing
    - Typically 10 units/mL with 1mL per injection site
    - Injected volume and spacing of injections not standardized
- Benefits of Botulinum toxin
  - 40-70% improvement in frequency and urgency
  - 60-80% complete continence after single injection
- Cons of Botulinum toxin
  - Risk of urinary retention (dose dependant, use lowest necessary dose)
    - Rate of CIC <10% in my practice
    - Must be willing and able to perform CIC
  - UTIs
    - Mostly associated CIC
  - Need repeat injection ~ every 6 months
    - Waning efficacy at end of treatment period=relapse of symptoms
  - Rare systemic adverse events
    - <10 cases, usually with high doses
  - ? efficacy over repeat injections (? antibody formation)
- Key to choosing the best therapy
  - Neurogenic versus non-neurogenic
    - Need for future MRI
  - Able to operate device
  - Willing and able to perform CIC
  - Presence of bowel complaints
  - Patient preference
  - Pre-therapy post void residual
Clinical Neurostimulation Parameters: The Role of Programming

Norbert Kaula, Ph.D. and Steven Siegel, M.D.

Abstract—Although an array of neurostimulation parameters can be adjusted during a trial and permanent lead implantation, most often only the stimulation amplitude is attuned. Taking advantage of either the stimulation amplitude, such as frequency, pulse width, unipolar or bipolar stimulation may improve the clinical outcome of the neurostimulation implant patient. Further, documenting these stimulation parameters in a complete fashion, may reveal gradual or abrupt changes over time, that are supportive during trouble shooting or improving neurostimulation therapy.

I. INTRODUCTION

Electrical neuromodulation of the sacral spinal nerves involves the implantation of a temporary or permanent stimulation lead, with multiple electrodes, connected to an external, EPG, or implantable pulse generator, IPG. Surgically, the rationale is to place the lead in close vicinity to the nerve trunk and connect it to a suitable pulse generator. This therapy requires electrical excitation of the neurons of the nerve trunk, produced by the pulse generator that in return is controlled by an external clinician programmer. The following discusses parameters that are accessible and adjustable by the clinician through a clinician programmer. A cylindrical shaped stimulation lead with quad ring electrodes is considered here, other electrode geometry, though similar, is not covered. A rectangular cathodic monophasic waveform is assumed.

II. ADJUSTABLE STIMULATION OPTIONS

The typical adjustable stimulation parameters of a neurostimulator include the amplitude, frequency and pulse width. Additionally, the electrodes of the lead can be selectively turned on or off and assigned a polarity. Below is summary of typical parameters with frequently observed clinical settings and ranges:

Active:
Electrode states: on – off
Amplitude \( A \) in mA; \( 0 < A < 10 \)
Pulse width \( PW \) in \( \mu s \); \( 0 < PW < 1,000 \)
Stimulation frequency \( f \) in \( s^{-1} (Hz) \); \( 10 < f < 20 \)
Polarity: cathodal – anodal

Passive:
Impedance \( Z \) in \( \Omega \); \( 100 < Z < 5k\Omega \)

A. Amplitude

The stimulation amplitude is responsible for the excitation of the neural tissue. It has a distinct non-linear behavior, requiring a minimal stimulation amplitude, charge density, to elicit a neural response. This charge density is inverse proportional to the distance between nerve and electrode, thus the need of placing the stimulation lead close to the nerve bundle.

Steadily increasing the stimulation current reaches a threshold, where most fibers are deployed. Further increase in stimulation amplitude activates more axons until saturation is reached, followed by a decline, a natural inhibition to protect the nerve from a too high sodium influx.

B. Pulse Width

As a rule of thumb, a larger pulse width recruits more fibers with smaller diameter. Clinically, a wider pulse width can be used to bridge amplitude increments that are to large as perceived by the patient. Larger pulse widths also deliver more current into the neural tissue and may cause nerve damage, besides draining the implantable stimulator battery.

C. Frequency

Often, the stimulation frequency is selected according to the the patients’ perception. Characteristically, patients report stimulation frequencies below 15 pulses
III. Amplitude - Pulse Width Relationship

The relationship between amplitude and pulse width is well known and termed as the Strength-Duration Curve. A minimal charge per phase, pulse width multiplied by stimulation amplitude, is required to bring a nerve to threshold. The amplitude of current threshold decreases with increase of pulse width. The smallest excitation current of this curve is called rheobase. Twice the rheobase results in the chronaxie, a measure of the excitability of the neural tissue. Smaller chronaxie denotes higher excitability.

IV. Reprogramming and Documentation

The human body is a dynamic environment for neurostimulation. Healing and encapsulation can increase the electrical tissue-electrode impedance. This may be automatically adjusted by current regulated stimulators, however in voltage regulated systems, the patient will experience a decrease in the stimulation effect and will require an adjustment of the voltage amplitude. Changes in stimulation parameters may be expected over time, often occur gradually and should be documented carefully and completely. Good stimulation parameter record keeping may reveal trends helpful in optimizing the treatment or future troubleshooting.

V. Conclusion

While stimulation amplitude adjustment is the most important parameter in neurostimulation, pulse width, frequency and polarity should also be considered in regular programming session. This can greatly improve the neuroselectivity of the neurostimulation therapy. Further, complete documentation of all stimulation parameters can reveal trends or drastic changes requiring troubleshooting.

REFERENCES


Sacral neuromodulation is postulated to improve overactive bladder by correcting deficient spinal inhibitory signals, hence suppressing detrusor contractions and allowing pelvic floor relaxation. While the exact mechanism is unknown, it is thought that leads placed at S3 nerve roots take effect via afferent bladder innervation. (Wyndaele JJ 2000; Vodusek DB 1986) This is done through direct stimulation of afferent anorectal branches (of pelvic nerves), afferent sensory fibers (pudendal nerve), and lower extremity muscle afferents. In addition, neurologic alteration is thought to occur in sensorimotor learning areas of the brain with acute SNS, and with bladder awareness, urge, and timing of micturition on a chronic basis. (Blok BF 2006)

Sacral neuromodulation was trialed in the first patient by Brindley in 1972 (Brindley GS 1972; Oerlemans D 2008) with use in children since 2001, beginning as transcutaneous electrical nerve stimulation (TENS). (Bower WF 2001; Hoebeke P 2001) TENS provided early data on treatment of neurogenic and non-neurogenic dysfunctional elimination disorders. Favorable results were seen using TENS for the treatment of non-neurogenic urgency/urge incontinence, (Bower WF 2001; Hoebeke P 2001; Haggstroem S 2009) but results were less promising among children with spina bifida where only a trend toward improvement in bladder capacity and defecation was noted. (Marshall DF 1997) Success rates of 51% at one year, prospective randomized controlled data and “child friendly” therapy continue to make this a viable treatment option; different settings and stimulation schedules remain a problem when comparing various study outcomes. (Hoebeke P 2010) Percutaneous tibial nerve stimulation (PTNS) has also been described for both neuropathic and non-neuropathic voiding dysfunction. (Hoebeke P 2002; De Gennaro M 2004; Capitanucci ML 2009) Lumbar to sacral nerve rerouting is perhaps the newest investigational treatment for neurogenic voiding dysfunction. Reports of significant improvement in spontaneous voiding are described in early data by Xiao et al, although conflicting data exist with respect to continence. (Xiao CG 2005; Peters KM 2010)

Inherent to the success of pediatric sacral neuromodulation is appropriate patient selection. Its use in children with neurogenic bladder has recently shown success in a randomized trial demonstrating improvement in bladder capacity and continence (but not in urodynamic parameters). (Haddad M 2010) For the purposes of this review, we will focus predominantly on voiding dysfunction in neurologically intact children. After failure of behavioral modification, timed voiding, maximal anti-cholinergic/pharmacologic therapy, treatment of constipation, and biofeedback, consideration can be given toward sacral neuromodulation. Botulinum toxin (Botox®) injection into the detrusor is often offered as an alternative or may have already been tried; however, Botox® failure is not required prior to offering SNS. Preoperatively, a detailed history, physical exam, urinalysis and culture, abdominal radiograph, retroperitoneal ultrasound and urodynamic evaluation with post-void residual were routinely recommended. (Roth TJ 2008) Formal urodynamic studies, voiding cystourethrogram and lumbosacral MRI (due to contraindication and frequent request after implanted pulse generator (IPG) placement) are now routinely obtained by our group (Reinberg YE, personal communication). Typically, a two stage technique under general anesthesia is employed, using the smaller Interstim II device (Medtronic, Minneapolis, MN) with unilateral quadripolar tined lead placement via percutaneous transforaminal access to the third sacral spinal nerve (S3). Radiation can be minimized with a methylene blue tattoo for localization of the lead connector to temporary external lead, allowing for placement of the IPG without fluoroscopy. (McGee SM 2009) Motor responses to S3 stimulation include bellows movement of the pelvic floor, and plantar flexion of the great toe (as opposed to S2 pinching of the anal sphincter and plantar flexion with lateral foot rotation, or S4 bellows without lower extremity movement). (Daneshgari F 2006) Following implantation, patient history and voiding diaries are performed to evaluate urinary frequency, urgency, incontinence, nocturnal enuresis and constipation. Clinical success is defined as greater than or equal to 50% improvement in symptoms. (Roth TJ 2008) Functional bladder capacity and urodynamic studies are variably performed by other investigators, (Hoebeke P 2001; Haddad M 2010) however, no standardized screening or postoperative assessment has been defined and is problematic for data comparison. Concerns over lead migration with vertical growth, battery longevity, and traumatic fracture in a pediatric population as yet have no solution. However,
device miniaturization and lead redesign have been suggested and explantation is possible with sustained treatment effect (minimum 12 months) and stable symptoms after device deactivation for 6 months.

In 20 prospectively followed patients described by Roth et al, 90% went on to second stage IPG placement. Resolution or greater than 50% improvement occurred in 88% of children with urinary incontinence, 63% with nocturnal enuresis, 89% with daytime frequency, and 59% with constipation. This is in comparison to 51% one-year durable response rate using TENS for non-neurogenic overactive bladder, and 81% positive response for urinary incontinence in children with neurogenic bladder. Complications commonly cited with sacral neuromodulation are device or wound infection, electrode migration, loss of effect and lead fracture. Revision rates range between 7-18% due to lead migration, faulty connection, and wound infection. In our own observations, revisions have also been necessary due to uncomfortable buzzing or painful sensations and battery replacement (Reinberg YE, personal communication) given 4.4 year average battery life (Interstim II product specifications, Medtronic, 2010).

In summary, SNS is a promising technique for refractory pediatric voiding dysfunction. It is essential to develop standardized pre-operative evaluation and post-operative follow up protocols for uniform comparison of data.

Competing interests
The authors have no disclosures or conflicts of interest.

REFERENCES
Brindley GS. Experiments directed towards a prosthesis which controls the bladder and the external sphincter from a single site of stimulation, 1972, Liverpool.
POSTER ABSTRACTS
MARK YOUR CALENDARS!

SUFU at the AUA 2011
May 14, 2011
Renaissance Washington, DC
Washington, DC

SUFU 2012 Annual Meeting
February 28 – March 3, 2012
The Roosevelt
New Orleans, LA

SUFU 2013 Annual Meeting
February 26 – March 2, 2013
Caesar’s Palace
Las Vegas, NV
Poster #BS1
ANGIOTENSIN II TYPE I (AT-1) RECEPTOR INHIBITION PREVENTS THE URODYNAMIC AND DETRUSOR CHANGES ASSOCIATED WITH BLADDER OUTLET OBSTRUCTION – A MOUSE MODEL
Craig Comiter, MD and Hardeep Phull, BS
Stanford University, Stanford, CA
(Presented by: Craig Comiter)

Introduction: Bladder outlet obstruction (BOO) is often associated with detrusor overactivity and detrusor hypertrophy and collagen deposition. As the lower urinary tract has been shown to have a functional local rennin-angiotensin system, we investigate whether treatment with the AT–1 receptor blocker losartan can prevent the structural and functional changes that occur with BOO in a mouse model.

Methods: 20 Balb/CAN mice underwent partial proximal urethral obstruction, and were survived for 6 weeks. Half were given losartan (10 mg/kg/day) via gastric gavage for 6 weeks, and half were not. Six mice served as untreated, unobstructed controls. Urodynamics were performed (fill rate = 25 ul/min) at baseline and after 6 weeks. Capacity (C), voiding pressure (Pdet) and volume at first non−voiding contraction as a percentage of bladder capacity (NVC1) were recorded. Bladders were harvested, fixed in 10% formalin, processed for histological evaluation, and stained with trichrome (collagen deposition) and hematoxylin and eosin (detrusor hypertrophy). Trichrome scores of 1=decreased staining, 2=normal, and 3=increased staining compared to our control group. Hematoxylin and eosin scoring =1 for atrophy, 2 for normal, and 3 for hypertrophy compared to controls. Histological scoring was performed (blinded) by 2 pathologists and 2 urologists.

Results: Compared to controls, BOO caused an increase in capacity (154±21 vs 58±7 ul, p<0.01), increase in Pdet (29±2.1 vs 12±1.9 mm Hg), decrease in NVC1 (median=24% vs 54% p=0.03). BOO mediated an increase in detrusor hypertrophy (median 3 vs 2, p=0.02), and fibrosis (median 3.0 vs 2.0, p=0.01) compared to controls. Compared to untreated BOO mice, treatment of BOO mice with 6 weeks of losartan mediated an increase in bladder capacity (249 ± 29 vs 154 ± 21 ul, p=0.01), no significant change in Pdet (25±1.6 vs 29±2.1 mm Hg, p=0.2) an increase in NVC1 (47% vs 24%, p=0.02). Structural changes were also noted. Compared to untreated BOO mice, treatment with losartan mediated a reduction in detrusor hypertrophy (median 2 vs 3, p=0.02), and in fibrosis (median 1 vs 3, p<0.01.)

Conclusion: In a mouse model of BOO, treatment with six weeks of an AT−1 receptor antagonist prevented some of the urodynamic and histological changes that occur with untreated BOO. Improvement was realized in detrusor overactivity, without adversely affecting bladder contractility. Detrusor hypertrophy and collagen deposition were also partially inhibited.

Poster #BS2*
SANCTURA XR MUSCARINIC ANTAGONIST RESISTS TRANSPORT (SMART) ACROSS THE BLOOD-BRAIN BARRIER (BBB): A PROSPECTIVE NEUROCOGNITIVE, BIODISTRIBUTION AND PHARMACOKINETIC STUDY OF EXTENDED RELEASE TROSPRIUM
Michael Oefelein, MD, FACS¹, Gary Kay, PhD², Howard Goldman, MD, FACS³, John Ling, PhD⁴, Kavitha Bhasi, PhD⁵, Cara Tannenbaum, MD⁶ and David Staskin, MD⁷
¹Urology, Allergan, Irvine, CA; ²Cognitive Research Corporation, St. Pete, FL; ³Cleveland Clinic Foundation, Cleveland, OH; ⁴Pharmacology, Allergan, Irvine, CA; ⁵Pharmacology, Allergan, Irvine CA; ⁶Univ of Montreal, QC, Canada; ⁷Tufts University, Boston, MA
(Presented by: David Staskin)

Introduction: Antimuscarinic treatment of overactive bladder (OAB) has the potential to cause clinically relevant impairment of CNS function, and preclinical data strongly support different propensities of OAB drugs to cross the BBB (tertiary>quaternary amine). The specific aims of this study are: 1) to determine if Trospium Chloride (TrCl) crosses the BBB and 2) to determine if TrCl demonstrates a clinically significant memory effect.

Methods: This is an open−label, non−comparator evaluation of Sanctura XR to penetrate the BBB at plasma steady state (Day 10). TrCl levels (time 0, 2, 5, 7, 12 and 24 hr post dose) in cerebrospinal fluid (CSF) and steady−state (day 10) peak and trough plasma levels (time 0, 5 and 24 hr) were measured in non−demented elderly (mini−mental state score >25) human volunteers (n=12) 65–75 years of age (NCT00863551). Pre−TrCl dose and day 10 post−dose neurocognitive testing Hopkins Verbal Learning Test−Revised (HVLT−R) were compared using a reliable change index (RCI) to assess if any study subject shows evidence of a clinically and statistically significant change in learning or memory.

Results: Subjects (mean age=68ys) reported no serious adverse events. The primary outcome (TrCl concentration in CSF at steady state peak plasma concentration 5 hours post dose) achieved undetectable TrCl concentration (<40 pg/ml) despite measureable peak plasma steady state values (Cmax=964 pg/mL, AUC=18,600 pg, Table). All 72 CSF samples fell below the LQ (<40 pg/ml) for TrCl. The secondary end point (RCI pre−/10 days post−dose neurocognitive measurements HVLT−R) revealed minimal improvement, but no clinically meaningful net drug effect.
**Conclusion:** TrCl is undetectable at multiple timepoints in the CSF of elderly OAB patients despite day 10 steady state peak plasma TrCl levels. No change in memory as assessed by the RCI of the HVLT–R was identified. These results support CNS safety in the neuro-cognitively vulnerable elderly OAB patient.

---

**Poster #BS3**

**ANATOMIC AND HISTOLOGIC EXAMINATION OF THE PORCINE VAGINA AND SUPPORTIVE STRUCTURES: IN SEARCH OF AN IDEAL MODEL FOR PELVIC FLOOR DISORDERS EVALUATION AND MANAGEMENT**

Daniel Gruber, MS, MD¹, William Warner, MD¹, Eric Lombardini, VMD², Christopher Zahn, MD³ and Jerome Buller, MD³

¹Walter Reed Army Medical Center, Washington DC; ²Armed Forces Radiobiology Research Institute, Bethesda, MD; ³Uniformed Services University, Bethesda, MD

(Presented by: Daniel Gruber)

**Objectives:** To examine the anatomy and histology of the swine vagina and adjacent supportive structures in comparison to human tissues; to determine the potential utility of this model for pelvic floor disorders evaluation and management.

**Methods:** This is a descriptive study of the gross anatomy and histology of the swine anterior and posterior vagina, vaginal cuff, uterosacral ligament, cardinal ligament and recto–vaginal space. Tissues were obtained from six swine. Histological analysis was performed by both gynecological and veterinary pathologists and utilized routine hematoxylin and eosin (H&E), Masson’s Trichrome and Van Gieson stains.

**Results:** The vast majority of the porcine tissues, grossly and histologically, were extremely similar to the human vagina and supporting structures.

Grossly, the swine uterosacral ligament tracked from the cervix to the sacrum, coursing over the ischial spines in the same pattern as the human. The cardinal ligaments fanned laterally away from the vagina as it does in the human.

Histologically, the swine and human vaginas are similar. Both consist of epithelium (E), lamina propria (LP), muscular layer, and adventitia. The swine vagina muscular layer is arranged in an inner circular smooth muscle (CSM) and outer longitudinal smooth muscle (LSM) manner, a pattern seen in the human.

Collagen and elastin are in all sites; however, elastin is minimal, 1.0(±0), in all except for the uterosacral ligament, 4.0(±1.7) (p=0.1). Collagen was evenly distributed with the exception of the uterosacral ligament, 2.2(±1) and 3.8(±1.6) in the cardinal ligament (p=0.03).

Smooth muscle was found in all sites except for the cardinal ligament. The epithelium of the swine vagina measured 40 µm at the vaginal cuff and 50–200 µm at anterior and posterior vagina. The lamina propria has minimal elastic fibers but has numerous narrow papillae projecting into the epithelial layer, mainly involving the anterior and posterior vagina but not present in the cuff area.

**Conclusions:** The swine vagina and adjacent supportive structures are grossly and histologically similar to human vaginal anatomy and may represent a useful model for further studies of pelvic floor disorders.
**Poster BS4**

**INTRAVESICAL THERAPY BY LIPOSOMES COMPOSED OF LIPIDS ENDOGENOUS TO URINARY TRACT DOES NOT AFFECT SERUM LEVELS OF LIPID OR ITS METABOLITES**

Michele Anthony¹, David Chancellor¹, Vikas Tyagi, MD², Michael Chancellor, MD², Pradeep Tyagi, PhD² and Jonathan Kaufman, PhD¹

¹Lipella Pharmaceuticals, Pittsburgh, PA; ²William Beaumont Hospital, Royal Oak, MI

(Presented by: Michele Anthony)

**Purpose:** Urinary bladder erects an internal barrier to the back diffusion of urine constituents into the systemic circulation by means of apical cell membranes of exceptionally low permeability composed of glycoproteins, phospholipids and cholesterol. Liposomes composed of sphingomyelin phospholipid endogenous to bladder, has shown promise as a treatment for interstitial cystitis. However, sphingomyelin generates several signaling metabolites on sequential enzymatic metabolism. In the current study, we tested the hypothesis whether local metabolism of instilled liposomes in bladder leads to changes in serum lipid levels.

**Materials and Methods:** A validated liquid chromatography mass spectrometry (LC/MS/MS) assay was developed for sphingomyelin and its 5 metabolites (ceramide, ceramide−1−phosphate, lysophosphorylcholine, sphingosine, and sphingosine−1−phosphate) in rat serum. Plasma concentrations were quantified over a week after 0.5mL instillation (30min dwell time) of sphingomyelin liposomes (n = 4) for each time point (1 hr, 2 hrs, 8 hrs, 24 hrs, and 168 hrs) relative to control levels measured in vehicle treated sham rats (n=2) at corresponding time points using a Thermo Finnigan TSQ 7000 quadrupole mass spectrometer, operating in a multiple reaction monitoring positive ionization mode.

**Results:** The normal animal behavior in terms of food and water intake and general well being after liposome instillation was indistinct from sham control rats. The baseline serum levels of sphingomyelin (10mg/ml) in sham control untreated rats were itself very high to necessitate its 1000 fold dilution in methanol prior to LC−MS analysis against a solvent curve. The serum sphingomyelin levels showed insignificant change after liposome instillation at each time point. Serum analysis for the levels of all 5 metabolites against matrix matched curves did not register any change as all the metabolites were below the lower limit of quantitation (LOQ).

**Conclusion:** The extensive bioavailability study of intravesical liposomes using the sensitive LC/MS/MS assay did not reveal any changes in the serum profile of sphingomyelin or its lipid metabolites. These studies lend further support to the safety of liposomes composed of endogenous lipids as a therapeutic entity and as a delivery platform for restricting the effect of drugs only to the bladder.

---

**Poster BS5**

**AGE ASSOCIATED CHANGES IN URINARY PROTEOME OF OAB PATIENTS**

Vikas Tyagi, MD¹, Harvey Qu, PhD², Kenneth Peters, MD³, Yao-Chi Chuang, MD⁴, HT Liu, MD⁴, Hann-Chorng Kuo, MD⁴, Naoki Yoshimura, MD, PhD⁴, Shachi Tyagi, MD⁴, Michael Chancellor, MD¹ and Pradeep Tyagi, PhD¹

¹William Beaumont Hospital, Royal Oak, MI; ²Oakland University, Rochester, MI; ³Chang Gung Memorial Hospital, Kaohsiung, Taiwan; ⁴Buddhist Tzu Chi General Hospital, Hualien, Taiwan; ⁵University of Pittsburgh, Pittsburgh, PA; ⁶UPMC, Pittsburgh, PA

(Presented by: Vikas Tyagi)

**Purpose:** Epidemiology studies done consistently report increased prevalence of overactive bladder (OAB) prevalence with age, and the elderly population is rapidly increasing worldwide. Studies on aged rodent bladder have so far yielded contradictory results on age associated changes in muscarinic receptors, which further highlight the species differences with respect to OAB pathology. In the current study, we hypothesized that biochemical changes (decreased muscle mass, urothelial thinning and increased collagen) associated with age that result in altered bladder function (overactive hypercontractile bladder) will be reflected in altered urinary proteome.

**Methods:** Single time point urine specimens were obtained from 74 OAB patients in the age range of (25−90 years) of either sex coming routinely to the two Urology clinics in Taiwan. Differentiation between OAB-wet and OAB-dry was based on symptoms and a 3-day voiding diary. Ten chemokines in urine were measured by Luminex based immunoassays and urinary NGF levels were measured by enzyme-linked immunosorbent assay (ELISA). The urinary chemokines and NGF levels were compared among OAB-dry and OAB-wet subgroups, and also between OAB patients.

**Results:** Of the 11 proteins analyzed in the urine of OAB patients we observed positive age associated elevation for four selected proteins. Analysis of NGF in the urine revealed positive but modest correlation with age of OAB dry patients (p<0.05) with Spearman r=0.3821. There was no association of urinary NGF with OAB wet population. Analysis of MCP-1 and IP-10 levels in urine of OAB patients without separation into dry or wet also revealed age correlation with r=0.274 for MCP-1 (p<0.05) and r=0.250 for IP-10 (p<0.05).

**Conclusions:** Based on our findings, we postulate that age associated biochemical changes in the bladder are related to changes in proteins that target specific components of bladder function, such as the afferent sensory nerve pathways (NGF, MCP-1 and IP-10). Elevation of MCP-1 with increasing age may be related to decrease in muscle mass of bladder. Urinary NGF and MCP-1 can be surrogate markers for monitoring the age associated biochemical changes in bladder and the effect of therapeutic interventions in elderly OAB patients.
URINE ANALYSIS OF CONFIRMED UTI PATIENTS REVEAL HIGHER LEVELS OF CXC CHEMOKINES COMPARED TO PATIENTS WITH LUTS BUT WITHOUT UTI

Pradeep Tyagi, PhD¹, Vikas Tyagi, MD¹, Harvey Qu, PhD², Kenneth Peters, MD¹, Yao-Chi Chuang, MD³, HT Liu, MD⁴, Hann-Chorng Kuo, MD⁴, Priyanka Tyagi, MS and Michael Chancellor MD¹

¹William Beaumont Hospital, Royal Oak, MI; ²Oakland University, Rochester, MI; ³Chang Gung Memorial Hospital, Kaohsiung, Taiwan; ⁴Buddhist Tzu Chi General Hospital, Hualien, Taiwan

(Presented by: Pradeep Tyagi)

Purpose: The eponymous function of chemokines is inflammatory cell adhesion and infiltration into injured tissue. Chemokines belong to two different classes, with CXC family mainly implicated in the recruitment of neutrophils to sites of infection and CC family for rest of the leukocytes. Studies in the past have focused on a single member of CXC family such as CXCL-8 (IL-8). In the present study, we investigated whether other CXC chemokines are also elevated following UTI and whether they can together form a multi-marker panel that is useful as a surrogate marker for rapid laboratory diagnosis of UTI.

Method: Single time point urine specimens were collected from 42 patients with confirmed UTI (positive culture) prior to initiation of antibiotics and compared with 4 other cohorts of subjects of either sex without any infection (ruled out by urine dipstick test) in the age range of 25−90 years. There were OAB (n=115), IC/PBS (n=59) and asymptomatic controls (n=44)

Differentiation between IC/ PBS, OAB-wet and OAB-dry was based on absence or presence of pain symptoms and a 3-day voiding diary. Ten chemokines in urine were measured by Luminex based immunoassays and urinary NGF levels were measured by ELISA. Kruskal-walls ANOVA followed by Dunn’s test was used to check for significance.

Results: Patients with UTI revealed 5 fold higher mean levels of CXCL−1, 12 fold higher CXCL−10 and 2 fold higher CXCL−8 relative to controls. Levels of these chemokines in UTI patients were also significantly higher than patients with OAB, (96.16± 28.19 vs. 11.15±7.50) for CXCL1, (1203±537.2 vs. 39.31±17.51) for CXCL−10 and (113± 29.45 vs. 29.1±13.54 for CXCL−8. OAB wet had 3−5 fold higher chemokine levels than OAB−dry. Urine levels of non−CXC chemokines like MCP-1, IL-1ra and PDGF were higher in population without underlying infection in urinary tract such as IC/PBS and control population with NGF highest in OAB wet cohort.

Conclusions: Our data lends support to the emerging concept that multiple panels of urine chemokines reflect ongoing infection and inflammation of lower urinary tract. Several fold higher urine levels of CXC chemokines in UTI patients argue for their important role in the development of a local inflammatory response to UTI. Although single marker such as urinary level of IL−8 may be a sensitive test for UTI, but it is poorly specific. The IL−8 specificity for UTI may be further increased by a multimarker panel that also includes other CXC or CC chemokines.

DIFFERENTIAL EFFECT OF BLADDER INHIBITION BY ELECTRICAL STIMULATION OF THE SPINAL NERVE AND THE DORSAL NERVE OF THE CLITORIS

Xin Su, Angela Nickles and Dwight Nelson
Medtronic Inc.

(Presented by: Thaddeus Brink)

Introduction and Objective: Stimulation of the spinal nerve (SN) and the dorsal nerve of the penis/clitoris have been shown to inhibit the bladder rhythmic contraction (BRC), but the relative efficacy of stimulation at those sites and the optimal parameters to achieve inhibition are not known. We have quantified the parameter effects of electrical stimulation of the SN and the dorsal nerve of the clitoris (DNC) using the BRC model in the rat.

Methods: In anesthetized female rats (urethane, i.p. 1.2g/kg), a wire electrode was placed under either the L6 SN or the DNC bilaterally. A cannula was placed into the bladder via the urethra and the urethra was ligated to ensure an isovolumetric bladder. Saline infusion induced the BRC. Electrical stimulation of the SN evoked hind−toe twitches and pelvic floor muscle contraction and stimulation of the DNC evoked the reflex contraction from the external anal sphincter. Stimulation currents were adjusted for each animal as a function of motor threshold. Stimulation of either the SN or the DNC significantly attenuated the frequency of the BRC depending on the frequency and intensity of current stimulation.

Results: Ten Hz stimulation produced the strongest inhibition and low and high frequency stimulation produced less or no attenuation on the BRC. Attenuation of the bladder contraction frequency was stronger with increases in the current intensity. However the time course response and the degree of inhibition were dependent on stimulation location. At the threshold intensity, stimulation of the SN (0.18 ± 0.01 mA) produced a delayed and post−stimulation inhibition to 34 ± 11% (mean, SEM) of control (n=10, v.s. control, n=13, p<0.05, two−way ANOVA) and stimulation of the DNC (1.04 ± 0.06 mA) generated immediate attenuation of the BRC during stimulation to 56 ± 16% of controls (n=8 v.s. control, n=9, p<0.05, two−way ANOVA).
Conclusion: There was no significant difference in maximal bladder inhibition achieved from stimulating the DNC or the SN. The different time course responses to threshold level stimulation of the SN and the DNC suggest that different mechanisms/nerve pathways could underlie the bladder quieting responses to different stimulation sites. Compared with responses to SN stimulation, the absolute currents required to reduce the BRC using DNC stimulation appear to be higher. The results provide useful information of neuromodulation at different stimulation sites as a treatment option of overactive bladder.

Funding: The study was supported by Medtronic Inc.

Poster #BS8*

EFFECT OF AGING ON URETHRAL AND BLADDER FUNCTION OF RATS
Andrea Staack, MD, PhD¹, Joanne Leung, BS², Rong Zhang, DDS, PhD², Danielle Ziva Shulaker², David Tehrani, BS², Ais Wu, BS², Vanda Lopez Guenther, MD² and Larissa Rodriguez, MD²
¹Division of Female Urology, Urodynamics, and Pelvic Reconstructive Surgery, Department of Urology, David Geffen Medical, Los Angeles, CA; ²Department of Urology, David Geffen Medical School, Los Angeles, CA
(Presented by: Andrea Staack)

Introduction: The prevalence of stress urinary incontinence increases with age, suggesting that age–related changes may influence its development. It remains poorly understood how factors such as aging, parturition, and hormones contribute to these changes. The purpose of this study is to evaluate the effects of aging on the urethra and bladder of female Sprague–Dawley (SD) rats.

Methods: Nulliparous female SD rats (n=52) were divided into two groups: young rats (3–15 months, mean: 8 months) and older rats (16–24 months, mean: 18 months). All animals underwent cystometry and evaluation of abdominal leak point pressure (ALPP). Urethral resistance was evaluated by retrograde urethral perfusion pressure (RUPP). After sacrificing the animals, muscarinic receptor activation was tested on urethral and bladder strips in isometric studies. Harvested tissue from both groups was evaluated for apoptosis with TUNEL staining, neural innervation with the neuronal–specific marker PGP 9.5, urothelial thickness, amount of blood vessels, and extracellular matrix to smooth muscle ratio with Masson’s trichrome staining.

Results: Cystometry revealed a similar baseline bladder capacity in young and older rats when adjusted to their body weight. Urodynamic studies showed a significant lower ALPP (p<0.000) and RUPP (p=0.0003) in older animals when compared to young. Older rats’ bladder strips were statistically less contractile than those of young rats when responses were tested to KCl (p=0.03), carbachol (p=0.03), and isoproterenol (p<0.00). A similar trend was seen in urethral contractility. Histological evaluation demonstrated thinning of the urothelial layer in urethral tissue (p=0.022) of the aging rat. The smooth muscle content was decreased in the bladder and urethral tissue of aged animals. There was an increase in apoptotic cells in the older rat urethral (p=0.021) and bladder (p=0.035) tissue in comparison to tissue from young animals.

Conclusions: Older rats have lower baseline urethral resistance and decreased contractility in comparison to younger animals. Histological changes, such as thinning of the urothelium, decrease of smooth muscle content and an increase of apoptotic cells, were observed in older rats and point to a possible mechanism for the observed changes in voiding dynamics. These findings mimic those seen in humans and therefore naturally aging SD rats appear to provide an excellent animal model to study the pathophysiology of SUI with respect to age.

Poster #BS9

THE EFFECT OF CHRONIC WATER AVOIDANCE STRESS ON BLADDER MAST CELL ACTIVITY IN A RODENT MODEL
Una Lee, MD¹, Ariana Smith, MD², Viktoriya Golovatscka¹, Sylvie Bradesi, PhD¹ and Larissa Rodriguez, MD¹
¹Los Angeles, CA; ²Philadelphia, PA
(Presented by: Una Lee)

Introduction: Hypersensitivity disorders of the bladder are associated with bladder mastocytosis as well as stress related exacerbation of symptoms. We have shown that in a model of acute and chronic environmental stress, experimental animals manifest voiding abnormalities including urinary frequency and small voided volumes. The objective of this study is to examine the effect of chronic water avoidance stress (WAS) on bladder mast cell activity in a rodent model.

Methods: Adult female Wistar rats were exposed to chronic WAS (n=12) or sham water avoidance (sham WA) (n=9) 1 hr/day for 10 days. For WAS, the animal was placed on a platform surrounded by water. For sham WA, the animal was placed on an identical platform with no water. Bladders were harvested, fixed in 10% formalin, and prepared in 5um paraffin. For mast cell analysis, sections were stained with Toluidine blue. In each bladder cross sectional specimen, total number of resting (no degranulation), partially activated (PA; released <20% granules), and fully activated (FA; released >20% granules) cells were counted under light microscopy. 2–4 sections per animal were counted and the mean calculated.
Results: Rat bladder tissue from animals exposed to chronic WAS demonstrated significantly increased total mast cells numbers (including resting, PA and FA), when compared to sham WA ((166.28±SEM 24.2; 88.39±14.34, P=0.02). There was a significant increase of the number of resting mast cell after stress (51.67±8.96), when compared to sham (23.94±5.64) (P=0.02). Similarly, the total number of activated mast cells (PA and FA) was significantly higher in stressed rats (114.61±19.18), compared to sham (64.44±10.56)(P=0.05). The chronic WA group had significantly more PA mast cells (60.72±7.74) compared to sham (32±5.42)(P=0.01). No significant difference between FA mast cell numbers between groups was noted.

Conclusions: Rat bladder tissue exposed to chronic WAS demonstrated increased total, resting, and activated mast cells numbers when compared to sham WA. This suggests that chronic psychological stress results in increased bladder mast cell activity, supporting neuroimmune interactions between the bladder and stress response.

Poster #BS10
NICOTINIC AND PURINERGIC RECEPTOR INTERACTIONS IN RAT BLADDER SMOOTH MUSCLE
Alvaro Munoz, PhD¹, Adan Dagnino-Acosta, PhD¹, Paz Vital, PhD¹, Christopher Smith, MD¹, Timothy Boone, MD, PhD¹ and George Somogyi, MD, PhD¹
¹Baylor College of Medicine, Houston, TX; ²The Methodist Hospital
(Presented by: Alvaro Munoz)

Objective: Bladder smooth muscle contractions are mediated by muscarinic and purinergic receptors. We found that in the presence of the mixed cholinergic agonist carbachol the purinergic response to alpha-beta methylene-ATP (mATP) is attenuated, raising the possibility that muscarinic/nicotinic receptors have differential roles in regulating purinergic contractions. Our objective was to analyze the interactions of nicotinic and purinergic receptors in bladder smooth muscle

Methods: Female Sprague–Dawley rats were used. Dissociated bladder smooth muscle cells were loaded with fura–2 and the intracellular calcium levels (ICL) measured. Cells were plated on cover slips and continuously superfused with a physiological solution. Drugs were applied with an injection system for 10 seconds in 3 min intervals. In separate experiments, rat bladder strips were mounted in an organ bath and the contractile responses were isometrically measured in response to drugs injected every 15 min.

Results: Application of mATP (50uM) increased ICL; the repeated application of mATP exhibited desensitization close to 50%. After an application of mATP, nicotine (50uM) had a minimal effect on ICL. However, in the co-application of nicotine and mATP the ICL were attenuated by 50%. When mATP was applied 3 min after nicotine the purinergic desensitization was prevented with ICL at the level of the first mATP stimulus. Similarly, measuring isometric contractions, mATP (50 uM) evoked sizable contractions while nicotine was ineffective. A second purinergic contractile response with mATP alone or co-applied with nicotine was decreased by 50%. Nevertheless, when the second challenge with mATP occurred 15 min after nicotine application, the desensitization was abolished and the mATP-induced contraction was not significantly different from the first mATP.

Conclusion: Our results indicate that nicotinic receptor activation prevents desensitization of purinergic receptors. Since nicotine is not present at the second application of mATP we suggest that is the desensitization of the nicotinic receptors the precondition for the inhibition of purinergic desensitization. We propose that there is a negative interaction between smooth muscle purinergic and nicotinic receptors. This interaction is important for understanding purinergic transmission and their function in pathologic conditions.

Supported by NIH (DK069988); the Neurourology Fund and the Methodist Hospital Foundation.

Poster #BS11
EFFERENT NERVOUS EXCITATION OF DETRUSOR AND SPHINCTER DURING PHASIC DETRUSOR OVERACTIVITY
Françoise Valentini, MD, PhD and Pierre Nelson, PhD
ER6-UPMC (Paris 06) France
(Presented by: Françoise Valentini)

Introduction and Objective: DO is a frequent urodynamic diagnosis in patients with urge syndrome. DO is characterized by non inhibited detrusor contractions (NIDC). The precise mechanism underlying DO remains discussed but evaluation of the detrusor excitation during NIDC and subsequent voiding could allow determining some ways of research. It is usual to distinguish phasic (P) (wave(s) with or without leakage) from terminal (T)DO. Our objective was to analyze the efferent nervous control of both detrusor and striated sphincter during NIDC using the VBN mathematical model of micturition [1–2].

Methods: Cystometries (filling rate 50 mL/min, triple lumen urethral catheter 7F) of 15 women (incontinence or frequency) were analyzed; all women had urodynamically proven PDO. Urethral sensor was located at the site of maximum urethral closure pressure.
The VBN model [1] was applied to the recordings to deduce \( F/F_{\text{max}} \) from the recorded pressures [2]. The calcium concentration in the muscular cell is a delayed function of the firing rate with a time constant \( T_{\text{det}} = 6 \text{s} \) and \( T_{\text{sph}} = 3 \text{s} \) [2]. Each NIDC was analyzed independently.

**Results (Fig):** Each NIDC resulted from all or none variation of \( (F/F_{\text{max}})_{\text{det}} \) which amplitude varied from a low value = 0 to the higher value = 1. In case of successive NIDC, the amplitude increased with bladder filling; the value duration \( \text{HVD} \) was 8±2 s. HVD was consistent with an inhibitory feedback.

During NIDC the sphincter behavior was relaxed 13 files, steady 1, contracted 1; relaxation resulted from all or none variation of \( (F/F_{\text{max}})_{\text{sph}} \) which amplitude varied from a low value \( i,0 \) to a higher value \( i,1 \). The duration of spikes was wider for the sphincter.

**Conclusion:** That first study of the efferent signals suggests that an afferent signal would trigger a normal voiding which components are separately and quickly inhibited. HVD slightly greater than \( T_{\text{det}} \) is consistent with an inhibitory loop including, as suggested in [3], a urothelium–derived inhibitory factor.


---

**Poster #BS12**

WITHDRAWN

**Poster #BS13**

**ADJUSTABLE PASSIVE STIFFNESS (APS) IN WHOLE BLADDERS FROM PARTIAL BLADDER OUTLET OBSTRUCTED (PBOO) MICE**

John Speich, PhD¹, Adam Klausner, MD², Samuel Chacko, DVM, PhD³, Stephen Zderic, MD⁴ and Paul Ratz PhD²

¹Virginia Commonwealth University School of Engineering, Richmond, VA; ²Virginia Commonwealth University School of Medicine, Richmond, VA; ³University of Pennsylvania School of Medicine, Philadelphia, PA; ⁴Children's Hospital of Philadelphia, Philadelphia, PA

(Presented by: John Speich)

**Introduction and Objective:** The passive length–tension curve in rabbit detrusor smooth muscle (DSM) strips exhibits APS that is a function of strain and activation history. Whether APS exists in whole bladder and the role of APS in bladder function remain to be determined. We propose that APS provides a means to adjust power output during voiding. To test this hypothesis, we examined a bladder model that voids against an obstructed outlet. The objectives of this study were to determine whether 1) APS increases power in DSM strips, 2) whole mouse bladders exhibit APS, and 3) PBOO mouse bladder exhibits greater APS than control.

**Methods:** DSM strips from New Zealand White rabbits were attached to an electronic lever. Velocity (V) was measured upon quick release during a KCl–induced contraction. KCl–induced tension (T) and V were measured before and after APS had been abolished and power (T x V) was compared. Mouse bladders (C57BL6) were surgically obstructed to a diameter of 0.1 mm and harvested two weeks post–surgery. Urethra openings of bladders from PBOO and control mice were attached to a needle connected to a syringe pump to control bladder volume and a pressure transducer. Passive and active pressure–volume curves were constructed to identify the optimal volume (Vo) where peak KCl–induced active pressure (Po) was produced. Relaxed bladders bathed in calcium–free EGTA solution (0–Ca) were steadily filled (10 min) and emptied (1 min) multiple times between 20% and 100% Vo. Between each fill/void cycle, bladders were either maximally contracted with KCl or relaxed in 0–Ca at 20% Vo. Pressure attributed to APS (PAPS) was calculated as the pressure difference between the fill following KCl and the fill following 0–Ca.

**Results:** Power in DSM strips was 37% greater with APS \( (0.11±0.01 \text{ vs. } 0.08±0.01, n=4, p<0.05) \). All mouse bladders exhibited greater pressure throughout the 0–Ca fill following KCl stimulation compared to no stimulation, revealing APS. Peak PAPS/Po was greater for the PBOO group compared to the control group \( (0.21±0.08, n=3; 0.06±0.004, n=5; p<0.05) \).

**Discussion:** Based on these data we propose a model in which one function of APS is to regulate bladder power output during voiding, permitting compensation during disorders such as PBOO. We hypothesize that one negative consequence of the compensatory increase in relaxed filling pressure due to APS in the PBOO bladders is urgency at lower volumes contributing to DSM overactivity.

**Funding:** P50DK52620 (SC, SZ)
Introduction and Objectives: Urothelial purinergic receptors are important for the regulation of afferent sensory pathways in bladder pain and overactivity. Using in vivo electrophysiological recordings we evaluated the activity of spinal dorsal horn neurons in female rats at the L6/S1 level when urinary bladder pressure was abruptly increased. Intravesical infusion of ATP and systemic application of suramin allowed us to evaluate the contribution of urothelial purinergic receptors.

Methods: Rats were anesthetized with isofluorane. Suprapubic, venous and tracheal catheters were implanted. Laminectomy was performed at the L6–S1 spinal levels. The cervical spinal cord was transected, and rats were mechanically pithed. Anesthesia was stopped, rats were ventilated, and a muscle relaxant was administered. Bladder pressure was monitored and an AC amplifier was used for neural activity acquisition at 10 KHz via a tungsten electrode inserted into the dorsal horn. We evaluated field potentials during intravesical pressure steps ranging from 0–60 cm/H2O in A) control (saline in the bladder), B) after stimulation of urothelial purinergic receptors (1mM vesical ATP) and C) after the intravenous application of suramin (100 mg/kg). Pressure steps were maintained for one minute following by three minutes for recovery.

Results: Only neurons that showed an increased activity during bladder distention were evaluated. Under saline control conditions, the generation of field potentials increased concomitantly with bladder pressure steps, showing an activity change threshold between 20 and 40 cm/H2O. Intravesical application of 1mM ATP produced an increase in baseline activity, indicative of noxious stimulation, and activity increased above 40 cm/H2O pressure. Systemic suramin prevented the increase in neural activity in response to pressure changes, even after intravesical ATP. At a pressure of 60 cm/H2O, the frequency of the afferent responses was (potentials/20 s): 769.2+/−45 in saline, 1057.0+/−103 following intravesical ATP, and 203.8+/−78 following suramin injection.

Conclusions: These results suggest that urothelial purinergic receptors are important modulators of lumbosacral dorsal spinal neuronal activity. The inhibitory effects of suramin imply that enhanced lumbosacral neuronal signals result from activation of C-fibers during noxious bladder stimulation.

Supported by Department of Veterans Affairs (CDA 200600158 to CPS) and the Methodist Foundation.
POSTER #BS16
STRENGTH AND DEGRADATION CHARACTERISTICS OF BIODEGRADABLE POLYMER FIBERS AND ELECTROSPUN MESH DURING SHORT TERM SALINE IMMERSION
Sandeep Manandhar¹, Nandika D’Souza, PhD¹, Leslie Robertson, MS², Robert Eberhart, PhD³, Harry F. Tibbals, PhD¹ and Philippe Zimmern, MD⁴
¹Univ. of North Texas, Denton, Texas; ²College of Visual Arts and Design, Denton, Texas; ³UT Southwestern Medical Center, Dallas, Texas; ⁴UT Southwestern Medical Center, Dallas, TX
(Presented by: Philippe Zimmern)

Objectives: To design an improved mesh based on customized fiber and mesh properties that can result in slow degradation, durable tensile strength and mesh flexibility.

Methods: Fibers were produced by twin screw extrusion of polypropylene (PP, an internal control), Vicryl, Polycaprolactone (PCL), Polylactic acid (PLLA), and mixed blends of PCL/PLLA; meshes of these materials were produced by electrospinning. Weekly measurements over an 8 week period of 37°C saline immersion were obtained in triplicate, and analyzed for in vitro degradation based on percent weight loss, and elastic modulus, tensile strength, and strain at failure (TA, RSA3). A mesh was woven with increasing degree of tension to generate three levels of porosity for PCL and 50/50 PCL/PLLA.

Results: PCL, PLLA, and mixed fiber blends yielded different weight loss (degradation) patterns over time, much slower than Vicryl. 50/50 PCL/PLLA had the best tensile strength (fig 1). PLLA fibers absorbed water and degraded faster than PCL fibers. Similar behaviors were noted for extruded and electrospun fibers. The extent of mesh stretching, was proportional to porosity (more stretching with larger pores, suggesting better flexibility). Mesh design resulted in increased compliance at low strains with no loss of peak stress of the fiber.

Conclusion: 50/50 PCL/PLLA fibers had the highest residual tensile strength at 8 week saline immersion; no fiber approached the Vicryl degradation rate. The utilization of mesh design factors enables a combination of increased compliance and retention of fiber strength in biore Absorbable meshes. These results help to set the stage for in situ tradeoff studies between degradation rate, flexibility and strength.

Poster #BS17
AN EXPANDED MODEL OF PRESSURE/FLOW MOUSE CYSTOMETRY
Phillip Smith, MD¹, Anthony DeAngelis, PhD, Lisa DeAngelis, MD and George Kuchel, MD
¹University of Connecticut Health Center, Farmington, CT
(Presented by: Phillip Smith)

Background: While the mouse cystometry model is valuable due to the wide availability of genetically-modified strains, current methodology does not fully assess voiding dynamics. Murine voiding is accompanied by striated muscle activity of the abdominal wall and rhabdosphincter, complicating the assessment of expulsive pressures, voiding flows and detrusor contractility. We sought to clarify the dynamics of mouse bladder filling and voiding under cystometric conditions, incorporating assessment of the contribution of the abdominal wall activity to the micturition cycle.

Methods: Ten mature female mice underwent cystometric pressure/flow study under urethane anesthesia, using a constant filling rate 1.5 ml/hr. Catheters were placed in the bladder dome and an isolated small bowel segment. Abdominal wall muscle electromyographic activity was recorded. A modified gravimetric method assessed voided volumes. Means and s.e.m. were calculated for cystometric parameters. Research funding: NIH 5R01AG028657 (G.A.K.), Dennis W. Jahnigen Career Development Award (P.P.S.)

Results: Mouse bladders filled with gradually increasing passive pressure. The voiding sequence began with an isovolumetric increase in bladder pressure to its maximum value, followed immediately by activation of the abdominal wall (VAR) and flow onset. Bladder pressure decreased during flow, with oscillations suggesting pulsatile rhabdosphincter activity. The VAR contributed 1.8% of the maximum expulsive pressure. Mean voided volume was 0.097 +/−0.012 ml, and flow rate was 0.020 +/−0.003 ml/s. Pulsatile and abdominal wall activity ceased with flow cessation, and intravesical pressure demonstrated a small isovolumetric increase prior to resolution of the voiding contraction. Bladder pressure at flow start and end were not different from maximum and voiding contraction threshold pressures, respectively. Proposed contractility indices correlated with voiding volume or flow rate.
Conclusions: The dynamics of the mouse bladder differ from humans. Expulsive pressures distinct from detrusor contraction, and pulsatile bladder pressure during flow presumed attributable to the rhabdosphincter are similar to voiding in other rodents. These factors must be considered when mouse strains are used to model specific aspects of human lower urinary tract performance. Quantitation of specific expulsive pressures during flow and validation of proposed contractility indices remain to be determined.

Poster #BS18
MATURATION, NOT AGING, IS ASSOCIATED WITH ALTERED URINE STORAGE AND VOIDING IN AN AGING MOUSE CYSTOMETRIC MODEL
Phillip Smith, MD, Anthony DeAngelis, PhD, Lisa DeAngelis, MD and George Kuchel, MD
University of Connecticut Health Center, Farmington, CT
(Presented by: Phillip Smith)

Background: Disorders of urine storage and voiding in the elderly result from degradation of lower urinary tract function and control. Aging has been implicated as a pathophysiologic process, however is difficult to separate from age−associated comorbidities. Specifically, the impact of aging on detrusor function remains unclear. We utilized a mouse cystometric model to evaluate the impact of aging on the micturition cycle.

Methods: Young (YM, 2 month, n=10), Mature (MM, 10−12 month, n=10) and Aged (AM, 22 month, n=6) female B6 mice underwent multichannel pressure/flow cystometric study under urethane anesthesia. Catheters were placed in the bladder dome and small bowel. Voids were quantified by a modified gravimetric technique. Cystometry was conducted with a continuous bladder infusion of 1.5 ml/hr. Comparisons of parameters between groups used ANOVA with Bonferroni test; p<0.05 was regarded as statistically significant. Research funding: NIH 5R01AG028657 (G.A.K.), Dennis W. Jahnigen Career Development Award (P.P.S.)

Results: Body and bladder weight were less in YM than MM and AM, although weight ratio did not vary. Baseline bladder pressure and voiding pressure threshold were greater in YM compared to MM and AM, however maximum bladder pressures during voiding were not statistically different between groups. Compliance increased with age; YM demonstrated poorer compliance than MM and AM. The estimated abdominal contribution to expulsive pressure did not vary between groups although this trended downward with age. Average flow rates, voided volumes (VV) and intercontraction interval (ICI) trended upwards with age; YM had a significantly shorter ICI and smaller VV than MM and AM, but other comparisons did not achieve statistical significance. Estimators of contractility (area under pressure curve during flow, PIP, and simple work and power) were less in YM than in MM and AM, however MM and AM did not differ. Estimators of urethral resistance (pressure/flow) did not differ between groups.

Conclusions: Contrary to expectation, aged mice did not demonstrate impaired storage and voiding when compared to young and mature mice. Significant differences between young and older mice were observed, suggesting that maturational processes, rather than aging, are responsible for bladder performance changes observed between young and old animals. These data indicate the importance of consideration of maturational changes in aging research.

Poster #BS19
ACUTE EFFECTS OF BLADDER AND RECTAL FUNCTION AFTTER TRAUMATIC BRAIN INJURY IN RATS
Haihong Jiang, MD, PhD¹, Olga Kokiko-Cochran, PhD², Kevin Li³, Margot Damaser, PhD¹ and Yu-Shang Lee, PhD³
¹Department of Biomedical Engineering, Glickman Urological and Kidney Institute, Cleveland Clinic, Cleveland, OH; ²Department of Neurosciences, Research Core Services, Cleveland Clinic, Cleveland, OH; ³Department of Neurosciences, Cleveland Clinic, Cleveland, OH
(Presented by: Haihong Jiang)

Introduction and Objective: Traumatic brain injury (TBI) is a common cause of death and disability. Bladder and rectal dysfunctions may occur after TBI, but little is known about the link. Early evaluation of bladder and rectal dysfunction may help prevent damage to the urinary and fecal systems during rehabilitation. This study investigated the acute effects of bladder and rectal function after TBI in an animal model.

Methods: Seventeen female Sprague−Dawley rats underwent TBI (n=10) or a sham injury (n=7). To replicate a moderate clinical TBI using the animal model, a fluid−percussion injury (FPI) was made, which injured the posteromedial brain and caused the rats to lose consciousness several minutes after the TBI. Rats in the sham group underwent all the procedures without FPI. One day after TBI or sham TBI, all rats underwent filling cystometry (5ml/h) under ketamine and xylazine anesthesia while bladder pressure and rectal pressure were simultaneously recorded. A 6mm diameter water−filled balloon was placed into the anal canal to record rectal pressure. Quantitative assessments of pressure results were utilized to compare bladder and rectal function between the TBI and sham TBI groups.
**Results:** 70% of the animals in the TBI group and 29% of the animals in the sham group were not able to void. Time to first voiding or leakage 1 day after TBI was significantly prolonged compared to 1 day after sham TBI (p<0.05). Non-voiding contractions occurred in both groups without significant differences in duration and peak pressure. The duration of rectal contractions and number of small waves within the contraction were significantly increased 1 day after TBI compared to sham TBI (p<0.05).

**Conclusions:** Acute bladder and rectal dysfunction occurs after TBI. Decreased voiding and prolonged time to first voiding or leakage suggests that hypocontractility or bladder/sphincter dysynergia occurs acutely after TBI. In addition, the sham procedure (brain surgery) appears to acutely affect voiding function. Future work will be aimed at assessing the long term urinary and rectal outcomes of TBI and of investigating urethral function with external urethral sphincter electromyography. (Support from AUA Foundation and Cleveland Clinic)

**Poster #BS20**
**MORPHOLOGICAL EXPRESSION OF PDGFR? CELLS, AND NOT ICC, IN MURINE BLADDER**
Byoung Koh, BS and Sang Don Koh, MD, PhD
Reno, NV
(Presented by: Sang Don Koh)

**Introduction:** In the guinea pig bladder, several studies have reported the existence of spindle shaped cells known as interstitial cells of Cajal (ICC) in specific regions including the lamina propria and within the detrusor layer. It has also been reported that morphologically similar ‘fibroblast cells’ are anatomically distributed in similar patterns to ICC. However identification of fibroblast cells from other cell types has been difficult due to the lack of definitive markers for solely fibroblasts. Recently, specific labeling of fibroblast cells was obtained using platelet-derived growth factor receptor α (PDGFRα) antibodies. Therefore the aim of this study was to clearly identify the morphological arrangement of fibroblast cells using PDGFRα relative to the anatomical distribution of ICC.

**Methods:** Immunohistochemical techniques were used to ascertain the distribution of PDGFRα cells in the murine bladder and their spatial relationship to ICC, nerves and smooth muscle cells. Two different genetically engineered mice were used; one mouse expressed eGFP in solely smooth muscle cells (smMHC−eGFP mice) and the other expressed eGFP in PDGFRα expressing cells were also utilized.

**Results:** One discrete network of branching PDGFRα positive cells was identified in the lamina propria, directly below the urothelium and a second population was located in the detrusor layer. PDGFRα staining of bladders taken from smMHC−eGFP mice, revealed PDGFRα positive cells in the interstitial spaces in the detrusor layer, in close proximity to smooth muscle cells. Double labeling experiments using PDGFRα antibody with either a neural marker (PGP9.5), enteric excitatory neural marker (vesicular acetylcholine transporter, vAChT) or enteric inhibitory neural marker (nNOS), revealed they were closely associated in some regions. Interestingly staining with mSCFR and ACK−2, specific ICC markers, revealed no immunopositive cells in any layers of the bladder. (Control experiments using the same antibody in the small and large intestine revealed expected networks of ICC, thus confirming it viability).

**Conclusions:** The murine bladder contains two distinct populations of PDFGRα cells, in the lamina propria and detrusor muscle. However, there is no evidence of ICC within any layers of the murine bladder. The discrete distribution of these fibroblast cells suggest particular physiological roles for these cells in normal bladder function.

**Funding:** Supported by NIH P20–RR18751

**Poster #BS21**
**COMPARING DIFFERENT DECELLULARIZATION PROTOCOLS OF ANIMALS’ BLADDERS FOR MESENCHYMAL STEM CELL-BASED TISSUE ENGINEERING**
Wally Mahfouz, MD, Oleg Loutochin, MD, Coutu Daniel, PhD, Jacques Galipeau, MD, PhD and Jacques Corcos, MD
JGH, Montreal, QC, Canada
(Presented by: Wally Mahfouz)

**Introduction and Objective:** Artificial bladder tissue is a constant need in reconstructive surgery. Intestine can be used but it has several deleterious complications. We are aiming to produce xenogenic decellularized bladder seeded with autologous mesenchymal stem cells for bladder replacement/augmentation in human. We are reporting the first stage of this work which is decellularization protocol for efficient removal of cells and nuclear debris in three species. We also demonstrate the adherence and differentiation of mesenchymal stem cells on the decellularized scaffolds.
Methods: This study compared four decellularization protocols for bladders of three species: rat, rabbit and porcine. We first determined which detergent (1% SDS or 1% Triton X−100 in hypotonic Tris−HCl) was more efficient at removing cytoplasmic debris while preserving the structural anatomy. This was done by H&E staining of paraffin sections. We also determined the optimal duration of decellularization. After extensive washes, we verified whether deoxyribonuclease (DNase) digestion of nuclear debris was necessary and adequate using 4',6−diamidino−2−phenylindole (DAPI) staining. We then analyzed the resultant decellularized extracellular matrices for evidence of preserved active growth factors (VEGF, TGFβ1, EGF, TGFα) and matrix proteins collagen (type 1, 2, 3, 4), laminin, and elastin by histology, immuno−fluorescence staining and confocal microscopy. We then tested the ability of mesenchymal stem cells to adhere and differentiate into smooth muscle cells on these scaffolds.

Results: Both detergents were equally efficient at removing cytoplasmic debris. The duration of detergent treatment proved to be critical here. Triton X−100 appears to preserve the extracellular matrix better. DNase digestion was always necessary for complete removal of nuclear debris. Mesenchymal stem cells adhered well on the scaffolds.

Conclusions: The use of Triton X−100 in hypotonic buffer followed by nuclease digestion is efficient for production of decellularized bladder tissue. This method preserves the structural anatomy, extracellular matrix proteins, and growth factors within bladder tissue. Moreover, mesenchymal stem cells adhere well on these scaffolds and remain viable after 2 weeks in vitro.
Introduction and Objectives: Multiple sclerosis (MS) is a debilitating inflammatory disease of the central nervous system which causes neurogenic bladder (NGB), in excess of 60% of patients. Experimental autoimmune encephalomyelitis (EAE) has been widely used in MS research as they demonstrate similar T cell mediated demyelination and neurodegeneration. We recently reported the elements of NGB in EAE mice. In this study, we aimed to examine the stages of neurologic deficit of the mice in relation to the gross and histologic alterations of the bladder.

Methods: Female SJL mice (n=23) were immunized with Mycobacteria tuberculosis along with Freund’s adjuvant (control) and injections with peptide of myelin protolipid protein (PLP 139−151) [subjects]. On day 0, 3, and 7 all mice received intraperitoneal injection of purified Bordetella pertussis toxin. Daily weights, and neurologic clinical scores (CS) were assessed for signs of neurodegeneration and graded 1−5. Mice were euthanized by asphyxiation and cervical dislocation, bladders were harvested and weighed, and then were prepared by serial 5−mm sections with routine hematoxylin−eosin and Masson’s trichrome staining. Digital imaging analysis was used to quantify equatorial cross−sectional areas of bladder tissue and lumen, as well as relative content of the three primary tissue components: smooth muscle, urothelium, and collagen (Image−Pro Plus).

Results: A significant difference in EAE bladder weight/body weight ratio was noted when compared to controls (P < 0.05). Histology exam demonstrated marked bladder remodeling with increased average luminal area and bladder tissue hypertrophy corresponding to progressive neurodegeneration based on subjects clinical score.

Conclusion: EAE causes neurologic disability in the mice and contributes to marked bladder remodeling which proportionally worsens as the neurodegeneration progresses. The EAE mice can be used as a useful model system for studies of pathophysiology and treatment strategies of NGB.

Funding: NIH/NIHCD RO3 HD061825
**Results:** As the neurologic CS increased, the threshold response to pain stimuli dramatically increased and visceral pain response decreased. No significant difference in visceral pain response was observed from first set-up of disease to day 70 for each specific neurologic CS ranking, indicating that disturbances of the noxious pain is an early and stable event in this model.

**Conclusion:** EAE causes neurologic disability in the animal model and demonstrates a dramatic contribution to visceral pain response. The EAE mice can be used as a useful model system for studies of pathophysiology and treatment strategies of chronic pelvic pain in neurodegenerative diseases such as MS.

**Funding:** NIH/NIHCD RO3 HD061825
Introduction and Objectives: Bladder pressure measurement has long been a useful tool in the diagnosis of male LUTS. Pressure−flow studies (PFS) are the current best method of obtaining this information, but have some morbidity due to invasiveness and can also cause discomfort and embarrassment to the patient. Ways to non−invasively measure bladder pressure have been reported (1,2) but these only achieve isolated measurements during the void. We have developed a new method of measuring bladder pressure continuously and non−invasively in men and report our pilot study results.

Method: With institutional and ethical board approval, 62 men referred for urodynamics for the assessment of LUTS had an extra fill−void cycle in order to test the pressure measurement function of a new non−invasive technique against simultaneous invasive measurements. After conventional urodynamic testing, an inflatable penile cuff was wrapped around the penis which, on commencement of voiding, inflated to reduce flow rate to ~2.5ml/s. The cuff pressure (pcuff) was then automatically modulated during the void to maintain flow at that constant low rate. We hypothesized that pcuff was equivalent to pves. We calculated the root mean square (RMS) difference between pcuff and pves during controlled flow to assess accuracy of this method.

Results: The figure shows the cuff measuring bladder pressure successfully during a void. In 16 men the RMS difference between pcuff and pves during the void was <10cmH2O (excellent agreement), in a further 15 it was <20cmH2O (reasonable agreement). In the remaining patients, the cuff either performed poorly or failed due to technical issues.

Conclusions: This technique, when successful, exceeded our expectations as an accurate measurement of bladder pressure. Failure tended to be due to technical/design problems which we have since improved following device adjustment. We envisage this technique will give greater diagnostic information than uroflow alone without the morbidities associated with invasive urodynamic studies.

Funding: from Dunhill Medical Trust

1. Griffiths, CJ et al. 2002 JUrol 174(4)1323
2. Pel, JJ et al. 2002 Neurourol Urodyn 21(2) 117
Results: We reviewed 697 patient charts and identified 224 subjects who met our strict OAB criteria and linked to the UPDB. The graph shows the distribution of pair-wise relatedness of OAB cases compared to controls. Excess relatedness can be observed among cases, extending to a genetic distance=4 (first cousins), and beyond genetic distance=8 (third cousins). The small sample size and narrow window of chart review limits the power of the test. In the subsets of 199 OAB subjects treated with anticholinergic drugs and 109 subjects successfully treated with drugs in the chart review period, we also observed more close and distant relationships among cases. In 2 large families with 8 OAB cases each, favorable anticholinergic therapy was observed in majority of cases (Family 1: 5/6 cases using drugs; Family 2: 5/7 cases using drugs); in these two families a diagnosis of DOI was common (Family 1: 5/8; Family 2: 3/8).

Conclusion: We observed an excess of close and distant relationships among strictly defined OAB cases, suggesting a heritable contribution to OAB.

Poster #BS28
CAFFEINE INGESTION INDUCES URINARY FREQUENCY AND DETRUSOR OVERACTIVITY IN MICE
Richard Kershen MD, Travis Mann-Gow BS and Peter Zvara MD, PhD
The University of Vermont, Burlington, VT
(Presented by: Richard Kershen)

Introduction and Objectives: Caffeinated beverages such as coffee are believed to incite or exacerbate the symptoms of overactive bladder (OAB). Though physicians routinely counsel patients with OAB to reduce caffeine (CAF) intake, studies linking the ingestion of CAF to OAB have been inconclusive and the mechanisms by which CAF may alter bladder function have not been elucidated. We aimed to investigate the effect of CAF on voiding and urodynamics (UDS) in mice.

Methods: To determine whether chronic CAF ingestion alters voiding in mice, an experimental group (n=12) was fed 150 mg/kg/day of CAF by gavage for 2 weeks. A control group (n=6) was fed 0.9% NaCl (NS) solution. Animals were observed for 12 hours at baseline and after treatment to determine voided volume (VV) and micturition frequency (MF). To study the effect of acute CAF ingestion on bladder function, NS cystometry (CMG) was performed on mice (n=4) before and then 1 hour after ingestion of 10mg/kg of CAF. To investigate a possible direct effect of CAF on the detrusor, a third group of mice (n=3) underwent CMG with NS followed by repeat CMG using a caffeinated (CAF-NS; 10μg/ml) solution. CMG’s were performed at 0.75ml/hour for equal time in all animals.

Results: Daily ingestion of CAF for two weeks resulted in a decrease in the average VV from 162.2µL to 101.4µL (p≤0.05). No statistically significant difference was noted in the control (NS) group. Average 12hr MF increased from 11.1 to 19.3 in the CAF treatment group while the control group MF was unchanged. CMG studies demonstrated that acute CAF ingestion results in an increase in the number of non-voiding bladder contractions (NVC’s; p=0.05) and a reduction in bladder capacity (BC; as determined by a reduction in the inter-micturition interval; p=0.01). Direct infusion of CAF-NS had no measurable effect on either of these urodynamic parameters.

Conclusions: Chronic ingestion of CAF appears to induce the development of OAB syndrome in mice as evidenced by an increase in MF and a reduction in functional BC. CAF-mediated OAB in mice may be related to the development of detrusor overactivity as suggested by the increase in NVC’s and reduction in cystometric BC observed in our UDS studies after acute CAF administration. The failure of intravesically administered CAF-NS to induce these changes in control mice suggests that orally administered CAF exerts its effect on the bladder via alterations in the autonomic nervous system.
Introduction and Objective: Vaginal delivery is a risk factor for development of stress urinary incontinence. During vaginal delivery, muscles, nerves, soft tissue, and ligaments of the pelvic floor can be compressed and injured. We have previously demonstrated that MCP−3, a stem cell homing cytokine, and its receptors are upregulated after childbirth injury, suggesting that stem cells injected intravenously can facilitate repair by homing to injured. This study investigates if intravenously injected mesenchymal stem cells (MSC) facilitate functional recovery after simulated childbirth injury in an animal model.

Methods: Age−matched virgin female Sprague−Dawley rats were divided into 3 groups: Vaginal Distension (VD) & saline treatment (N=6), VD & MSC treatment (N=7), and sham VD & saline treatment (N=5). VD was performed by inserting a modified 10Fr Foley catheter into the vagina and inflating the balloon to 3 ml for 4 hours. One hour after injury, 2 million MSCs or saline was injected via the tail vein. Outcomes were tested 1 week after injury by simultaneous leak point pressure (LPP) and external urethral sphincter electromyography (EMG). Intravesical pressure was recorded in a filled bladder via a urethral catheter while EUS EMG was recorded both at rest and while the bladder was gently compressed to induce leakage (LPP). LPP as well as mean frequency & amplitude of 1sec of EUS EMG data both at baseline and during LPP were statistically analyzed with ANOVA on Ranks followed by Dunn’s posthoc test with p<0.05 indicating a statistically significant difference between groups.

Results: LPP in the sham VD, and VD&MSC groups were not significantly different from each other but were significantly higher than that in the VD& saline group. EUS EMG frequency and amplitude at rest were significantly decreased in the VD&saline and VD&MSC groups compared to sham VD.

Conclusions: Intravenous MSC injection facilitates functional recovery of the urethra after simulated childbirth injury. However, its mechanism of action at the time point studied is not via an improvement in recovery of the EUS.

Funding: Cleveland Clinic and state of Ohio

Poster #BS30*

PANNEXIN-1 CHANNELS PROVIDE A PATHWAY FOR ATP RELEASE FROM RAT BLADDER MUCOSA
Mia Thi PhD¹, Arnold Melman MD², David Spray PhD³ and Sylvia Suadicani PhD⁴
¹Department of Surgery/Division of Orthopedics and Dominick P. Purpura Department of Neuroscience, Albert Einstein College of Medicine, Bronx, NY; ²Department of Urology, Albert Einstein College of Medicine, Bronx, NY; ³Dominick P. Purpura Department of Neuroscience, Albert Einstein College of Medicine, Bronx, NY; ⁴Department of Urology and Dominick P. Purpura Department of Neuroscience, Albert Einstein College of Medicine, Bronx, NY
(Presented by: Sylvia Suadicani)

Introduction and Objectives: Perception of bladder distension is crucial for coordination and initiation of the micturition reflex. It has been proposed that ATP released from urothelial cells in response to bladder distension may communicate bladder fullness by stimulating afferent nerve fibers within the urothelium and in the suburothelial nerve plexus. There is evidence that vesicular and non−vesicular ATP release mechanisms operate in urothelial cells and that activation of muscarinic cholinergic, purinergic (P2Rs) and TRPV1 receptors induce ATP release from these cells. In this study we investigated whether P2X7 receptors and Pannexin−1 (Panx1) channels, which are not only voltage and stretch−sensitive channels, but are also activated by P2X7R stimulation, participate in the mechanisms mediating ATP release in the bladder mucosa.

Methods: Cellular distribution of Panx1 and P2X7R in the rat bladder mucosa was investigated by immunostaining. Panx1 and P2X7R contribution to ATP release was analyzed using mucosal strips (MS; containing urothelium and lamina propria) that were mounted in sylgard chambers, bathed in Krebs–Henseleit solution and stimulated with BzATP (300uM; a P2X7R agonist) in the presence and absence of mefloquine (MFQ, 100nM; a Panx1 channel blocker). ATP release in the MS bathing solution was measured using the Luciferin–Luciferase assay. Released ATP amounts were corrected for MS wet weight and expressed as concentration (nM).

Results: Immunostaining analyses indicated abundant Panx1 and P2X7R expression throughout the urothelium and in the lamina propria myofibroblasts (LPM). Stimulation with BzATP induced release of significant amounts of ATP from MS (439.6 ± 57.8nM vs 1.3 ± 0.1nM in non−stimulated MS; p<0.001, N = 3) that was blunted in the presence of MFQ (62.4 ± 12.3nM vs 1.5 ± 0.1nM, N = 3).

Conclusions: Panx1 channels mediate P2X7R−induced ATP release from the bladder mucosa, possibly from both urothelial cells and LPM, and both P2X7R and Panx1 channels may play a key role in the cellular mechanisms involved in the transduction of bladder distension and modulation of bladder function. (Support: NIH DK081435)
**Introduction**: The specific mechanisms of pelvic floor injury after childbirth that lead to stress urinary incontinence (SUI) are unclear. We are interested in the mechanisms of recovery after urethral trauma and in potential treatments, (eg, stem cell therapies). Monocyte chemoattractant protein−3 (MCP−3) has been shown as a homing factor for mesenchymal stem cells in cardiac ischemia models. MCP−3 is over−expressed in the urethra after vaginal distension in models of SUI in rodents.

**Objective**: The aim of our study was to examine the feasibility, expression duration, and optimal dosing of gene delivery by way of plasmid injection into the mouse urethra.

**Methods**: A pilot study was conducted in which urethral injection of varying doses of luciferase−tagged plasmid were injected into 5 mice and followed with imaging. Based on pilot results, we conducted a study using 30 mice given either 20µg urethral injection of vector (control) or MCP−3. The mice were sacrificed at 1, 3 or 5 weeks after injection. Following anesthesia, a total of eight organs were harvested from each mouse including heart, liver, lung, kidneys, ovaries, uterus, urethra and bladder, which were evaluated by ELISA/immunohistochemistry for presence and levels of MCP3. Venous sampling for quantification of serum MCP−3 was also performed.

**Results**: The initial pilot study with luciferase−tagged plasmid confirmed our ability to inject the plasmid in the urethra by imaging. The minimal plasmid dose for sustained expression was 20µg. After MCP−3 plasmid injection there was a statistically significant difference in the 3 and 5 week levels of MCP3 in the urethra after injection compared to levels measured in all other harvested organs. Consistently elevated levels during weeks 1 to 5 of MCP3 were shown in the harvested urethra of mice after injection (Figure).

**Conclusions**: We were able to inject MCP−3 into the mouse urethra and show persistently elevated levels of MCP−3 in the mouse urethra over time. The persistent expression of MCP−3 was selective to the urethra. Further research will investigate the impact of MCP−3 plasmid injection on incontinence recovery and stem cell homing in SUI models.

**Funding**: UHC Family Medicine Fund #50551
but was less effective in SHR. The amplitude of the purinergic component of EFS decreased significantly after mβCD in both strains. The response to αβmeATP at baseline was lower in SHR compared to WKY. mßCD significantly decreased αβmeATP responses in WKY, but was less effective in SHR. The amplitude of the purinergic component of EFS decreased significantly after mβCD in both strains. In contrast, CCh−induced contractions and the amplitude of the cholinergic component of EFS were unaffected by mßCD in both strains. P2X1 co−localized and co−precipitated with Cav−1 in rat bladder tissue.

Conclusions: In normal bladder, nerve−mediated and agonist−induced purinergic responses require caveolar integrity. In overactive bladders from SHR, loss of caveolae is associated with significant alteration of purinergic contractile responses, suggesting that caveolae−mediated regulation of purinergic signaling is impaired. Thus pathologic aberrations in caveolar elements may lead to the development of DO.

Department of Veterans Affairs, Washington, DC

Poster #BS33*  (*Not CME Accredited)

MUSCARINIC INHIBITION OF NON-ADRENERGIC, NON-CHOLINERGIC (NANC) TRANSMISSION IN THE RAT URINARY BLADDER IN VIVO
F. Aura Kullmann, Grace Wells, MS, David McKenna, BS and Karl Thor, PhD
Urogenix Inc./Astellas, Durham, NC
(Presented by: F. Aura Kullmann)

Introduction and Objective: In the rat, neurogenic bladder contraction has two components: muscarinic and non−adrenergic non−cholinergic (NANC). The NANC contractions are mediated by the purinergic system. In vitro studies in bladder strips (Lai et al., 2008) showed that muscarinic receptor (mAChR) activation inhibits the NANC component of bladder contractions evoked by electrical field stimulation (EFS). The M3 mAChR antagonist, 4DAMP, inhibited EFS−evoked contractions by 25%. The remaining component was sensitive to • ii• CMe−ATP, indicating it is mediated by purinergic receptors. When bladder strips were first exposed to carbachol (CCh), 4−DAMP strongly inhibited (80%) EFS−evoked contractions and • ii• CMe−ATP had little effect on the remaining component. Thus, stimulating mAChRs inhibited the purinergic component of EFS−evoked contraction. This study investigates whether in vivo enhancement of mACHRs, by increasing endogenous acetylcholine (ACh) levels or by an exogenous mAChR agonist, inhibits the purinergic component of reflexogenic bladder contractions elicited physiologically by bladder filling.

Methods: Cystometry was performed in urethane anesthetized adult female Sprague−Dawley rats. The acetylcholine esterase inhibitors TAK−802 and distigmine and the nonselective mAChR agonist and antagonist, bethanechol and atropine, respectively, were delivered intravenously. Bladder contraction amplitude (BCA) and voiding efficiency (VE) were measured.

Results: TAK−802 (0.003−0.03 mg/kg) and distigmine (0.03−0.1 mg/kg) significantly increased BCA and VE dose dependently. Bethanechol (0.1−1 mg/kg) increased BCA but decreased VE. When administered as the first drug, atropine (0.4mg/kg) reduced BCA by 15% and VE by 40%. However, after enhancing mAChR stimulation with either TAK−802, distigmine, or bethanechol; atropine markedly reduced BCA by 55−75% and VE by 65−85%.

Conclusions: Enhancing mAChR stimulation, either by increasing endogenous ACh levels or by a mAChR agonist, increased the bladder’s sensitivity to mAChR blockade by atropine. Since two components mediate bladder contraction, muscarinic and purinergic, the results suggest that the enhanced bladder sensitivity to mAChR blockade reduces the purinergic component. Understanding the receptor subtypes and 2nd messenger systems underlying muscarinic−purinergic interactions may be important in human pathological conditions where the purinergic component of neurogenic bladder contractions is more prominent.

Poster #BS34*  (*Not CME Accredited)

MUSCARINIC RECEPTORS INHIBIT PURINERGIC NEUROTRANSMISSION IN RAT
Darryl Kitney, BSc¹,², Karl B. Thor, PhD¹, Christopher H. Fry, PhD² and F. Aura Kullmann, PhD¹
¹Urogenix Inc./Astellas, Durham, NC; ²University of Surrey, Guildford, UK
(Presented by: Darryl Kitney)

Introduction and Objective: Neurolly-evoked rat bladder contractions are mediated by acetylcholines (ACHs) activation of muscarinic receptors (mACHR) and ATPs activation of purinergic receptors. In vivo studies show a marked enhancement of the inhibitory effects of atropine (muscarinic antagonist) on rat reflex bladder activity following administration of muscarinic agonists or acetylcholine esterase inhibitors (see Kullmann et al, this meeting). Similarly, in vitro studies (Lai et al, 2008) show a marked enhancement of the inhibitory effects of 4-DAMP (M3 selective antagonist) on electrical field stimulation (EFS)-evoked rat bladder contractions following carbachol (CCh) application. These data indicate that mAChR stimulation reduces the contribution of the purinergic system, thus making the contraction more sensitive to blockade by mAChR antagonists. This study investigates whether the reduction in purinergic contribution to bladder contraction is due to effects on the smooth muscle’s ability to contract to purinergic receptor stimulation or due to decreased purinergic transmission from nerve terminals.
Methods: Bladder strips from adult female rats were prepared for in vitro contractility studies. EFS consisted of trains of 10s duration at 2, 5, 10, 20Hz (0.25ms pulse width, 40−80V), delivered every 80s. Drugs were applied directly to the bath (αβMe-ATP 10µM for 10−15min; CCh 3, 10µM for 30min; and 4-DAMP 0.1 – 0.5µM for 30min).

Results: 4-DAMP inhibited EFS−induced contractions by ~30% under control conditions and by ~55% after CCh. CCh alone did not inhibit the EFS-induced contraction; it only increased sensitivity to 4−DAMP. αβMe−ATP applied after 4−DAMP or alone reduced EFS−evoked contractions by 35%, but had little effect (<10%) when applied after CCh and 4−DAMP. Two applications of αβMe−ATP at 90 min interval produced similar smooth muscle contractions with or without CCh+4−DAMP treatment in between these applications of αβMe−ATP.

Conclusions: These results indicate that mAChR stimulation strongly inhibits purinergic neurotransmission in the rat bladder via inhibition of ATP release rather than a direct action on the detrusor muscle. Since CCh did not inhibit EFS−evoked contractions (it only increased sensitivity to mAChR blockade), inhibition of ATP release must be regulated independently of ACh release.

Poster #BS35
VISCERAL PAIN RESPONSE IN BALBC/J MICE IMMUNIZED WITH UROPLAKIN UP3B AS A MURINE MODEL FOR INTERSTITIAL CYSTITIS

Kenan Izgi, MD¹, Ahmet Ozer, MD², Justin Isariyawongse, MD², Fuat Bicer, MD², Cagri Sakalar, PhD³, Firouz Daneshgari, MD² and Cengiz Altuntas, PhD²
¹Cleveland State University, Cleveland, OH; ²Case Western Reserve University, Cleveland, OH; ³Cleveland Clinic Foundation
(Presented by: Justin Isariyawongse)

Introduction and Objectives: Intersitital cystitis/painful bladder syndrome (IC/PBS) is an elusive disease with irritative voiding symptoms and pelvic pain. Little progress has been made in elucidating the pathophysiology or treatment of IC/PBS. We recently reported a method of inducing bladder−specific autoimmunity that manifests IC/PBS symptoms. The aim of this study was to induce autoimmunity in murine bladder with uroplakin UP3b peptide and to examine its phenotype.

Methods: This study was supported by departmental funding. We used a database of major histocompatibility complexes (MHCs) and their recognized peptide motifs (http://www.syfpeithi.de/) to predict immunogenic peptides of known sequences for bladder−specific uroplakins. At 6−8 weeks of age, female BALBc/J mice were injected with an emulsion of water and CFA comprised of 400 µg of TB H37RA with (n=10) or without (n=8) 200µg of UP3b peptide. Peptides were made from the known sequence of UP3b and were selected based on having the binding motif for H2−D MHC II molecules expressed in BALBc/J mice. At 7 weeks, we assessed abdominal and paw visceral pain response using calibrated von Frey monofilaments and measured levels of antibody to UP3b by ELISA. We also assessed 24−hour urinary frequency−volume charts.

Results: We identified a motif from UP3b that was strongly recognized by MHC type H2−D and that correlated with increased antibody against UP3b. Increased micturition frequency and decreased output per micturition were observed in immunized mice compared to control (p<0.05). Visceral pain response to von Frey monofilament stimulus was statistically heightened in UP3b immunized mice compared with controls (p<0.05). Similarly, visceral pain response measured by paw stimulus was statistically heightened in immunized mice versus controls (p<0.05) (figure).

Conclusions: A peptide motif of UP3b is recognized by MHC H2−D. Immunization of BALB/C mice with UP3b induces an immunogenic response that phenotypically manifests as increased visceral pain response, increased micturition frequency, and decreased output per micturition. This phenotype is similar to that observed in IC/PBS patients and thus may qualify this animal model as a candidate model for IC/PBS.
**Poster #BS36**

**EXPRESSION OF RHO-KINASE ACTIVITY IN FEMALE PELVIC FLOOR RELAXATION**

Hana Yoon, MD, PhD¹, Jae Yup Hong, MD, PhD², Ju Tae Seo, MD, PhD³ and Young Ho Kim, MD, PhD⁴

¹Ewha Womans University; ²Cha University, Pundang, Gyoungki, Korea; ³Kwandong University Jeil Hospital, Seoul, Korea; ⁴Soochunhyang University, Pucheon, Korea

(Presented by: Hana Yoon)

**Introduction:** Pelvic floor relaxation commonly associates with lower urinary tract symptoms (LUTS). To investigate the pathophysiology of LUTS in pelvic floor relaxation, we studied the change of expression of Rho–kinase in vaginal smooth muscle, one of the representative of pelvic floor structure.

**Materials and Methods:** From January 2008 to June 2010, among female patients who had surgical correction due to stress incontinence or cystocele or both, who were able to collect vaginal tissue samples were enrolled to this study. Vaginal tissue was separately collected as anterior proximal vaginal wall (AP) and anterior distal vaginal wall (AD), at least 0.5cm width x 1cm length each. Protein extracts were analyzed using ELISA methods to detect Rho kinase activity.

**Results:** Mean age of patients was 56.1 years old; 30’s−3(mean 36.7 years old), 40’s−10(46.3 years old), 50’s−10(52.6 years old), 60’s−11(64.1 years old), 70’s− 6(73.3 years old). In general, Rho kinase activities were significantly different between AP and AD (p<0.001, t−test, Table 1). However, each Rho kinase activity did not show any statistically significant differences among age groups (p>0.05, Kruskal– Wallis test).

**Conclusion:** Rho kinase activity showed significant difference between proximal and distal anterior vaginal wall. However, those differences were not correlated with age. Although this study has limitation of small sample size, this study suggest that vaginal pelvic floor relaxation is more severe in distal part of vaginal wall and age related change has little effect on muscle weakness but individual characteristics.

**Table 1. Expression of Rho kinase activity in vaginal walls**

<table>
<thead>
<tr>
<th>Age group</th>
<th>AP</th>
<th>AD</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>30’s(3)</td>
<td>1.60364</td>
<td>1.01718</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>40’s(10)</td>
<td>1.82298</td>
<td>1.04498</td>
<td>0.109</td>
</tr>
<tr>
<td>50’s(10)</td>
<td>1.78021</td>
<td>1.04899</td>
<td>0.013</td>
</tr>
<tr>
<td>60’s(11)</td>
<td>1.64923</td>
<td>1.10443</td>
<td>0.013</td>
</tr>
<tr>
<td>70’s(6)</td>
<td>1.44820</td>
<td>1.05571</td>
<td>0.075</td>
</tr>
</tbody>
</table>

**Poster #BS37**

**OPTIMIZING MUSCLE STEM CELL CONSTRUCTS FOR PELVIC FLOOR**

Jason Kim, MD¹, Heather-Marie Wilson, PhD², Alvaro Lucioni, MD¹, Kathleen Kobashi, MD¹ and Margaret Allen, MD²

¹Virginia Mason Medical Center, Seattle, WA; ²Benaroya Research Institute, Seattle, WA

(Presented by: Jason Kim)

**Introduction:** Stem cells derived from autologous skeletal muscle biopsies are currently in clinical trials for stress urinary incontinence via transurethral injection. However, for use in pelvic floor reconstruction, it may be advantageous to organize implanted muscle–derived stem cells (MDSC) on biodegradable scaffolds. We sought to optimize the conditions for MDSC growth within candidate scaffolds by varying the seeding densities and scaffold composition.

**Methods:** MDSC were isolated from rat anterior tibialis using the pre–plating technique and were seeded at densities of between 2.2x106 cell/ml and 4.4x106 cell/ml onto Nitex frames using biodegradable scaffolds, which included 100% collagen and 95% collagen/5% Hystem–HP© (Glycosan Biosystems). Hystem–HP is a hydrogel designed to promote expansion of stem cells. A mixture of collagen and Hystem–HP was selected to achieve a balance, allowing a proportion of MDSC to proliferate, while still allowing differentiation of MDSC to muscle fibers. The fully polymerized constructs were incised on the long edges to induce uniaxial tension for cell and scaffold fiber alignment. These constructs were observed for up to 21 days.

**Results:** Seeding densities of 3.3x106 and 4.4x106 cell/ml caused excessive scaffold traction that resulted in construct dehiscence within 48 hours. However, a seeding density of 2.2x106 cell/ml provided stable constructs that did contract, but were able to remain intact for 21 days.

At that density, H&E staining showed a higher cell density with a definite subpopulation of cells that retained proliferative ability (Figure 1) in the constructs seeded on 95%collagen/5%Hystem–HP when compared to 100% collagen.
Conclusions: The preliminary findings here demonstrate that seeding density and scaffold composition are critical parameters to control in the generation of usable MDSC–seeded constructs suitable for in vivo implantation.

Poster #BS38
BONE MARROW MESENCHYMAL STROMAL CELL THERAPY FOR EXTERNAL URETHRAL SPHINCTER RESTORATION IN A RAT MODEL OF STRESS URINARY INCONTINENCE
Oleg Loutochin, MD, Lysanne Campeau, MD, Nicoletta Eliopoulos, PhD, Manaf Bouchentouf, PhD, Bertil Blok, MD, Jacques Galipeau, MD, PhD and Jacques Corcos, MD
JGH, Montreal, QC, Canada
(Presented by: Oleg Loutochin)

Introduction and Objective: To assess the effect of intra-sphincteric injections of bone marrow mesenchymal stromal cells (MSCs) on Valsalva leak point pressure (VLPP) changes in an animal model of stress urinary incontinence (SUI).

Methods: 24 female Sprague-Dawley rats underwent bilateral pudendal nerve section for SUI induction. Six rats were SUI controls, 6 received periurethral injection of Plasma-Lyte (SUI placebo control) and 12 were given periurethral injection of PKH26-labelled MSCs. Four weeks after injection, conscious cystometry was undertaken in animals and VLPP recorded. All groups were sacrificed, and frozen urethra sections were submitted to pathology assessment.

Results: Rat MSCs were positive for the cell surface antigens CD44, CD73, CD90, and RT1A, and negative for CD31, CD45, and RT1B, confirming their stem cell phenotype. In vitro, differentiated MSCs expressed α-smooth muscle actin (SMA) and desmin, markers of smooth and striated muscles. Immunohistochemistry of rat urethras revealed PKH26-labelled MSCs in situ and at the injection site. LPP was significantly improved in animals infused with MSCs. Mean LPP was 24.28 ± 1.47 cm H20 in rats transplanted with MSCs and 16.21 ± 1.26 cm H20 in SUI controls injected with Plasma Lyte (p<0.001).

Conclusions: Bone marrow rat MSCs have the ability to differentiate and skew their phenotype towards smooth and striated muscles, as demonstrated by SMA up-regulation and desmin expression. Periurethral injection of MSCs in an animal model of SUI restored the damaged external urethral sphincter and significantly improved VLPP.

Poster #BS39
THE EFFECT OF DONOR AGE ON INDUCED PLURIPOTENT STEM CELLS FROM WOMEN WITH PELVIC FLOOR DISORDERS
Yan Wen, MD¹, Prachi Gujar, MS², Roger Jarvis, PhD³, Thomas Baer, PhD³, Renee Reijo Pera, PhD³ and Bertha Chen, MD⁴
¹Stanford University, Stanford, CA; ²Institute for Stem Cell Biology and Regenerative Medicine, Stanford University, Stanford, CA; ³Stanford Photonics Research Center, Stanford University, Stanford, CA; ⁴Stanford University School of Medicine, Stanford, CA
(Presented by: Bertha Chen)

Introduction: Normal and damaged tissues are generally replaced by continuous recruitment and differentiation from tissue–specific stem cell populations. This process is reduced with aging resulting in an increased prevalence of degenerative conditions. An example of this is pelvic floor disorders (PDF), a group of disabling conditions that includes urinary and fecal incontinence and pelvic prolapse. Vaginal birth and aging are major contributors to PFD. Advances in the direct reprogramming of adult somatic cells to become pluripotent human embryonic stem cell–like cells (called induced pluripotent stem cells or iPSCs), has opened new possibilities for patient–specific therapies. In general, it is thought that iPSCs are unaffected by donor age; however, this has been challenged by recent studies.
Objective: Given that iPSCs have not been evaluated for PFD and patient−specific stem cell therapy for PFD requires derivation of cells from aged patients, we sought to derive iPSCs from women with PFD and examine the effect of donor−age on iPSCs.

Methods: We isolated vaginal fibroblasts from young and older women. iPSCs were generated simultaneously using an excisable polycistronic lentiviral vector expressing a “stem cell cassette” composed of Oct4, Klf4, Sox2, and cMyc. Age−related senescence was examined by comparing fully−reprogrammed and partially−reprogrammed colonies. Cellular dynamic and morphological characteristics were examined with time−lapse darkfield microscopy.

Results: We derived iPSCs from vaginal fibroblasts of women with PFD. Fully reprogrammed colonies was evident at 18 days post infection. These iPS cells expressed the pluripotency markers: AP, OCT4, SOX2, SSEA3, SSEA4, TRA1−60, TRA1−81, NANOG and hTERT. Reprogramming efficiency was decreased in iPSC from the older woman with lower fully reprogrammed colonies compared to the younger woman (56% vs 76%). Analysis of microscopy data showed grouping according to age with hierarchical cluster analysis and numerous phenotypic patterns between cell groups suggesting a donor−age effect.

Conclusions: iPSCs were successfully derived from vaginal fibroblasts of women with PFD. Donor age−related differences were observed in reprogramming efficiencies and phenotypical characteristics. These data will be further confirmed as they may have important implications for patient−specific stem cell treatments for PFD.

Funding: Stanford University Transitional Grant and Institute of Stem Cell Biology and Regenerative Medicine

Poster #BS40
CHARACTERIZATION OF SNPS WITHIN THE MMP-1 PROMOTOR REGION IN WOMEN WITH AND WITHOUT POP
Ilya Gorbachinsky, MD¹, Lysanne Campeau, MD², Jennifer Stancill³, Jan Rohozinski, PhD², Karl−Erik Andersson, MD, PhD², Julie Ziegler, MA³, Carl Langefeld, PhD³ and Gopal Badlani, MD¹
¹Wake Forest University Baptist Medical Center, Department of Urology, Winston-Salem, NC; ²Wake Forest University Institute for Regenerative Medicine, Winston-Salem, NC; ³Wake Forest University Health Sciences, Department of Biostatistics, Winston-Salem, NC
(Presented by: Ilya Gorbachinsky)

Introduction and Objectives: Pelvic organ prolapse (POP) is a detriment to quality of life in many affected women. It has been proposed that decreased collagen content may weaken pelvic floor support, culminating in POP. One possible etiology is elevated activity of extracellular matrix collagen degrading enzymes such as Matrix Metalloprotease−1 (MMP−1). Previously, we reported that an upregulating 2G single nucleotide polymorphism (SNP) in the −1607 position of the MMP−1 promoter region is significantly more common in women with POP versus non−POP controls. This promoter has other SNPs known to bind various transcription factors. Additionally, the specific combination of SNPs (haplotypes) has been shown to control MMP−1 expression in cancer cell lines from different tissues. A similar phenomenon might explain the pathogenesis of POP. We sought to determine if MMP−1 promoter SNPs and/or haplotypes were significantly correlated with the presence of POP.

Methods: Adult females with surgically corrected POP (n=63) and controls without POP (n=93) were identified in the Department of Urology and/or Obstetrics/Gynecology. DNA was isolated from blood cell lysates obtained via phlebotomy. MMP−1 SNPs were noted from prior literature. The MMP−1 promoter was sequenced and 8 SNPs identified and genotyped. Tests of association were computed assuming a dominant genetic model using a logistic regression model.

Results Obtained: For the −519, −755, and −839 SNPs, the number of POP and control specimens sequenced was 20 & 21, 19 & 16, and 23 & 18, respectively. All POP and control frequencies were consistent with Hardy−Weinberg equilibrium. Both the −519 A to G and −839 G to A SNPs were less common in POP populations (p= 0.024, OR=0.24, 95%CI=0.07−0.85, p=0.040, OR=0.27, 95%CI=0.08−0.97, respectively). The −755 T to G SNP is more frequent in POP (p=0.025, OR =6.61, 95%CI=1.13−38.7). No significant haplotypes were noted among these SNP combinations.

Conclusions: The increased presence of the 519 A to G and/or −839 G to A SNPs in the control population may represent a protective effect on POP manifestation. On the contrary, the strong correlation of the −755 T to G SNP in the POP group suggests that this allele is associated with the POP phenotype. Further studies with larger patient numbers will aid in recognition and characterization of these and other SNPs as well as possible haplotypes within the MMP−1 promoter region.

Poster #BS41
COMPARISON OF MMP-1 ENZYMATIC ACTIVITY AND TIMP-1 INHIBITION IN WOMEN WITH PELVIC ORGAN PROLAPSE
Lysanne Campeau, MD³, Ilya Gorbachinsky, MD², Julie T. Ziegler, MA³, Carl D. Langefeld, PhD³, Karl Erik Andersson, MD, PhD¹, Jan Rohozinski, PhD³ and Gopal Badlani, MD⁴
¹Wake Forest Institute for Regenerative Medicine, Winston-Salem, NC; ²Wake Forest University Baptist Medical Center, Department of Urology, Winston-Salem, NC; ³Wake Forest University Health Sciences, Department of Biostatistics, Winston-Salem, NC
(Presented by: Lysanne Campeau)
Introduction and Objectives: Pelvic organ prolapse (POP) can significantly affect the quality of life of patients and is associated with increased age, BMI and parity. Collagen metabolism and degradation is strictly regulated by a complex interplay of cell–cell and cell–matrix interactions involving the production of proteinases, activators, inhibitors and other regulatory molecules. Matrix metalloproteinase 1 (MMP−1) primarily degrades collagens Type I and III. Our previous studies have suggested that increased serum levels of MMP−1 are present in women with POP. However, the etiology of POP may also reside in the decreased inhibition of MMP−1 by tissue inhibitor of metalloproteinases 1 (TIMP−1) or their balanced activity. Our aim was to demonstrate a difference in the enzymatic activity of MMP−1 and in the MMP−1/TIMP1 ratio in serum between a group of women with POP and a control group.

Methods: A total of 156 subjects participated in the study: 63 women were undergoing surgical repair of the POP and 93 patients were included in the control group. Out of this cohort we obtained a frozen serum sample from 31 patients (14 from POP and 17 from control) on which we performed a specific, sensitive MMP−1 enzymatic assay system obtained as a commercial kit: SensoLyte Plus™ 520 MMP−1 Assay Kit (AnaSpec). From the same sample, we also assayed the TIMP−1 concentrations using an ELISA kit (RayBiotech, Inc.). All of these patients previously had a PCR amplification of the MMP−1 promoter gene from their extracted DNA, where we determined the presence of single nucleotide polymorphisms (SNPs). Statistical analyses were done using a Student t−test with a one−tailed p−value.

Results: The control group and the POP group had a respective mean total MMP−1 concentration (active and inactive enzyme) of 3.172 and 5.890 ng/ml (p=0.0327). There was no significant difference in the TIMP−1 levels as the mean for the control group and the POP group was respectively 87.58 and 90.57 ng/ml. The mean MMP−1/TIMP−1 ratio was 0.037 for the control group and 0.065 for the POP group (p=0.04).

Conclusion: We found a statistically significant increased level of MMP−1 and of MMP−1/TIMP−1 ratio in the POP group compared to the control group. There was no difference in TIMP−1 levels between the groups. These differences in serum activity levels could lead to a better understanding of the pathophysiology of POP and of underlying tissue processes.

Poster #BS42
FEASIBILITY OF SUBMUCOSAL BLADDER PRESSURE SENSING
Paul Fletter¹, Steve Majerus², Adam Boger, PhD³, Kenneth Gustafson, PhD³, Steven Garverick, PhD², Hui Zhu, MD⁴ and Margot Damaser, PhD⁵
¹Research Service, Louis Stokes Cleveland VA Medical Center, Cleveland, OH; ²Dept. of Electrical Engineering and Computer Science, Case Western Reserve University, Cleveland, OH; ³Dept. of Biomedical Engineering, Case Western Reserve University, Cleveland, OH; ⁴Dept. of Urology, University Hospitals, Case Medical Center, Cleveland, OH; ⁵Dept. of Biomedical Engineering, Lerner Research Institute, Cleveland Clinic, Cleveland, OH
(Presented by: Paul Fletter)

Introduction and Aim: Urinary incontinence due to uncontrolled detrusor contraction is a source of morbidity after spinal cord injury (SCI). Pressure sores in contact with urine often result in infection & septicemia, a leading cause of hospitalization & death in SCI patients. Open−loop electrical stimulation can be used to arrest medically refractory detrusor contractions. Studies have shown that stimulating only at the onset of unwanted contractions substantially reduces stimulation time & increases therapy effectiveness. However, no clinically suitable sensor has been identified to close the loop for conditional stimulation. Submucosal placement of a wireless bladder pressure sensor would reduce stone formation & enable chronic use but the ability to monitor bladder pressure from a submucosal location has not previously been demonstrated. The goal of this study was to demonstrate feasibility of sensing bladder pressure submucosally in vivo.

Methods: Wired prototype devices comprising a pressure sensor & custom analog−to−digital data acquisition circuitry were assembled & packaged for acute implantation. Wires conducted power & a timing signal to the prototype. A single line returned digital data to a custom external receiver for analog waveform reconstruction & collection on a PC. System frequency response was characterized in vitro by sinusoidal pressure changes swept in frequency (10mHz−Hz). Devices were implanted into the bladder wall submucosa of feline (n=1) & canine (n=1) models. External reference sensors (via a catheter) & implanted devices recorded simultaneous intravesical pressures in vivo during cystometry, manual manipulation, and spontaneous & evoked detrusor contractions. Data were detrended, smoothed, and simultaneous reference & device recordings were correlated (r≥0.8 indicated significance).

Results: The device exhibited a flat frequency response ≤ 30Hz. Device output correlated significantly with bladder lumen pressure during spontaneous detrusor contractions (duration=115s; r=0.992) & manual manipulation (duration=13.5s; r=0.997) in the feline model. Significant correlation between device & lumen pressure was also found during evoked canine detrusor contractions (n=3; r=0.893 ± 0.28).

Conclusions: We have demonstrated feasibility of sensing bladder pressure from a submucosal location. This data suggests that a wireless submucosal pressure sensor can provide feedback for conditional electrical stimulation.

Funding: Financial support from the VA.
**Poster #BS43**

**IN VITRO CHARACTERIZATION OF PHENOTYPIC DIFFERENCES BETWEEN PRIMARY CULTURED RAT AND HUMAN BLADDER UROTHELIAL CELL**

Yu-Chao Hsu, MD¹, Yan Sun, PhD² and Toby C. Chai, MD²

¹Division of Male and Female Urology, Department of Surgery, Chang Gung Memorial Hospital, Chang Gung University, Taoyuan, Taiwan; ²Division of Urology, University of Maryland School of Medicine, Baltimore, MD

(Presented by: Yu-Chao Hsu)

**Objectives:** Primary rat cultured bladder urothelial cells (rBUC) provide a reliable source of cells for urothelial physiological investigations. rBUC should share as much in common with primary cultured human BUC (hBUC) for rBUC to be a good model for studies. In this study, we compared a range of phenotypes between rBUC and hBUC. An understanding of both similarities and differences between rBUC and hBUC is important because many studies utilize rBUC as a model to understand human diseases.

**Methods:** hBUC were established from random cystoscopic bladder urothelial biopsies from research subjects. rBUC were cultured from rat bladders that were inverted inside-out so that the urothelium was exposed to Trypsin (0.25%). We only used freshly dissociated rBUC for this study. hBUC had undergone up to 5–passages. Immunofluorescence was used to detect expression of cytokeratin AE1/AE3 (CK), vimentin (VM), and smooth muscle alpha–actin (SM). For functional phenotyping, rBUC and hBUC were stimulated with carbachol (100 µM) or extracellular calcium (10 mM) to measure changes in intracellular calcium [Ca²⁺]i levels using fura-2 ratiometric microfluorimetry. To use as a “control” cell culture, fibroblasts (3T3) were also utilized in the same experiments.

**Results Obtained:** Both rBUC and hBUC expressed CK and neither expressed SM. Only rBUC expressed VM. 72% of hBUC responded to carbachol stimulation while 52% of rBUC responded. hBUC responded to extracellular calcium with a rise in [Ca²⁺]i whereas none of the rBUC responded.

**Conclusions:** Both rBUC and hBUC expressed CK and none expressed SM consistent with an epithelial phenotype. However, rBUC expressed VM, whereas hBUC did not. From a functional basis, rBUC and hBUC behaved differently to stimulation with carbachol and extracellular calcium. Reasons for these functional differences, besides species difference, include: different cell harvesting methodologies, different culture medium, different generation of cells being used, and different topographic location in the bladder from which the cell cultures were obtained. Nevertheless this study shows that rBUC and hBUC may have different phenotypes in culture and this should be taken into account.

**Funding:** NIDDK RO1–DK075728

---

**Poster #BS44**

(*Not CME Accredited*)

**NGF INDUCED SIGNALING IN THE BLADDER IS MODULATED BY CAVEOLAE**

Vivian Cristofaro, PhD¹, Celia D. Cruz, PhD², Samar Lowalekar, MD¹, Soumil Mhaskar¹, Subbarao V. Yalla, MD¹, Maryrose P. Sullivan, PhD¹ and Francisco Cruz, MD²

¹West Roxbury, MA; ²Porto, Portugal

(Presented by: Samar Lowalekar)

**Introduction and Objectives:** Nerve Growth Factor (NGF) is elevated in urine of OAB patients in proportion to severity of overactivity. In animal models of DO, bladder NGF levels are increased and neurotrophin receptor inhibition reduces overactivity. Although these data suggest a role for NGF in influencing bladder function, the mechanisms that regulate NGF signaling in the bladder have not been studied. In other tissues, several components of the NGF–Trk–A cascade are localized in caveolae, membrane domains that sequester a variety of signaling molecules and regulate responses to extracellular stimuli. This study investigated if caveolae are involved in regulation of NGF signaling in bladder and whether NGF affects caveolin (Cav) protein expression.
Methods: Rats bladder tissue was placed in Kreb's solution at 37°C and exposed to NGF (1µg/ml) for 30 min, 1, 2, 6, 24 and 36 hours. Control strips were left untreated for the same times. To deplete caveolae from cell membrane, some bladder tissues were pre-incubated with methyl-β-cyclodextrin (mβCD) before exposure to NGF. Tissue samples were processed for confocal microscopy, western blotting and immunoprecipitation to determine the effect of NGF on Cav-1 expression, interaction between Cav-1 and Trk-A, and the effect of caveolar depletion on the NGF-induced phosphorylation of ERK1+2 (p–ERK).

Results Obtained: Cav-1 and Cav-3 were significantly upregulated within 2hrs of NGF exposure. However, prolonged exposure to NGF significantly downregulated all caveolin isoforms. Cav-1 co-precipitated with Trk-A, and their association increased with NGF stimulation in a time dependent manner. NGF decreased p-ERK over the 2hrs of exposure. Depletion of caveolae prevented the NGF-induced decrease in p-ERK at each time point. No change in non-phosphorylated ERK expression was observed after NGF or mβCD exposure.

Conclusions: Interaction between Cav–1 and Trk–A in bladder tissue and the effect of mβCD in preventing NGF induced attenuation of p-ERK suggest a potential mechanism by which signaling through Trk-A receptor is regulated by caveolin and dependent on caveolar integrity. These results, together with NGF-mediated alteration in caveolin proteins, indicate a complex reciprocal regulation between NGF and caveolar elements that, when perturbed, may contribute to bladder dysfunction.

Department of Veterans Affairs, Washington, DC

Poster #BS45*

EVALUATION OF THE TENSILE PROPERTIES OF THE TVT- O AND SUB-URETHRAL TAPE I-STOP® IN LONG-TERM FOLLOW-UP IN VIVO RAT MODEL

Wally Mahfouz, MD¹, Oleg Loutochin, MD², Maude Carmel, MD², Chiara E. Ghezzi, PhD², Showan N. Nazhat, PhD², Robert Moore, PhD² and Jacques Corcos, MD²
¹JGH, Montreal, QC, Canada; ²McGill University, Montreal, QC, Canada
(Presented by: Wally Mahfouz)

Introduction and Objective: Mid urethral sling became the gold standard of surgical management of stress urinary incontinence (SUI) in women. Tensile properties seem to be important to insure good results. Any new mesh must be compared to a well known polypropylene mesh. I-STOP is a new device recently introduced. We are comparing relative tensile properties overtime of TVT-O and I-STOP in an in vivo animal model.

Methods: 1x2 cm strip of both TVT-O and I-STOP were implanted in the inner part if anterior abdominal wall of 30 female Sprague-Dawley (SD) rats weighing 250–300 g. Six rats were sacrificed at timed intervals: 6 weeks, and 3, 6, 9 and 12 months after implantation. Bose® ElectroForce® BioDynamic® test instrument was used to measured max load of isolated mesh fibers.

Results:

<table>
<thead>
<tr>
<th>Time</th>
<th>TVT-O (blue fibre)</th>
<th>TVT-O (white fibre)</th>
<th>I-Stop white fiber</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>9.447+/−0.516</td>
<td>9.9+/−0.416</td>
<td>6.92+/−0.272</td>
</tr>
<tr>
<td>6 weeks</td>
<td>9.247+/−0.210</td>
<td>8.31+/−0.703</td>
<td>6.08+/−0.555</td>
</tr>
<tr>
<td>3 months</td>
<td>8.425+/−1.342</td>
<td>8.63+/−0.845</td>
<td>6.817+/−0.781</td>
</tr>
<tr>
<td>6 months</td>
<td>9.033+/−0.851</td>
<td>7.503+/−3.112</td>
<td>6.585+/−0.827</td>
</tr>
</tbody>
</table>

Conclusions: There are no significant differences in relative tensile properties of the fibers between each group. The tensile strength of the fibers didn’t decrease significantly over time up to 6 months. 9 and 12 months data should be mature at the time of presentation.

Poster #BS46

THE EFFECTS OF DIABETES ON URETHRAL BIOMECHANICAL PROPERTIES IN THE RAT USING SIMULTANEOUS MULTI-POSITION MEASUREMENTS

Matthew Fraser, PhD, Zhongguang Yang, MD and Paul Dolber, PhD
Dept. of Surgery, Duke University Medical Center, Durham, NC
(Presented by: Matthew Fraser)

Introduction: Changes in urethral biomechanical properties due to diabetes mellitus (DM) could impact changes in bladder function. In order to better understand the impact of diabetes on urethral function, we examined the effects of chronic DM on urethral compliance in both contracted and passive states.
Methods: Female Sprague−Dawley (SD) rats (n=4−5/group) received streptozotocin (65 mg/kg) or vehicle. 10 weeks later, urethras harvested and mounted at in vivo length in a chamber of oxygenated Krebs at 37C. A fluid filled reservoir on a vertical post allowed for adjustment of intraluminal pressure (0−20 cmH2O). Video capture with edge detection allowed for simultaneous recording of urethral diameter at 9 evenly spaced points along the urethral length. Measurements were made after contraction (100 uM L−NO−Arg and 40 uM phenylephrine) and following complete relaxation by EDTA (3 mM). Compliance was estimated using the delta diameter.

Results: Urethral compliance was bimodal, with peaks at p30−40 distal positions, and at p90 proximal position. The middle urethral position of p50−60 marked a low compliance region. This bimodality was lost in the contracted condition of control urethras at 10 cmH2O and above, demonstrating a relatively strong active contraction of the distal urethra, but not of the proximal urethra. When compared to controls, urethras from DM rats demonstrated an overall increase in compliance in both the contracted (P<0.0001) and passive (P=0.0096) states. DM rats had a significantly greater compliance along the longitudinal axis of the urethra in both the contracted (P<0.) and passive (P<0.0001) states, with the distal region p30 being the most affected. The mid−urethral region of low compliance likely corresponds to the high pressure zone found in rat urethral profilometry.

Conclusions: The current finding of increases in urethral compliance in both contracted and passive states following 10 weeks of diabetes in rats might help explain the strong association with DM and UI (DM women are 50−200% more likely to have UI). Further studies are necessary to confirm the suspected progression from increased urethral compliance of early stage disease progression to that of decreased compliance which might be associated with end stage disease.

Funding: Supported by Supported by R01 DK061391 and U24 DK076169

Poster #BS47
THE EFFECTS OF ADMINISTRATION OF AUTONOMIC DRUGS ON NON-VOIDING CONTRACTIONS IN THE RAT DURING VIDEO URODYNAMICS
Matthew Fraser, PhD and Paul Dolber, PhD
Dept. of Surgery, Duke University Medical Center, Durham, NC
(Presented by: Matthew Fraser)

Introduction: Preclinical urodynamic studies are typically performed at supraphysiological flow rates and via catheters delivering fluids through the urethra or dome. Under these conditions, the presence of non−voiding contractions (NVC) is thought to be associated with bladder irritation, and therefore a preclinical surrogate for urgency. The current studies utilized transureteral filling and transurethral static catheter recording technique to better approximate physiology.

Materials and Methods: Video capture of bladder motility was performed using a high speed video camera with a LabView frame grabber program. Pressure recordings were made using LabChart. Under these conditions, non−voiding pressure waves and their base−dome filling peristalsis−like contractions are readily evident. In some cases these contractions elicit a dome−to−base coordinated response which mimics a voiding contraction with the exception of an unrelaxed mid−urethra (the external urethral sphincter does not open and therefore there is no voiding). We hypothesized that this dome−to−base contraction was due to a spinal reflex. In order to test this hypothesis, we sequentially administered atropine (0.4−0.8 mg/kg), hexamethonium (50 mg/kg), a beta 3 adrenergic agonist (CL−316,243; 100 ug/kg) and isoproterenol (100 ug/kg) to urethane anesthetized rats undergoing our rodent video urodynamics method.

Results: Atropine had little effect on either filling contractions or later premicturition contractions even though greatly increasing compliance, while hexamethonium resulted in a dramatic increase in amplitude and area of non−voiding contractions to values characteristic of the later, larger premicturition NVCs. CL−316,243 resulted in a dramatic decrease in amplitude of NVCs, and they were virtually abolished by isoproterenol.

Conclusions: The results of the current study suggest that autonomic efferent pathways are not responsible for NVCs in this preparation, and therefore the dome−to−base contractions that we are witnessing are not due to a bladder−to−spinal cord−bladder reflex, but rather may represent either a return of the electrical waves responsible for the base−to−dome filling contraction or a purely local myogenic reflex in response to stretch. That muscarinic blockade was ineffective while beta adrenergic agonist activation was effective may bode well for therapies based on beta receptor stimulation, as long as those treatments do not interfere with the filling process.

Funding: Supported by Supported by AMDCC Consortium U24 DK076169
Introduction and Objectives: Up to 33% of women develop stress urinary incontinence (SUI) after vaginal delivery. The rat vaginal distention (VD) translational model is a reproducible model which mimics the fetal passage through the birth canal. It produces statistically significant decreases in abdominal leak point pressure (LPP) resultant from modified Foley catheter inflation in the rat’s vagina. Prior studies showed a greater distention volume led to a greater degree of injury. Animal size discrepancy in rats with diabetes, obesity, and advanced age represent potential confounders given the increased ratio of animal size to a fixed vaginal distention volume. Our study aimed to establish a target pressure (TP) based on the current distention volume for use as a new standard to eliminate such a bias. Secondary goals were to show feasibility and equivalence of injury of VD at TP (isobaric or IB) versus isovolumetric (IV), to show decreased variability of LPP between IB and IV groups, and to evaluate the effect of weight on LPP.

Methods: 10 Fr modified Foley catheters were inflated to 3.0mL and connected (both in vivo and ex vivo) to a pressure transducer to verify uniform intrinsic pressure responses to volume. Averaged result generated TP. 30 Sprague–Dawley rats (280–300g) were randomized to: IV, IB at TP, or sham VD. Students T-test was used to compare LPP and simple linear regression was used to evaluate the effect of weight as a continuous variable.

Results Obtained: Catheter mechanics demonstrated minimal inter-catheter variability. TP was 427mmHg. Rat deaths were 4 in IB, 3 in IV, and 4 in sham groups. LPP after VD by IB and IV was statistically equivalent. Both IV (16.92 ± 7.91mmHg) and IB (17.66 ± 6.45mmHg) LPPs were statistically lower than sham group (27.87 ± 7.16mmHg). The trend in LPP favored IV group. When treated as a continuous variable, weight had no effect on LPP produced by IB or IV.

Conclusions: The generation of TP as a new standard for VD injury models is feasible and results in a consistent injury pattern. The modified rat VD model should be considered for the evaluation of SUI in comparison of animals of varied size.

Funding: UHC Family Medicine Fund #50551.
**Poster #M1**  
**EARLY EXPERIENCE OF TRANSVAGINAL/OBTURATOR ADJUSTABLE (TVA/TOA) TAPE IN FEMALE STRESS/MIXED URINARY INCONTINENCE**  
Seong Jin Jeong¹, Daesung Kim¹ and Seung June Oh²  
¹Seoul National University Bundang Hospital, Seongnam, Korea; ²Seoul National University Hospital, Seoul, Korea  
(Presented by: Seong Jin Jeong)

**Objective:** When applying a sling mesh to female patients with SUI, the judgment of appropriate sling tension for the continence is usually deferred to the surgeon’s experience. However, even though in small portions of patients, some may experience continuous incontinence or retention after surgery due to inappropriate sling tension. We present our experience of transvaginal/obturator adjustable (TVA/TOA) tapes that can be readjusted postoperatively in the treatment of female stress/mixed urinary incontinence.

**Methods:** Fifty-eight patients who underwent mid–urethral sling with TVA (n=49)/TOA (n=9) (Agency for Medical Innovations, Austria) tape and were followed for > 3 months after surgery by a single surgeon were included. When the leakage was detected on cough test or a patient complained of continuous incontinence, the sling tension was strengthened postoperatively, while the tension was released when Qmax was ≤ 10ml/sec or residual urine volume was ≥ 150ml. Treatment success was defined as absence of subjective compliant of leakage and objective leakage on the stress test (cure) or rare leakage but satisfactory to the treatment regardless of the stress test (improvement). The patients were interviewed regarding the treatment satisfaction. We analyzed the results according to the readjustment (Group I: no readjustment; Group II: readjustment). Mean follow–up duration was 6.8 months (3.3−15.5).

**Results:** Mean age was 57.7 years (35–75). Thirty–eight patients had pure SUI and 20 patients had stress predominant mixed incontinence. Twenty–seven patients were in Stamey grade 1, 30 in grade 2, and 1 in grade 3. Mean MUCP and VLPP was 53.8cmH2O (22.0−122.0) and 92.3cmH2O (48−118), respectively and mean amount of 1–hour pad test was 39.7g (0.2−150.2). The sling tension was readjusted postoperatively in 9 (15.5%) patients (tension strengthening 8 cases; tension releasing 2 cases). In Group I and II, treatment success was 100% (49/49) and 88.9% (8/9) and satisfaction rate was 89.8% (44/49) and 77.8% (7/9), respectively; not significantly different between groups.

**Conclusions:** The sling operations with TVA/TOA tapes were effective for the treatment of female stress/mixed urinary incontinence in our early experience. TVA/TOA tapes could be readjusted within a few days following surgery. In our short–term follow–up, 15.5% of patients needed readjustment and the treatment success of the readjustment group was relatively high.

---

**Poster #M2**  
**HOW DOES THE UROGENITAL DISTRESS INVENTORY 6 SCORE CHANGE AFTER MID-URETHRAL SLING SURGERY?**  
Jason Kim, MD, Gjanje Smith, MD, Alvaro Lucioni, MD, Fred Govier, MD and Kathleen Kobashi, MD  
Virginia Mason Medical Center, Seattle, WA  
(Presented by: Jason Kim)

**Introduction:** Recently the OMIT study showed that the preferred questionnaire among SUFU members to assess outcomes following Stress Urinary Incontinence (SUI) treatment was the Urogenital Distress Inventory−6 (UDI−6). There is a paucity of data describing changes in UDI−6 score after surgery. We examined changes in UDI−6 score in patients who underwent mid–urethral sling surgery.

**Material and Methods:** Patients with SUI undergoing a mid–urethral sling were given pre–operative and post–operative UDI−6 questionnaires. We compared changes in total UDI–6 score and changes in individual questions in patients who were considered successful versus those considered failures. The definition of success at our institution has historically been <1 incontinent episode per week or ≥70% improvement in symptoms.

**Results:** We identified 154 patients in our database who had undergone a mid–urethral sling and who had a minimum of 12 months follow–up and with both pre–operative and post–operative UDI−6 questionnaire. Fifty–eight of these patients had a transobturator mid–urethral sling placed and 96 patients had a retropubic sling placed. Our success rate was 83.1% (128/154 patients), average age was 55.2 and average follow–up was 40 months (range 12−89 months). Differences between pre–operative and post–operative UDI–6 scores are displayed in table 1. The total UDI−6 score difference was significant between patients who were successful and unsuccessful (4.73 vs. 0.96, p<0.0001). In addition, the first 4 questions all had significant differences between successful and unsuccessful outcomes when assessed individually. Question 3 had the greatest amount of change and perhaps this question alone may represent the best way to report SUI outcomes rather than the composite score of the UDI−6.
Conclusion: There was a significant decrease in UDI−6 score in those patients who underwent successful mid−urethral sling surgery compared to those who were considered unsuccessful.

Poster #M3
COMPARISON OF SHORT AND LONG TERM OUTCOMES IN A PATIENT POPULATION UNDERGOING RETROPUBIC MID-URETHRAL SLING PLACEMENT
Jason Kim, MD, Gjanje Smith, MD, Alvaro Lucioni, MD, Fred Govier, MD and Kathleen Kobashi, MD
Virginia Mason Medical Center, Seattle, WA
(Presented by: Jason Kim)

Introduction: Retropubic mid−urethral polypropylene slings (MUS) have been shown to be a safe and efficacious procedure for the treatment of female stress urinary incontinence (SUI). We examined the durability of MUS by comparing outcomes in a fixed patient cohort at approximately 12−month and ≥60−month follow−up.

Materials and Methods: A prospective database of all consecutive patients who underwent SPARC sling placement was reviewed. Each patient was mailed post−operative questionnaires annually to assess outcomes. We selected those patients that had answered both an “early”post−operative questionnaire and a follow−up questionnaire at a minimum of 60 months following sling placement. We compared these results to evaluate for any differences between short− and long−term surgical outcomes. Success was defined as ≤1 incontinence episode/week and/or ≥70% patient−reported improvement.

Results: We identified 78 patients who fit the criteria described above. The mean/median follow−up at initial questionnaire was 13.0/9.0 months versus 67.1/61.0 months for the most recent questionnaire. A significant decrease in SUI severity was noted at short− and long−term follow−up as compared to pre−operative SUI (chart 1). Significant decreases were seen at long−term follow−up in all domains measured (table 1). Of the 29 patients who reported complete dryness at early follow up, 12 (41.4%) developed recurrent SUI at extended follow−up. Seventy−six percent (41/54) of the patients who initially had <1 incontinence episode/wk remained at a similar level of continence at extended follow−up. Long−term success was durable in 85.2% of those who initially reported success. Although outcomes are significantly worse with longer follow−up, the overall success rate for MUS remains at 64.5%.

Conclusion: Although outcomes following MUS placement appear to decline over time, the MUS still provides considerable improvement in SUI symptoms compared to pre−operative symptoms that can be durable in a many patients.
Poster #M4
CARDIOVASCULAR RISK FACTORS AND DISEASE IN WOMEN WITH OVERACTIVE BLADDER “WET” VS “DRY”
W. Stuart Reynolds, MD, Ekene Enemchukwu, MD, Laura Chang Kit, MD, Roger Dmochowski, MD and Melissa Kaufman, MD, PhD
Vanderbilt University Medical Center, Nashville, TN
(Presented by: W. Stuart Reynolds)

Introduction: As part of an ongoing investigation studying the potential relationship between overactive bladder (OAB) and cardiovascular disease (CVD), the prevalence of CVD and risk factors were determined in female OAB patients with incontinence (OAB wet) compared to those without incontinence (OAB dry).

Methods: Retrospective review of female patients presenting with OAB in 2008–2009 analyzing demographics, CVD risks and comorbidities, and symptoms and excluding patients with prior urologic surgery, recurrent UTI, neurologic disease, or mixed urinary symptoms. Patients were characterized as “wet”(OABW) if they reported urinary incontinence and “dry”(OABD) if they did not. Manifestations of CVD were considered coronary artery disease (CAD), cerebrovascular disease (CVA), and peripheral vascular disease (PVD); CVD risk factors included age ≥65, family history of CAD, smoking, hypertension (HTN), diabetes mellitus (DM), dyslipidemia (DysL), and body mass index (BMI) ≥ 30. Metabolic syndrome was defined as any 3 of preceding 4 risk factors.

Results: 66 OABD and 58 OABW patients were included with mean ages 44.4 (range 14–80) and 57.6 (range 25–85) *p<0.0001+ and mean BMI 25.0 (range 17.5–49.9) and 28.6 (range 17.3–42.6) *p=0.018+, respectively. 7 (11%) OABD patients reported CVD manifestations vs. 9 (16%) of OABW patients. Of CVD risk factors, OABW patients had higher rates of age≥ 65 (33% vs 12% OABD, p=0.002), smoking (57% vs 23% OABD, p=0.002), BMI≥30 (27% vs 14% OABD, p=0.049), DM (16% vs 8% OABD, p=NS), DysL (28% vs 11% OABD, p=0.02) and HTN (45% vs 25% OABD, p=0.02). Family history of CAD was more common in OABD (52% vs 36%, p=NS). 30% of OABD patients had no CVD risk factors vs. 3% of OABW patients (p=0.0001); however, 38% of OABD patients had ≥2 risk factors vs. 69% of OABW patients (p=0.0006). Prevalence of metabolic syndrome was not significantly different (3% OABD vs 9% OABW).

Conclusions: Results of this pilot study comparing OAB wet and OAB dry patients demonstrate a higher prevalence of CVD manifestations and risk factors in OAB wet patients: specifically age ≥ 65, smoking, BMI≥30, DM, DysL and HTN. While differences in CVD and risk factors appear to exist between OAB dry and OAB wet patients, greater numbers of patients are needed to substantiate these findings and to appropriately power the study.

Poster #M5
IS THE STANDING STRESS TEST EQUIVALENT TO THE 24 HOUR PAD TEST IN THE ASSESSMENT OF STRESS INCONTINENCE?
Danielle Markle, MD and Karen Noblett, MD
University of California, Irvine
(Presented by: Danielle Markle)

Introduction: The 24 hour pad test and the standing stress test are assessment tools that are often used after an intervention for stress incontinence to assess the success of the intervention. No comparative data of these two tests is available.

Objectives: 1. To evaluate the agreement of the stress test and pad test to each other and the urodynamic results. 2. To determine patients’ testing preference

Methods: Patients with primarily stress incontinence symptoms were enrolled in this IRB approved prospective observational study. The patients underwent a standing stress test with cough and valsalva efforts after retrograde filling of their bladder to 300cc or subjective maximum capacity. Patients then performed a 24 hour pad test using pre−weighed incontinence pads. The pads were weighed after use and an increase in weight of greater than 8 grams was considered positive. All patients underwent urodynamic testing. Patients were queried regarding their testing preference after completing both tests. Statistical analysis was performed with the kappa statistic for agreement.

Results: Complete data was available on 55 patients. Patients with positive urodynamic stress incontinence, stress test and pad test results were 91%, 84% and 58% respectively. Of the patients with urodynamic stress incontinence, 60% had a positive pad test and 90% had a positive stress test. Agreement between the urodynamic results and the stress test occurred in 89% of patients, giving a kappa of 0.51. Agreement between the urodynamic results and the pad test occurred in 60% of patients, giving a kappa of 0.08. Agreement between the standing stress test and the pad test occurred in 67% of patients and the kappa statistic was 0.26. Of the 5 patients with urodynamic stress incontinence and a negative cough test, all leaked at volumes greater than 300cc. Test preference results were available for 49 patients: 53%, 29% and 14% of patients preferred the pad test, cough test or had no preference.

Conclusions: Moderate agreement was shown between the urodynamic and the stress test results, fair agreement was noted between the pad and urodynamic results and slight agreement was found between the pad and stress test results. The standing stress test seems to be the most reliable test for quick and easy documentation of stress incontinence, however patients seem to prefer the pad test.
**Poster #M6**

**LOWER URINARY TRACT SYMPTOMS AND PELVIC PAIN IN YOUNG NULLIPAROUS WOMEN AND THE EFFECTS OF PEDIATRIC VOIDING DYSFUNCTION**

W. Stuart Reynolds, MD, Laura Chang Kit, MD¹, Roger Dmochowski, MD¹ and Harriette Scarpero, MD²

¹Vanderbilt University Medical Center, Nashville, TN; ²Nashville, TN

(Presented by: W. Stuart Reynolds)

**Introduction:** Little is known about pelvic floor symptoms in young nulliparous women, particularly related to etiology and associated conditions. We performed an email-based survey at our institution collecting information on lower urinary tract (LUTS) and pelvic symptoms specifically in young, nulliparous women ascertaining the prevalence of pelvic symptoms (specifically frequency-urgency, urinary incontinence and pelvic pain or painful urination) and associated conditions. We hypothesized that women with pelvic floor symptoms would have a increased rate of childhood voiding and elimination disorders.

**Methods:** Women older than 18 were anonymously recruited to complete an online questionnaire circulated by email to faculty, staff and students at our university medical center. Information regarding demographic information, medical and gynecologic history, voiding and pelvic symptoms and quality of life was obtained.

**Results:** 589 respondents were nulliparous, aged 18–40, and were analyzed for this study. Overall, 312 (53%) have symptoms either “frequently” or “all the time” and were considered to have pelvic floor dysfunction (PFD): 54 (9%) experience frequency/urgency; 206 (35%) experience urinary incontinence; and 52 (9%) experience pelvic pain. Of those with incontinence, 18% reported pure stress incontinence, 12% pure urge incontinence, and 10% mixed incontinence. Overall, 209 (35%) women reported a history of pediatric voiding or elimination dysfunction, either bedwetting (9%), frequency/incontinence (3%), urinary tract infections (16%), or constipation/encopresis (8%). Of 312 patients with PFD, 139 (45%) had a history of pediatric dysfunction vs. 70 (25%) with no PFD (p=0.0001). Patients with PFD vs. without PFD more frequently reported childhood bedwetting (11% vs. 8%), frequency/incontinence (4% vs. 1%), UTI (20% vs. 12%), and constipation (10% vs.5%) [p<0.001]. A history of any pediatric dysfunction was associated with an increased prevalence of PFD (OR 2.4, 95% confidence interval 1.65–3.34).

**Conclusions:** Pelvic symptoms (LUTS and pelvic pain) are common in nulliparous women aged 18–40 years and appear to be associated with a history of childhood voiding and elimination disorders.

---

**Poster #M7**

**STRESS URINARY INCONTINENCE AFTER ROBOTIC SACROCOLPOPEXY WITH AND WITHOUT CONCOMITANT MIDURETHRAL SLING**

Andrea Crane, MD¹, Elizabeth Geller, MD¹, Ashley Woodward, MD² and Catherine Matthews, MD¹

¹The University of North Carolina at Chapel Hill, Chapel Hill, NC; ²Virginia Commonwealth University, Richmond, VA

(Presented by: Andrea Crane)

**Introduction and Objectives:** Surgical correction of pelvic organ prolapse (POP) can cause stress urinary incontinence (SUI) in previously continent women due to “unkinking” of the urethra and loss of a negative urethral–vesical angle. The ideal method to repair POP and address cases of recognized and occult incontinence is a subject of debate. The objective of our study is to determine the rates of de novo and persistent SUI in women who underwent robotic sacrocolpopexy (RSCP) with or without midurethral mesh sling at two different surgical centers.

**Methods:** We performed a retrospective cohort study of women who underwent RSCP with (Group 1) or without concomitant midurethral sling (Group 2) between 2006 and 2010. Sling placement was based on the presence of urodynamic stress incontinence (USI). The primary outcome measure was any reported SUI at 3–6 months after surgery. Secondary outcomes included subjective reports of urinary urgency and/or frequency at 3–6 months after surgery.

**Results:** A total of 82 women were included, 49 from site A and 33 from site B. The overall rate of postoperative SUI was 31.7%, and 30.8% of these had a concomitant sling. There were no differences in baseline demographics between the two groups. Overall, the rate of postoperative SUI was lower in women who underwent RSCP with concomitant sling compared to those who underwent RSCP alone (18.6% vs. 46.2%, p = 0.007). The number of slings needed to prevent 1 case of de novo SUI was 3.6. There were no differences between the two groups for urinary urgency (22.7% vs. 34.6%, p=0.367), frequency (18.2% vs. 22.2%, p=0.99), or urge urinary incontinence (37.2% vs. 50.0%, p=0.246).

**Conclusion:** Women who underwent RSCP alone based on urodynamic testing were found to have a high rate of de novo SUI. Concomitant midurethral sling placement significantly reduced this risk.
COST-EFFECTIVENESS OF PERCUTANEOUS TIBIAL NERVE STIMULATION VERSUS EXTENDED-RELEASE TOLTERODINE FOR OVERACTIVE BLADDER
Heidi Chen, MD, Richard Bercik, MD and Stephen Thung, MD, MSCI
Yale University School of Medicine, New Haven, CT
(Presented by: Heidi Chen)

Introduction: Overactive bladder (OAB) with or without urge incontinence affects one out of every six Americans. It adversely impacts quality of life (QoL) and is a substantial economic burden on the U.S. health care system with a direct cost of $8.27 billion in 2000. Effective treatment of OAB could result in significant savings. While anticholinergics remain the mainstay treatment of OAB, side effects limit compliance and adherence. Percutaneous tibial nerve stimulation (PTNS) has been shown to have comparable efficacy with fewer side effects than extended-release tolterodine 4mg (tolterodine ER) in a recent multi-center, randomized trial. A follow up study showed sustained therapeutic efficacy of PTNS through 12 months of prolonged therapy offered at individualized treatment intervals.

Objective: To assess the cost-effectiveness of PTNS versus tolterodine ER for the treatment of OAB.

Methods: We developed a cost-effective model with a 1-year time frame from a societal perspective by comparing the medical costs and QoL determined by improved continence and therapy side effects (quality adjusted life-years (QALY)) of PTNS and tolterodine ER. PTNS therapy consisted of an initial 12 sessions in the first 3 months followed by maintenance therapy. Significant side effects from both strategies could result in reduced QoL or therapy termination. Assumptions made included: PTNS was more effective with fewer side effects, utility of improved continence (0.82) and continued incontinence (0.72), reduction in QoL from side effects (5%), cost of PTNS/session ($203), and cost of tolterodine ER/month ($118). Our primary outcome was the incremental cost-effectiveness ratio (ICER), defined as the marginal cost per QALY gained. Less than $50,000/QALY gained was considered cost-effective. Univariate sensitivity analyses assessed the impact of varying costs, efficacy, side effect rates, and utility indices over the range of reported and plausible values.

Results: PTNS added significant cost to the management of OAB with modest QoL improvement. For every 100 patients treated with PTNS, the costs increased by $332,380 and resulted in an additional 2.6 QALYs gained, when compared to tolterodine ER. The ICER was $128,615 per QALY gained. In the sensitivity analysis, PTNS became cost-effective when the cost of tolterodine ER exceeded $568.67/month.

Conclusion: PTNS was not cost-effective for treating OAB compared to tolterodine ER under a wide range of clinical circumstances.

PERCUTANEOUS TIBIAL NERVE STIMULATION: EFFECT ON FECAL INCONTINENCE FROM TWO RECENT OVERACTIVE BLADDER TRIALS
Sneha Vaish, MD¹, Steve Siegel, MD², Kenneth Peters, MD³, Donna Carrico, NP⁴, Leslie Wooldridge, GNP⁴ and Scott MacDiarmid, MD⁵
¹Metro Urology; ²Metro Urology, Woodbury, MN; ³William Beaumont, Royal Oak, MI; ⁴Mercy Health Partners; ⁵Alliance Urology, Greensboro, NC
(Presented by: Sneha Vaish)

Introduction: Patients with overactive bladder (OAB) frequently have concomitant fecal incontinence (FI). The objective of this review is to evaluate the efficacy of percutaneous tibial nerve stimulation (PTNS) in a subset of OAB subjects experiencing FI symptoms.

Methods: Two multi-center, clinical trials, OrBIT and SUmIT, were completed. OrBIT was an open-label trial of which 10% (5/50) experienced FI. SUmIT was a double-blind trial of which 13.6% (15/110) experienced FI. In each study, subjects received 12 weekly 30-minute PTNS treatments. Stimulation was delivered through a 34-gauge needle electrode using the Urgent® PC device. At the end of 12 weeks, questionnaires and voiding diaries were completed.

Results Obtained: Subjects in both trials were similar in age and duration of OAB symptoms. In the OrBIT Trial, the subject-completed Global Response Assessment (GRA) for FI symptoms indicated 80% (4/5) had reported improvement after 12 PTNS treatments. Similarly in the SUmIT Trial, 82% (9/11) reported improvement in FI symptoms, 4 subjects were excluded due to a “not applicable on their questionnaire. The combined GRA data reports 81% (13/16) had improvement in FI symptoms after 12 weekly PTNS treatments.

Conclusions: Although the two studies were designed for OAB patients, GRA outcomes suggest PTNS provides symptom relief for patients experiencing FI. Further research in larger study populations is needed.
Efficacy of Neurostimulation Using a Novel Transdermal Amplitude Modulated Signal (TAMS) in a Pre-Clinical Detrusor Overactivity (DO) Rat Model

Ash Monga¹, Michael Hoffman, BS², Anthony DiUbaldi, MS³ and Steve Wahlgren, MS³
¹Southampton University Hospital; ²Ethicon, Inc., Somerville, NJ; ³Ethicon Endo-Surgery, Somerville, NJ

(Presented by: Ash Monga)

Introduction: Detrusor Overactivity (DO) is characterized by hyperreflexive intravesical contractions. Research has shown that frequency and/or amplitude of these contractions can be affected by electrical stimulation. Understanding the effect of different parameters on the bladder is critical to evaluate the stimulation of nerves that affect the bladder.

Objectives: The objective of this study was to determine the influence and importance of different waveform parameter variables of a new transdermal amplitude modulated signal (TAMS) in a rodent neurogenic DO model.

Methods: A neurogenic bladder overactivity model was developed in rodents through constant infusion of a noxious agent (0.25% acetic acid at 2 mL/h) into the bladder (n=226; Treatment=145, Control=81). Baseline hyperactivity was established by counting the number of voiding contractions every 30 minutes. Commercial Ag/AgCl electrodes (Active area= 1 cm) were applied over the sacral (S1) region. The TAMS was applied and voiding contractions were counted again. Each 4 hour trial consisted of 2 hours of stabilization followed by 2 hours of stimulation (Eight 30 minute intervals). For data analysis, the difference in urine output and the number of bladder contractions at the last 30 minute interval of stabilization and stimulation periods of treatment groups were compared to their respective control groups. Statistical significance was assessed at p<0.05. Study was approved by Ethicon, Inc’s Institutional Animal Care and Use Committee (IACUC).

Results: Pulse frequencies of 5.95, 25, and 35 Hz produced significant reduction in contraction frequency (3.25+/−1.50 vs. 0.50+/−0.71; 4.25+/−0.96 vs. −0.50+/−3.54; 2+/−0.82 vs. −0.5+/−0.71). Reduction in contraction frequency between all controls and stimulated groups was significant. A pulse width of 200 µs and an amplitude of 8 V also yielded significant reductions in contraction frequency.

Conclusions: Pulse frequency of the TAMS is likely the most influential parameter associated with reduction in bladder contraction frequency in a rodent neurogenic DO model. The results indicate the potential utility of this transdermal neuromodulation signal in the clinical treatment of urge incontinence.

Identifying Barriers to Communication and Disease Understanding Among Spanish-Speaking Latinas with Pelvic Floor Disorders

Aqsa Khan, MD¹, Claudia Sevilla², Rezoana Rashid², Cecilia Wieslander, MD³, Sally Maliski, RN, PhD⁴, Rebecca Rogers, MD⁵,6 and Jennifer Anger, MD, MPH⁷
¹Department of Urology, University of California, Los Angeles, CA; ²David Geffen School of Medicine, University of California, Los Angeles, CA; ³Department of OB-Gyn, University of California, Los Angeles, CA; ⁴UCLA School of Nursing, Los Angeles, CA; ⁵Department of Urogynecology; ⁶University of New Mexico, Albuquerque, NM; ⁷Department of Urology, Cedars-Sinai Medical Center, University of California, Los Angeles, CA

(Presented by: Aqsa Khan)

Objective: To evaluate barriers in communication and disease understanding among Spanish-speaking patients with pelvic floor disorders.

Methods: Interviews were conducted with ten office staff and credentialed hospital-based translators focusing on the experiences of Spanish-speaking women with pelvic floor disorders (PFDs) in the clinic setting and in translation. Using grounded theory methodology, the interview transcripts were analyzed qualitatively.

Results: Analysis of the interview transcripts revealed several barriers in communication. Three major classes of barriers were predominant: patient, translator, and system-related. PATIENT-RELATED BARRIERS included 1) lack of understanding of basic medical history, anatomy, and pelvic floor disorder treatments, 2) inability to use medical terminology, 3) inhibited discussion of pelvic floor disorders within Spanish-speaking cultures, 4) embarrassment from their inability to speak English, 5) trust placed in the clinician to make decisions for the patient, and 6) increased time requirement per interaction. PROVIDER-RELATED BARRIERS included 1) poor knowledge of pelvic floor vocabulary, 2) assumption that patients are familiar with issues related to their conditions, 3) stereotyping of patients to be incapable of understanding, 4) the use of office staff without translating credentials, and 5) the need for office staff to act as triage clinicians. SYSTEM-RELATED BARRIERS included 1) poor access to information, 2) lack of Spanish-translated forms and paperwork, and 3) a lack of knowledge of understandable vocabulary. From these preliminary themes, an emergent concept was revealed: it is highly likely that Spanish-speaking women with PFDs have poor understanding of their condition due to multiple obstacles in communication innate within the current healthcare system.
Conclusion: There are many levels of barriers to communications with Latinas treated for PFDs, existing at the level of the patient, translator, and within the system. Given the multiple levels of barriers, it is highly likely these patients will have a lower level of understanding than English-speaking patients. Our next step is to better define these barriers.

Poster #M12
EVALUATING THE QUALITY OF URINARY INCONTINENCE AND PROLAPSE TREATMENT (EQUİPT) STUDY: QUALITY INDICATOR DEVELOPMENT FOR PELVIC ORGAN PROLAPSE
Aqsa Khan, MD¹, Krista Kiyosaki², Victoria Scott³, Claudia Sevilla³, Sarah Connor, MPH¹, Carol Roth, RN, MPH⁴, Mark Litwin, MD, MPH¹, Larissa Rodriguez, MD¹, Neil Wenger, MD⁵, Paul Shekelle, MD, PhD⁶ and Jennifer Anger, MD, MPH⁶
¹Department of Urology, University of California, Los Angeles, CA; ²University of Hawaii Medical School, Honolulu, HI; ³David Geffen School of Medicine, University of California, Los Angeles, CA; ⁴Southern California Evidence-Based Practice Center RAND Corporation, Los Angeles, CA; ⁵Department of Medicine, University of California, Los Angeles, CA; ⁶Department of Urology, Cedars-Sinai Medical Center, University of California, Los Angeles, CA
(Presented by: Aqsa Khan)

Objective: With the ultimate goal of measuring the quality of care provided to women with pelvic floor disorders (PFDs), we sought to develop and rate a set of quality-of-care indicators (QIs) for the work-up and management of pelvic organ prolapse (POP).

Methods: An extensive literature review was performed to develop a set of potential quality indicators for the management of pelvic organ prolapse. QIs were modeled after those previously described in the Assessing the Care of Vulnerable Elders (ACOVE) project. The indicators were then presented to a panel of nine experts who were asked to rate the indicators on a nine-point scale for both validity and feasibility. Using the RAND Appropriateness Method, analysis was performed on preliminary rankings of each indicator. A forum was then held in which each indicator was thoroughly discussed by the panelists as a group, after which the indicators were rated a second time individually using the same nine-point scale. Based on the post-discussion ratings, quality indicators that received a median score of seven or greater were passed.

Results: Quality indicators were developed that addressed screening, diagnosis, work-up, and both nonsurgical and surgical management. Areas of controversy included whether screening should be performed to identify prolapse, whether pessary users should undergo a vaginal exam by a health professional every six months versus annually, and whether a colpocleisis should be offered routinely to older women planning to undergo surgery for POP. Controversy also centered on whether a prophylactic sling should be offered at the time of prolapse surgery. Following the expert panel discussion, 12 of 18 potential indicators were determined to be valid for pelvic organ prolapse with a median score of 7 or greater.

Conclusion: We developed and rated twelve potential quality indicators for the care of women with POP. Once these QIs are tested for feasibility they will be applied on a national level to measure the quality of care provided to women with POP in the United States.

Funding: Funded by a Patient-Oriented Research Career Development Award (1 K23 DK080227-01) and an American Recovery and Reinvestment Act (ARRA) Supplement Award (5K23DK080227-03, JTA).
**Poster #M13**

DEVELOPMENT OF A ROBOTIC SURGICAL TRAINING CURRICULUM FOR GYNECOLOGY AND UROLOGY RESIDENTS: ROBOTIC OBJECTIVE STRUCTURED ASSESSMENT OF TECHNICAL SKILLS (ROSATS)

Megan Tarr, MD¹, Elizabeth Mueller, MD, MSME², Anthony Polcari, MD¹, Sondra Summers, MD¹ and Kimberly Kenton, MD, MS¹

¹Loyola University Medical Center, Maywood, IL; ²Loyola University, Maywood, IL

(Presented by: Megan Tarr)

**Objectives:** Determine times to complete 5 dry lab tasks in a robotic surgical curriculum (ROSATS) developed for urology & gynecology residents and if prior experience with activities requiring fine motor dexterity correlates with robotic surgical skill proficiency.

**Methods:** To determine time estimates for dry lab tasks, we recruited experienced robotic surgeons who had performed ≥ 10 robotic cases from the urology/gynecology departments: “Experts” (EXP). “Novices” (NOV) were 3rd & 4th year medical students with no robotic experience. EXP & NOV surgeons completed demographic questionnaires; recorded perception of their dexterity, skill & experience with dexterity activities. Robotic tasks included manipulation, knot tying, suturing, dissection & transection. Participants were timed & evaluated by one investigator. Continuous measures between groups were compared with the Mann–Whitney test. Pearson’s test was used for all correlations.

**Results:** 10 “Experts” and 10 “Novices” were enrolled. Mean age±SD for NOV & EXP was 27±4 and 42±10. 9/10 EXP were fellowship trained urologic or gynecologic surgeons. NOV included 6, 3rd year & 4, 4th year students. EXP completed a median of 34 robotic (range10–200) and 85 laparoscopic (20–3000) cases. Total robotic task completion time (minutes) was greater for NOV compared with EXP (19±5 vs 9±1, p=.00), although number of mistakes did not differ between the groups (p=.45). NOV had lower self–perceived dexterity scores than experts (5.3±3.2 vs 8.8±1.4, p=.01). NOV & EXP surgeons reported participating in a similar number of dexterity tasks (1.4±.70 vs 2.2±.9, p=.06). Experience with a higher number of dexterity tasks correlated with self–perceived dexterity scores (r = .44, p < .06). When analyzing both groups, experience with dexterity tasks and total time for tasks did not correlate (r =−.23, p=.32). Experience with dexterity tasks correlated with time for robotic tasks in the expert group (r =.64, p=.05).

**Conclusions:** EXP perform dry lab skills more quickly than NOV, although they do so with a similar number of mistakes. EXP who previously performed activities utilizing dexterity had slower times on robotic dry lab skills testing, suggesting an association between non-surgical hobbies that utilize fine motor skills and a possible detraction from robotic performance speed. Further research is necessary to determine if experience with activities utilizing dexterity detracts from or enhances robotic surgical performance.

---

**Poster #M14**

A COMPARISON OF MIDURETHRAL SLING OUTCOMES WITH AND WITHOUT CONCOMITANT PROLAPSE REPAIR

Gwen Grimsby, MD, Mark Tyson, MD and Christopher Wolter, MD

Mayo Clinic Arizona

(Presented by: Gwen Grimsby)

**Introduction and Objectives:** Stress urinary incontinence (SUI) is present with pelvic organ prolapse (POP) up to 80% of the time. Controversy exists regarding the effect of concomitant prolapse repair on sling outcomes. We report the outcomes of both single incision and retropubic midurethral slings with and without concomitant POP repair.

**Methods:** A non–funded retrospective review was performed of all midurethral slings (MiniArc, Monarc, and Sparc slings AMS, Minnetonka, MN) performed at one institution from September 2008 to July 2010 with and without concomitant POP repair. Pre–operative urinary incontinence was confirmed by physical exam as well as urodynamics when indicated. The choice of sling was based on surgeon preference. Prolapse was repaired transvaginally with light–weight polypropylene mesh or robotically via sacrocolpopexy based on the nature of the prolapse and surgeon preference. Success of the sling procedure was defined as complete resolution of leakage or great improvement of leakage based on the Patient Global Impression of Improvement (PGI–I) score and lack of leakage on post–operative physical exam. The outcomes of midurethral slings with and without prolapse repair were compared via chi–squared tests.

**Results:** Average age was 68 years old (48–83). Forty patients underwent single incision sling, 17 of with concomitant POP repair. Thirty three underwent retropubic sling, 11 of with concomitant POP repair. Success of single incision sling 21/23 (91%) and retropubic sling 21/22 (95%) were similar (p=0.577). Success decreased with POP repair and midurethral sling 6/17 (35%) compared with POP repair and retropubic sling 10/11 (91%). Of the patients with sling failure with concomitant prolapse repair, 6/7 (86%) had transvaginal repairs and 1/7 (14%) had a robotic repair. Follow up was 6 weeks to 20 months.
Conclusion: There appears to be a higher incidence of single incision midurethral sling failure when done concomitantly with repair of pelvic organ prolapse. This was most notably seen with transvaginal prolapse repair. We hypothesize this may be the case because a single incision sling may not adequately re-support the urethra in a patient with prolapse who already has compromised pelvic floor support. There appears to be no difference in success of retropubic slings when done with or without concomitant prolapse repair.

Poster #M15
INTERMEDIATE TERM FOLLOW UP AFTER CYSTOCELE REPAIR USING PORCINE DERMIS GRAFT THROUGH TRANSOBTURATOR APPROACH
Ayman Mahdy, MD¹, Willy Davila, MD², Deborah Karp, MD² and Gamal Ghoniem, MD, FACS³
¹University of Arkansas for Medical Sciences; ²Urogynecology, Cleveland Clinic Florida; ³Female Urology, Cleveland Clinic Florida
(Presented by: Ayman Mahdy)

Introduction and Objective: Anterior vaginal wall prolapse is the most common type of Pelvic Organ Prolapse (POP) with an incidence of 34.3%. Between the widely used grafts for cystocele repair, porcine dermis has been recently reported with variable outcomes. The technique of graft secure in most of these studies involved laterally placed delayed absorbable sutures. Our technical modification with placation of the perivesical fascia has improved the graft outcome. The objective of this study is to evaluate the intermediate term outcome of Perigee® with biocompatible Porcine Dermis Graft (InteXen®) in cystocele repair.

Methods: After the Institutional Review Board (IRB) approval, the charts of all patients who had Perigee/InteXen® repair were reviewed during the period between May 2005 and May 2009. The preoperative data including patient age, parity, menopausal status, previous vaginal surgeries, hysterectomy status, presenting symptoms and pertinent physical findings were collected. Success was defined as a postoperative anatomical stage 0 or 1 using the POP Quantification (POP–Q) scoring system or POP stage 0 or 1 Baden–Walker if no POP–Q was available. Any intra– or postoperative graft related complications were also recorded.

Results: The charts of 89 patients were reviewed. Sixty-nine (78%) patients had at least 6-month follow up with a mean follow−up of 20 (6−44) months. Seventeen patients (25%) had previous anterior repair. Preoperatively, nine patients (13%) had stage II cystocele, 27 (39%) had stage III, and 33 (48%) had stage IV. Anatomic success was present in 48 (69%) patients with 23 (33%) having stage 0, 25 (36%) stage 1, 11 (16%) stage 2, 6 (9%) stage 3, and 4 (6%) stage 4. Median time to cystocele recurrence was 6 (3–22) months. Mean preoperative point Ba was 1.8 +/− 2.4, and mean postoperative Ba −1.0 +/− 2.3. Complications included bladder perforation (n=1), cystotomy (n=1), mesh erosion (n=1), and wound dehiscence (n=1).

Conclusions: Our data conclude that the use of transobturator approach for cystocele repair with the porcine dermis (Perigee/Intexen®) kit is a safe and effective procedure. These intermediate term results are less favorable and continued follow up is needed.

Poster #M16
FEASIBILITY AND SHORT-TERM OUTCOMES FOLLOWING THE USE OF THE UPHOLD VAGINAL SUPPORT SYSTEM FOR TREATMENT OF SYMPTOMATIC VAGINAL PROLAPSE
Joe Mobley, MD, MPH, Melanie Crites, DO and Gamal Ghoniem, MD
Section of Female Urology and Voiding Dysfunction, Cleveland Clinic Florida, Weston, FL
(Presented by: Joe Mobley)

Introduction and Objectives: Over the last decade surgical mesh kits have been used more frequently for the treatment of vaginal prolapse. A multitude of kits now exist with a variety of mesh sizes and configurations. The Boston Scientific Uphold Vaginal Support System (UVSS) is one such kit and offers support to the anterior and apical compartment with mesh anchored via a bilateral sacrospinous fixation (SSF). Limited data are available regarding the use of this system. Potential benefits of this system include a smaller mesh footprint, a knotless SSF, and a transvaginal approach which is void of external trocar passes. This technique is reproducible and allows for uterine preservation and the potential for a suture line that does not overlap the mesh repair. Given these potential benefits, we structured this prospective evaluation to investigate the safety, feasibility and short−term outcomes associated with this procedure.

Methods: Following IRB approval, enrolled patients underwent history and physical exam and demographic data were recorded. Vaginal prolapse was assessed using the modified POPQ staging system. Subjective questionnaires (UDI−6, IIQ−7, AUA QoL, Visual Analog Scale−VAS, PGI−I, PGI−S) were utilized pre and postoperatively and exams were recorded to document anatomic outcome and complications. Perioperative data and procedural details and technique were reviewed.
Results: From 09/15/2009 to 09/15/2010, 14 women with a mean age of 66 (35–83) underwent vaginal prolapse repair employing the UVSS. At mean follow up of 27 weeks VAS scores for degree of satisfaction and cure were both 96.9%, mean PGI−I score was 1.4 and mean PGI−S score was 1.1. Preoperatively, mean prolapse stage was 2.9 in the anterior compartment and 2.0 apically and mean total vaginal length (TVL) was 10.3 cm. At 6 week follow up visit, mean prolapse stage was 0.5 anteriorly and 0 apically and TVL was 11.3 cm. Preoperatively, mean scores for UDI−6, IIQ−7 and QoL were 8.25, 8.2 and 4.5, respectively and were 1.1, 0.4 and 0.6 postoperatively. There was one (7%) mesh erosion.

Conclusions: The use of UVSS to address vaginal prolapse is feasible with short−term follow up yielding satisfactory anatomical results and symptomatic improvement. Mesh complications remain a concern with one erosion present in our early series. Continued follow up is required to evaluate the durability of these results.

Poster #M17
LONG-TERM FOLLOW-UP OF BOVINE DERMIS AS A BIOLOGIC SUBSTITUTE FOR AUTOLOGOUS TISSUE IN PUBOVAGINAL SLING SURGERY
Joshua Holstead, MD, B. Jill Williams, PhD and Alex Gomelsky, MD
LSUHSC-Shreveport
(Presented by: Joshua Holstead)

Introduction and Objectives: We have previously reported medium−term outcomes of acellular bovine dermis (BOV) as a substitute for autologous rectus fascia (ARF) in women at high risk for surgical failure after sling surgery. We now evaluate long−term outcomes after sling surgery with both materials in a “high−risk”population (advanced age / hypoestrogenic state, failure of previous anti−incontinence surgery, and intrinsic sphincter deficiency (valsalva leak point pressure ≤60 cm H2O).

Methods: Women were assigned to a sling material by hospital, as BOV was not available at one of two participating institutions. All slings were placed at the bladder neck. Pre- and postoperative assessment included pelvic exam, SEAPI classification (Stress incontinence (SUI), Emptying, Anatomy (anterior vaginal wall descent), Protection (pad use), Inhibition (urge incontinence)), and quality of life (QoL) questionnaires (SF−IIQ−7, UDI−6, and visual analog scale (VAS, 1−10)). “Global cure” was defined as SEAPI subjective composite=0 and VAS≥8. “SUI cure” was defined as SEAPI−subjective(S) subset=0 and a negative cough−stress test. Demographics and perioperative morbidity were abstracted from the hospital and clinic charts. Statistical evaluation was conducted.

Results: 106 women completed a minimum follow−up of 36 months (41 BOV, 65 ARF). Due to differences in patient populations between the 2 hospitals, women in the BOV group were older, more parous, and had greater degrees of concomitant prolapse. Preoperative SEAPI scores and QoL indices were not statistically different (NS) between groups. SUI cure rates for BOV and ARF were 80.5% and 73.8%, respectively (NS). Global cure rates for BOV and ARF were 48.8% and 47.7%, respectively (NS). SUI cure rates remained relatively stable with longer follow−up, while global cure rates declined. Perioperative complications, rates of short−term and long−term voiding dysfunction, and rates of reoperation for recurrent SUI or prolapse were similar (NS). For each material, there was a significant postoperative improvement in SEAPI scores and all QoL indices, and improvement was similar between ARF and BOV groups (NS).

Conclusions: At long-term follow-up, BOV continues to be a durable substitute for ARF in a population at “high−risk” for surgical failure. Global and SUI−specific clinical outcomes are similar to the ARF sling, and rates of complications continue to be low.

Poster #M18
MANAGEMENT OUTCOMES IN THE SEVERELY IMPAIRED PATIENT WITH MORIBUND OBESITY AND IATROGENIC INTRINSIC SPHINCTERIC DEFICIENCY
Kimberly Burgess, MD, Deborah Lightner, MD and Douglas Husmann, MD
Mayo Clinic Department of Urology, Rochester, MN
(Presented by: Kimberly Burgess)

Objective: The obese, neurologically impaired patient with high grade urinary incontinence due to a destroyed urethra may be managed with an intestinovesicostomy. Our objective was to compare the urologic outcomes of this patient population with four standard options; suprapubic tube placement (SPT) with concurrent operative bladder outlet obstruction (BOO), ileovesicostomy with BOO, ileal conduit diversion, or BOO with augmentation and continent stoma.

Methods: A review of obese patients (BMI >29) with urinary incontinence secondary to a neurogenic bladder and a destroyed urethra from 1987 to 2010 was performed. All patients were unable to perform natural orifice clean intermittent catheterization due to limited dexterity, cognitive impairment, noncompliance, or inadequate ancillary support. Baseline and annual evaluations included renal clearance, urodynamic, and radiographic studies. The number of uroseptic episodes, development of renal or bladder calculi, serial change in renal clearance or scarring, or the need for additional surgery were recorded. Decline in renal clearance was defined as a decrease in creatinine clearance of 25% from baseline or development of end stage renal disease (ESRD).
Results: 68 patients were identified and outcomes are listed in table 1. Other complications included the development of new vesicoureteral reflux in 3 patients managed with SPT and BOO, and in 4 patients managed with ileovesicostomy with BOO.

Conclusion: Ileovesicostomy offers no significant benefit over other management strategies in the obese and neurologically impaired patient with urinary incontinence secondary to a destroyed urethra. The number of uroseptic episodes and stone incidence is significantly higher in the ileovesicostomy patients. These patients often require additional procedures including conversion to a different management strategy.

Poster #M19

OBTURATOR FORAMEN DISSECTION FOR EXCISION OF TRANSOBTURATOR MESH

W. Stuart Reynolds, MD, Laura Chang Kit, MD¹, Gregory T. Bales, MD² and Roger R. Dmochowski, MD¹

¹Vanderbilt University Medical Center, Nashville, TN; ²University of Chicago Medical Center, Chicago, IL

(Presented by: W. Stuart Reynolds)

Introduction: Groin pain after transobturator mid–urethral sling (MUS) placement occurs in 10% of cases and is often transient. In few instances it can be recalcitrant and the effects devastating. Surgical exploration and excision may be warranted in these instances. We describe our experience and technique with obturator dissection for mesh excision.

Methods: A retrospective review of patients undergoing obturator foramen and groin dissection for removal of symptomatic transobturator mesh was performed. Data were collected on demographic, perioperative, and outcomes information.

Result: Six patients were identified from 2005–10. Mean age 54 years (range 44–71). 4 patients had transobturator MUS placed for stress urinary incontinence (SUI); 1 patient had both transobturator MUS and vaginal mesh placed for SUI and pelvic organ prolapse (POP); 1 patient had transobturator vaginal mesh for POP. Patients had 0 to 2 prior transvaginal mesh excisions before obturator surgery. All patients presented with complaints of intractable pain in the area of obturator foramen and/or medial groin. All had failed oral analgesic therapy+/− nerve block. 2 patients had right−, 3 left−sided, and 1 bilateral complaints. One patient presented with vaginal drainage and inguinal swelling consistent with obturator canal abscess. 4 patients underwent concurrent vaginal and obturator dissection; 2 patients underwent obturator dissection alone. Average time between mesh placement and obturator surgery was 25.6 months (range 10–42). In all cases, residual mesh (3–11cm in length) was identified and excised from obturator foramen as well as peri−obturator tissues and tendonous structures. Mesh was closely associated to or traversing adductor longus muscle and tendon insertion with significant fibrous reaction in all cases; in 1 case mesh was intimately associated with obturator neurovascular bundle. Post−operatively, improvement was varied: 3 were cured of pain and/or infection; 1 reported significant improvement initially with some pain recurrence; 1 reports mild improvement in site−specific pain, but no overall improvement in pelvic pain; 1 has had no or minimal improvement. Mean follow−up 6 months (range 1–12).

Conclusions: In our experience of cases of intractable groin and obturator foramen pain after transobturator mesh placement, surgical excision of residual mesh alleviated some of the symptoms in most of the patients, but total cure or resolution was only seen in half.

Table 1: Comparison of Management Options

<table>
<thead>
<tr>
<th>Type of Surgery (N=8)</th>
<th>Ursepsis</th>
<th>Stone</th>
<th>Denlete in Renal Clearance</th>
<th>New Renal Scarring</th>
<th>Additional Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPT with BOO (N=26)</td>
<td>5 yrs (2–20)</td>
<td>2(8%)</td>
<td>2(8%)</td>
<td>4(16%)</td>
<td>3(12%)</td>
</tr>
<tr>
<td>Intestinovesicostomy with BOO (N=15)</td>
<td>Median F/U: 11 yrs (3–16)</td>
<td>10(67%)</td>
<td>11(73%)</td>
<td>7(47%)</td>
<td>6(40%)</td>
</tr>
<tr>
<td>Intestinal Conduit (N=15)</td>
<td>Median F/U: 15 yrs (2−26)</td>
<td>6(40%)</td>
<td>5(33%)</td>
<td>8(56%)</td>
<td>9(60%)</td>
</tr>
<tr>
<td>Augment, Continent stoma, BOO (N=13)</td>
<td>Median F/U: 7 yrs (2−18)</td>
<td>0</td>
<td>5(38%)</td>
<td>2(15%)</td>
<td>0</td>
</tr>
</tbody>
</table>
Objective: Describe demographics, diagnoses and treatment success of women presenting to the National Hospital in Niamey, Niger for evaluation of obstetric fistula.

Methods: Retrospective chart review of 700 patients evaluated for obstetric fistula at the National Hospital in Niamey, Niger from December 2003 – March 2008. Demographic, pre-operative physical examination, fistula classification, surgical procedures and follow-up assessment were included.

Results: Of 700 patients, 595 were from Niger with mean (± SD) age at presentation 28.5 ± 10.4 years, mean age at first delivery 18.1 ± 3.4 years. Prior deliveries included vaginal in 80.6% of patients, and cesarean section in 23.6%. Symptoms began in 22.9% following cesarean and 70.3% following vaginal delivery. 77.9% delivered at a hospital and 20.4% delivered at home. Mean (± SD) time of labor was 2.6 + 1.5 days, resulting in stillbirth in 90.6% of cases. 524 patients were diagnosed with fistulas. Of these, 246 (46.9%) were vesico-vaginal, 233 (44.5%) were urethra-vaginal, 24 (4.6%) were combined vesico-vaginal and rectovaginal, 13 (2.5%) were isolated recto-vaginal, and 8 (1.5%) involved the uterus. Of 286 fistulas involving the urethra, 138 (48.2%) had circumferential urethral damage, and many patients had > 2 cm between the urethra and the bladder.

636 patients underwent fistula repair, 51 were lost to follow-up. Median follow-up time after repair was 2.17 months (range 0.1–48.7 months). Primary repair was performed in 48.4%, secondary in 23.9%, 13.5% were tertiary repairs, and 82 had 4 or more previous repairs.

At the time of longest follow-up, successful closure was demonstrated following 72.4% of primary fistula repairs, 63.6% of secondary, 55.7% of tertiary and 52.4% of repairs in patients with 4 or more prior repairs. Of the successful closures, residual incontinence was found in 26.8% of primary repairs, 22.1% of secondary repairs, 25.3% of tertiary repairs and 26.8% of those who had 4 or more repairs. Incontinence was due to stress urinary incontinence, detrusor overactivity or mixed incontinence.

Conclusion: Obstetric fistula is a common problem in Niger, associated with patients who experience prolonged labor, seek hospital care, and deliver a stillborn infant. Urethral fistulas comprised 52.1%, half of which had circumferential urethral damage. Primary repair has the highest success rate; however there remains a significant risk of residual incontinence even after successful closure.
### Conclusion

The decrease in Qmax observed during IF does not result from the mechanical effect of the catheter. It must be related to an incomplete sphincter relaxation and could involve a urethral reflex. Other flow parameters (Qave, tvoid and tQmax) are also modified. FF and IF must be performed during a session to increase the reliability of the conclusions of the urodynamic investigation.


<table>
<thead>
<tr>
<th></th>
<th>Qmax mL/s</th>
<th>Vini mL</th>
<th>Vv mL</th>
<th>Qave mL/s</th>
<th>tvoid s</th>
<th>tQmax s</th>
</tr>
</thead>
<tbody>
<tr>
<td>FF</td>
<td>26±10</td>
<td>353±177</td>
<td>329±166</td>
<td>15±7</td>
<td>22.2±12.3</td>
<td>7.6±2.3</td>
</tr>
<tr>
<td>IF</td>
<td>10±6</td>
<td>370±113</td>
<td>296±126</td>
<td>6±3</td>
<td>60.8±30.3</td>
<td>17.7±9.5</td>
</tr>
<tr>
<td>p</td>
<td>&lt;0.0001</td>
<td>n.s.</td>
<td>n.s.</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

### Poster #M22

**REDUCTION OF RADIATION DURING FLUORO URODYNAMICS: AN ANALYSIS OF A QUALITY ASSURANCE PROTOCOL LIMITING FLUOROSCOPIC IMAGES DURING FLUORO URODYNAMIC STUDIES**

Courtney Lee, MD, Kevin Wunderlee, MS¹, Sandip Vasavada, MD² and Howard Goldman, MD²

¹Imaging Institute, Cleveland Clinic Foundation, Cleveland, OH; ²Glickman Urological and Kidney Institute, Cleveland Clinic Foundation, Cleveland, OH

(Presented by: Courtney Lee)

**Introduction and Objective:** There has been a dramatic increase in diagnostic imaging procedures over the last decade resulting in elevated medical exposures to ionizing radiation. Over time repeat exposures to ionizing radiation can result in high cumulative effective doses of radiation to both the patient and staff involved in the imaging procedure. Our institution initiated a quality assurance protocol to decrease the amount of fluoroscopy during fluoro urodynamic studies (FUDS). We evaluated whether the decrease in fluoroscopic images translates into a significant reduction in radiation and whether decreasing fluoroscopic images per the quality assurance protocol affects the interpretation of FUDS.

**Methods:** The quality assurance protocol defined 5 points for fluoroscopic images: prior to filling, during the filling phase, during a valsala, during voiding, and while voiding without catheter (if patient was unable to void with catheter). The number of spot films, fluoroscopy time, Air Kerma (AK), and Dose Area Product (DAP) from FUDS performed by our division during the 3 months prior to the conceptualization of the quality assurance protocol were compared to FUDS performed by our division 3 months after the initiation of the protocol. Four female urologists reviewed 10 FUDS with 5 or more images performed prior to the initiation of the protocol. Questionnaires assessing diagnosis, treatment, and confidence in each choice were completed after reviewing the patient’s history, physical, and FUDS containing images that correlate with the new protocol and after reviewing all fluoroscopic images. We evaluated responses to both questionnaires.

**Results:** Fifty-four FUDS performed in the 3 months prior to the conceptualization of the protocol were compared to 43 FUDS performed after the initiation of the protocol. The mean number of spot films recorded before and after the quality assurance protocol was 11.2 and 5.6 respectively (p<0.001). The mean fluoroscopy time decreased from 40.9 seconds to 11.7 seconds per procedure (p<0.001). The mean AK decreased from 15.48 mGy to 4.25 mGy, and the mean DAP decreased from 518.90 mGycm2 to 150.28 mGycm2 (p<0.001 and p<0.001 respectively). There was no difference in treatment or diagnosis in 100% of 40 FUDS evaluations.

**Conclusions:** Our quality assurance protocol significantly decreased the amount of fluoroscopy time, DAP, and AK during each FUDS without changing diagnosis or treatment recommendations.

### Poster #M23

**VOIDING DYSFUNCTION IN PATIENTS WITH NEUROMYELITIS OPTICA SPECTRUM DISORDERS**

Cristiano Gomes, MD, Fabricio Carvalho, MD, Julio Bissoli, MD, Jose Bessa, Jr., MD, Samira Pereira, MD, Paulo Marchioli, MD, Dagoberto Callegaro, MD, Homero Bruschini, MD and Miguel Srougi, MD

Sao Paulo University, Medical School-Division of Urology, Sao Paulo, SP

(Presented by: Cristiano Gomes)

**Introduction and Objectives:** Neuromyelitis optica (NMO) is a newly defined demyelinating autoimmune disease of the central nervous system that preferentially affects the optic nerve and spinal cord and was formerly considered a multiple sclerosis variation. Several clinical forms of NMO spectrum disorders (NMO–SD) have been described and include: monophasic–nmo, relapsing–nmo, recurrent longitudinally extensive transverse myelitis and recurrent–optic neuritis. We assessed the lower urinary tract symptoms (LUTS) and urodynamic findings in patients with NMO–SD, a population that has not been previously evaluated in this regard.
Methods: We prospectively evaluated 30 patients (23 women and 7 men) with a mean age of 41.1 ± 13.5 years (range 13 to 70) and mean duration of disease of 33.8 ± 30.8 months (range 3 to 135). All patients had an established diagnosis of NMO−SD based on stringent criteria and were invited to participate irrespective of the presence of LUTS. Neurological impairment was assessed by the Expanded Disability Status Scale (EDSS) and LUTS with the Overactive Bladder V8 (OAB V8) questionnaire. General quality of life (QOL) was assessed with the Life Satisfaction (LiSat) questionnaire. All patients underwent urodynamic evaluation.

Results: Neurological evaluation showed a significantly impaired population, with a mean EDSS score of 5.3 ± 1.8 (range 1 to 8.5). The mean OAB−V8 score was 17.5 ± 14.0 (range 0 to 40). The most common urinary complaints were urge−incontinence in 15 (50%) patients, weak urinary stream in 15 (50%), nocturia in 14 (46.6%), hesitination in 14 (46.6%) and increased urinary frequency in 10 (33.3%). Six (20%) patients were severely incontinent and 7 (23.3%) used diapers. Mean QOL measured by the Lisat was 38.9 ± 6.8 (range 26 to 49). Urodynamics revealed detrusor overactivity (DO) with sphincteric dyssynergia (DESD) in 11 (36%) patients, DESD without DO in 7 (23.3%) and DO with normal emptying in 4 (13.3%). Five (38.5%) patients had normal findings and 4 (13.3) had stress urinary incontinence. The finding of DESD was associated with more severe neurological impairment (mean EDSS 5.9 ± 1.8 vs 4.5 ± 1.5; p=0.027) as well as worse general quality of life (mean Lisat 36.4 ± 6.7 vs 41.9 ± 4.3; p=0.016).

Conclusions: Patients with NMO−SD have a high prevalence of LUTS, with DESD and detrusor overactivity as the main urodynamic findings. Detrusor−external sphincter dyssynergia is associated more severe neurological impairment.

Poster #M24
MANAGEMENT OF LOWER URINARY TRACT PATHOLOGY: A SURVEY OF AUGS MEMBERS
Catrina Crisp, MD, Apurva Pancholy, MD, Angela Fellner, PhD and Rachel Pauls, MD
Good Samaritan Hospital/TriHealth, Cincinnati, OH
(Presented by: Catrina Crisp)

Objective: The purpose of this study was to evaluate the level of surgical comfort of physician members of the American Urogynecologic Society (AUGS) when managing lower urinary tract pathology and injury.

Study Design: This was an Internet based survey of physician members of AUGS. Physicians were contacted via email and asked to follow a link to the 23 question, online survey.

Results: One thousand two hundred thirty−seven AUGS physician members were contacted via email; 297 responses were collected for a 24% response rate. All geographic regions of the U.S. were represented, 49.3% were female, and the majority (37.2%) worked in an academic or university affiliated practice. While 92.2% (273) of respondents were very comfortable with cystoscopy for the diagnosis of lower urinary tract injury, only 43.9% (130) were very comfortable performing a cystoscopic bladder biopsy. In the case of ureteral injury, 35.1% (104) were very comfortable passing ureteral stents for diagnosis, however only 18.6% (55) were very comfortable passing ureteral stents for treatment. Interestingly, 22.5% reported feeling somewhat or very comfortable performing a ureteral reimplantation with or without a psoas hitch, but only 8.5% of all respondents performed the procedure more than once within the last year. Most respondents were somewhat or very comfortable removing mesh from the bladder wall (70.3%) or urethra (75.2%), but the majority (50.7%) was somewhat or very uncomfortable removing mesh from the trigone. With respect to the urethra, 115 surgeons had excised mesh at least once within the last year. Of these, 45 had performed this procedure 3 or more times.

Conclusion: Most AUGS physician members are comfortable with basic cystoscopy and procedures involving the bladder wall and urethra. However, a majority of respondents were somewhat or very uncomfortable with cystoscopic bladder biopsy and complex ureteral surgeries. This may be an area of consideration when establishing guidelines for and evaluating training programs. Also, it is noteworthy that, in this participant sample, mesh involvement in the urethra, bladder wall, and trigone was common.

Poster #M25
OUTCOMES OF REDUCTION CYSTOPLASTY IN MEN WITH IMPAIRED DETRUSOR CONTRACTILITY
Daniel Thorner DO¹,², Jeffrey Weiss MD¹,², Jerry Blaivas MD¹,²,³, Rajveer Purohit MD¹,²,³ and Johnson Tsui BS¹,²
¹SUNY Downstate College of Medicine, Brooklyn, NY; ²Institute for Bladder and Prostate Research, New York, NY; ³Weill Cornell Medical College, New York, NY
(Presented by: Daniel Thorner)

Hypothesis and Aims of Study: The aim of this study is to report surgical outcomes in patients with impaired detrusor contractility (IDC) treated with reduction cystoplasty (RC).
Study Design, Materials, and Methods: This was a retrospective study of consecutive patients with IDC who underwent RC. IDC was defined as a bladder contractility index of <100 and/or a detrusor contraction of insufficient duration to empty the bladder. All subjects had pre–operative International Prostate Symptom Score (IPSS), uroflow (Qmax), post–void residual volume (PVR), bladder diary, videourodynamics, and cystoscopy. Indications for reduction cystoplasty included impaired detrusor contractility, bladder capacity > 1000mL and PVR > 600mL. Surgical technique for reduction cystoplasty was tailored to operative findings. Patients with prostatic obstruction underwent synchronous open prostatectomy. Follow–up was at 3 months, 1 year, and yearly thereafter. Post–operative Qmax, PVR, need for clean intermittent catheterization (CIC), and Patient Global Impression of Improvement (PGII) score were obtained.

Results: There were 8 men (age range 43–75 years, mean 60) of whom 2 had previously undergone TURP. Preoperatively, two patients fulfilled criteria for bladder outlet obstruction; their mean IPSS and bladder capacity were 11 and 2555mL (SD 1531), respectively. The two patients with obstruction underwent synchronous open prostatectomy. All subjects were available for follow–up at 1 year. 7/8 (88%) had a successful outcome (PGII score = 1 in five and 2 in two). One patient was unchanged (PGII = 4) and still needed CIC.

Conclusions: All but one patient who met specific criteria for reduction cystoplasty had excellent outcomes following surgery based on the PGII, PVR improvement, Qmax, and need for CIC. Reduction cystoplasty is a viable option for properly selected patients with IDC.

### Table 1: Pre and post-op data excluding one failure

<table>
<thead>
<tr>
<th></th>
<th>Mean Qmax, mL/sec (SD)</th>
<th>Median Qmax, mL/sec (range)</th>
<th>Mean PVR mL (SD)</th>
<th>Median PVR mL (range)</th>
<th># on CIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preop (n=7)</td>
<td>7 (7)</td>
<td>6 (0-20)</td>
<td>2183 (1260)</td>
<td>2271 (694-4150)</td>
<td>7</td>
</tr>
<tr>
<td>Postop (n=7)</td>
<td>25 (10)</td>
<td>22 (8-39)</td>
<td>163 (120)</td>
<td>143 (0-375)</td>
<td>0</td>
</tr>
</tbody>
</table>

Poster #M26* *(Not CME Accredited)*

PATIENT SATISFACTION FOLLOWING SURGERY FOR POST-PROSTATECTOMY INCONTINENCE; A COMPARISON OF ARTIFICIAL URINARY SPHINCTERS VERSUS MALE SLINGS

Eva Fong, MD, Benjamin Brucker, Abdullah Demirtas, Sagar Shah, MD, Daniela Kaefer, BA, Nirit Rosenblum MD and Victor Nitti, MD NYU
(Presented by: Benjamin Brucker)

Aim: Outcomes for procedures to treat post prostatectomy incontinence (PPI) are not standardized. Recently patient reported outcomes including global assessment have been found to be useful in PPI. We assessed patient satisfaction following surgical treatment for post–prostatectomy incontinence (PPI) at medium term follow–up (>1 year) using patient reported outcomes, comparing artificial urinary sphincter (AUS) versus male slings.

Method: Questionnaires were sent to men who had undergone PPI surgery from January 2004 to January 2009. Exclusion criteria were: no address was available or unable to answer. The primary endpoint was the PGI–I which gives a global assessment of patient–assessed improvement after surgery. Secondary assessment used ICIQ–SF, UCLA–RAND and the MESA questionnaires. SPSS was used for statistical analysis comparing type of treatment with PGI–I, level of significance p<0.05.

Results: There were 216 eligible subjects, 58% returned questionnaires; 61 were AUS, 64 slings (Invance or Advance). The available pad weight data showed that AUS patients had a mean pre–operative pad weight greater than those who underwent a sling, 576 vs 131g (p<0.005). For the primary variable of PGI–I see table 1. Overall 70.4% were better (scores 1 and 2) based on PGII. If we include 9 patients who refused to return questionnaires but were failures by phone this rate would be 66%. There was no statistically significant difference between AUS and slings compared for success versus failure, chi–square test. (0.17, p = 0.67). There was no difference in the mean MESA–SUI score between those who had undergone sling (11.1) vs AUS (12.08) surgery (p=0.502). There was also no significant difference between the mean ICIQ scores, UCLA scoreas for AUS vs slings.
Conclusion: Although many PPI patients continue to have incontinence symptoms after treatment, the rate of patient satisfaction is very high as assessed globally by PGI−I. We did not find significant differences in PGI−I or other criteria between the two treatments. Preoperative severity data, such as pad weights suggested the AUS group were significantly severely more incontinent pre-operatively. Our study suggests that in appropriately selected subjects either AUS or sling surgery has very favourable outcomes in terms of patient satisfaction.

Table 1: PGI−I scores

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>57</td>
</tr>
<tr>
<td>2.00</td>
<td>31</td>
</tr>
<tr>
<td>3.00</td>
<td>15</td>
</tr>
<tr>
<td>4.00</td>
<td>10</td>
</tr>
<tr>
<td>5.00</td>
<td>2</td>
</tr>
<tr>
<td>6.00</td>
<td>2</td>
</tr>
<tr>
<td>7.00</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
</tr>
</tbody>
</table>

Poster #M27

DULOXETINE FOR THE TREATMENT OF POST-PROSTATECTOMY STRESS URINARY INCONTINENCE

R. Corey O’Connor, MD, Amy Guise, MD, Jonathan Vincent, MD, Donald Neff, MD, Peter Langenstroer, MD, William See, MD and Michael Guralnick, MD
Medical College of Wisconsin, Milwaukee, WI
(Presented by: R. Corey O’Connor)

Introduction: Stress urinary incontinence (SUI) is a known complication following radical prostatectomy. Duloxetine, a combined serotonin and norepinephrine reuptake inhibitor, has been shown to decrease SUI by increasing urethral sphincter contractility. We examined the outcomes of patients with mild to moderate post-prostatectomy SUI treated with duloxetine.

Methods: A retrospective chart review of all men treated with duloxetine for the management of mild to moderate post-prostatectomy SUI from 2006 to 2010 was conducted. Mild to moderate SUI was defined as urethral leakage with physical activity requiring 5 or fewer absorptive pads per day. Patients with a history of pelvic radiation therapy were excluded from the study. Data extracted included patient age, daily pad usage, date of prostatectomy and medication side effects. In addition, pre and post treatment incontinence impact questionnaire (IIQ−7) and linear satisfaction scores were recorded. All patients received duloxetine 30mg by mouth Qhs x one week, then 60mg Qhs thereafter. Patients were seen one month later to determine drug efficacy and side effects.

Results: Thirty-five men were included in the study. Mean patient age was 64.1 years (range 48 – 82). Average time from radical prostatectomy was 19.6 months (range 9 – 48). Daily pad usage decreased from 2.9 (range 1 – 5) to 1.5 (range 0 – 4) (p < 0.05). IIQ−7 scores decreased from 12.9 (range 6 – 18) to 7.6 (range 2 – 16) (p < 0.05). Linear satisfaction scores improved from 0.8 (range 0 – 2) to 2.3 (range 1 – 3) (p < 0.05). Following a one month trial of duloxetine 12/35 (34%) men reported satisfactory SUI improvement and requested to continue the medication. The drug was discontinued in 23/35 (66%) patients: lack of efficacy in 13/35 (37%), intolerable side effects in 5/35 (14%) or both in 5/35 (14%). Reported side effects included fatigue, insomnia, nausea and dry mouth.

Conclusions: Duloxetine improved post-prostatectomy SUI in 17/35 (49%) men following a one month trial. However, only 12/35 (34%) of these patients were able to tolerate the drug. Duloxetine may be considered a treatment option for mild to moderate post-prostatectomy SUI.

Poster #M28

THE ADVANCE™ MALE SLING IN PATIENTS WITH MODERATE TO SEVERE STRESS URINARY INCONTINENCE

Paul McAdams, MD, Edward Houser, MD, Jennifer Bepple, MD and Kurt McCammon, MD
Eastern Virginia Medical School, Norfolk, VA
(Presented by: Paul McAdams)

Objectives: Although the artificial urinary sphincter (AUS) remains the gold standard for the treatment of stress urinary incontinence (SUI) in men, many refuse or are not candidates. For these patients, treatment options are limited. We present our experience in men with moderate to severe incontinence that elected to have an Advance™ trans-obturator sling.
Methods: Data was retrospectively reviewed on 52 patients with moderate to severe incontinence, defined as using at least 5 pads per day (ppd), who elected to undergo an AdVance™ sling. Preoperatively, most patients underwent urodynamics and cystoscopy. Baseline and postoperative pad usage data were collected.

Results: Etiology of the SUI was radical prostatectomy in 48 patients, transurethral resection of the prostate in 2, and cryotherapy and radiation therapy for prostate cancer in 1 patient each. Follow-up ranged from 1 to 31 months (with a median of 12 months.) Mean preoperative pad usage was 6.2 ppd, (range, 5 –12) and decreased significantly following surgery (p<0.001), with mean postoperative pad usage of 1.5 ppd (range, 0–8). Thirty four patients reported wearing <=1 ppd postoperatively (65%). Of these, 20 patients (38%) reported requiring no pads at all after the procedure. There was no significant difference in the average number of preoperative ppd in those patients reporting 0−1 ppd after the procedure (5.1 ppd) and those who worsened or had minimal improvement (4.7 ppd). Of 6 patients who had primary or salvage radiation therapy for prostate cancer, 4 (67%) required only 0–1 ppd postoperatively. Two patients experienced no improvement while 9 had a decrease in ppd of 2 or fewer pads. One patient had the sling removed secondary to retention. There were no urethral erosions, significant bleeding or mesh complications in our patients.

Conclusions: In men with moderate to severe SUI who refuse or are not candidates for an AUS, the AdVance™ sling can be performed with satisfactory results. Neither preoperative pad use nor a history of prior radiation was a predictor of poor outcome. The durability of the AdVance™ sling needs to be confirmed with longer follow-up, but these short-term results appear promising. Men who suffer from moderate to severe SUI can expect significant improvement with this minimally invasive option.

Poster #M29
THE ADVANCE TRANSOBTURATOR MALE SLING FOR POSTPROSTATECTOMY INCONTINENCE: CLINICAL RESULTS OF A PROSPECTIVE EVALUATION UTILIZING PATIENT-DRIVEN QUESTIONNAIRES
John Stoffel, MD and Arthur Mourtzinos, MD
Lahey Clinic Medical Center, Burlington, MA
(Presented by: Arthur Mourtzinos)

Introduction and Objectives: Transobturator male slings have been proposed to manage stress urinary incontinence (SUI) after prostate surgery, but data are still lacking. The purpose of this study was to prospectively evaluate the clinical outcome after management of SUI after prostatic surgery by placement of an AdVance male sling.

Methods: We conducted a prospective evaluation 45 patients treated in a single center between February 2008 and January 2010 for mild to moderate SUI with an AdVance male sling. The etiology was post−prostatectomy in 43 patients, external beam radiation therapy in 1 patient, and a laser transurethral resection of the prostate (TURP) in 1 patient. Five patients had received adjuvant radiation therapy. Eight patients had failed prior urethral bulking procedures. The surgical outcome was determined by clinical history and physical examination and, primarily, by patient self−assessment and included validated symptom, bother, and quality−of−life questionnaires.

Results: Of the 45 patients, 30 no longer wear any pads and have no incontinence, 10 were improved, and 5 had no improvement. Previous radiation therapy was associated with a slightly higher risk of failure. Of the 10 who were improved, 2 patients subsequently chose to have an artificial urinary sphincter (AUS) placed and are now totally continent. One patient who had significant improvement and was using greater than >6 pads/day elected to proceed with a second type of sling as a salvage procedure. Of the 5 patients who had no improvement, one underwent placement of an AUS and is totally continent. The other four are contemplating either placement of a different type of perineal sling or an AUS. Over 85% of patients reported subjective improvement in their overall quality of life. Two patients developed post−operative urinary retention requiring clean intermittent catheterization for 1 and 3 weeks respectively. One patient who had no improvement in his symptoms had unresolving scrotal pain requiring further surgical therapy.

Conclusions: Placement of an AdVance male sling is a safe and effective procedure and does not preclude the later placement of other types of perineal slings or an AUS in patients who do not achieve desired results. Further evaluation and high−quality controlled, randomized studies are needed to assess long−term efficacy and precise indications of this procedure for post−prostatic−surgery SUI management.
COMORBID ERECTILE DYSFUNCTION IN MEN REQUIRING SURGICAL INTERVENTION FOR POST-PROSTATECTOMY URINARY INCONTINENCE
Ekene Enemchukwu, MD, MPH, Benjamin Whittam, MD, Todd Doran, PA-C, Melissa Kaufman, MD, PhD and Doug Milam, MD
Vanderbilt University Medical Center, Department of Urologic Surgery, Nashville, TN
(Presented by: Ekene Enemchukwu)

Introduction and Objectives: As advances in prostate cancer treatment have impacted survival, the focus on improving quality of life related outcomes and patient satisfaction is evolving. Rates of post-prostatectomy urinary incontinence (PPI) and erectile dysfunction (ED) in the literature vary widely. Data regarding the relationship between these critical quality of life parameters is sparse and substantial controversy persists concerning the anatomic factors responsible for both complications. Herein we sought to determine the incidence of ED in men with moderate to severe PPI requiring surgical intervention.

Methods: Retrospective chart review was performed for patients who had undergone artificial urinary sphincter (AUS) implant or bulbar male sling +/- inflatable penile prosthesis (IPP) from 1/2004 to 7/2009. Data collected included American Urologic Association Symptom Index scores (AUASI), Sexual Health Inventory for Men scores (SHIM), demographics and complications. Outcomes were assessed in the following subgroups: AUS only, AUS + IPP, male sling only and male sling + IPP.

Results: Ninety seven radical prostatectomy patients met inclusion criteria. Forty patients underwent male sling and 57 patients AUS. All patients presenting for surgical intervention for PPI reported severe ED with average pre-op SHIM scores of 3.25 for the AUS group and 3.32 for the sling patients (Table 1). Interestingly, these scores did not demonstrate improvement for patients undergoing an isolated incontinence intervention (3.49 for AUS and 5.18 for sling). With regards to urinary symptoms, AUS patients displayed improvement (AUASI −7.83 for AUS only and −4.6 for AUS + IPP). In male sling patients the AUASI decrease was a modest −2.74 and curiously, scores were higher in the sling + IPP group (+0.2).

Conclusion: This analysis demonstrates the comorbid nature of incontinence and ED in the post-prostatectomy population. Herein we reveal a 100% rate of ED in patients presenting for PPI interventions. Several critical parameters including nerve sparing status could not be evaluated in this analysis and prospective studies are ongoing to further define parameters contributing to ED in PPI patients.
NON-MODERATED POSTERS

Poster #NM1

DORSAL BUCCAL MUCOSAL GRAFT URETHROPLASTY FOR TREATMENT OF FEMALE URETHRAL STRICTURES

Rajveer Purohit MD¹, Jerry Blaivas MD²,³, Johnson Tsui BS³, Janice Santos MD⁴ and Jeffrey Weiss MD³

¹SUNY Downstate College of Medicine, Brooklyn, NY; ²Weill Cornell Medical College, New York, NY; ³Institute for Bladder and Prostate Research, New York, NY; ⁴Columbia University Medical Center, New York, NY

(Presented by: Rajveer Purohit)

Study Design, Materials, and Methods: This is a retrospective study of recurrent urethral strictures treated with buccal grafts identified from a database of female patients seen between 1998–2010. Inclusion criteria included all patients who had a BMG and had: 1) a clinical diagnosis of urethral stricture, 2) stricture seen on cystoscopy, 3) urethral obstruction on videourodynamics (VUDS) according to the Blaivas–Groutz nomogram and/or 4) urethral calibration with sounds to less than 17F. Pre– and postoperative symptoms, uroflow, and post–void residual urine were recorded for all patients; VUDS and cystoscopy were done preoperatively. Indications for buccal grafts in patients were either insufficient vaginal tissue for a local flap and/or patients who had strictures that extended to the bladder neck.

Results: There were 3 patients ranging in age from 46–77 years. Follow–up ranged from 12–15 months. Initial stricture was idiopathic in two patients and both failed ventral vaginal flap reconstructions. The third patient failed multiple prior dilations. All three patients had panurethral strictures. Buccal grafts measuring 2.2 x 4cm were harvested by the urology team and sutured to a longitudinal dorsal urethrotomy extending from the urethral meatus to the bladder neck using absorbable monofilament sutures. Postoperatively, all were unobstructed on uroflow and had substantial resolution of symptoms. Two patients who were sexually active remained so afterwards and achieved normal orgasms. Results are seen in Table 1.

Conclusion: Buccal graft urethral reconstruction has good short term outcomes in women with complex, recurrent, long urethral strictures and has no impact on sexual function.

Poster #NM2

SOCIAL NETWORKS LACK USEFUL CONTENT FOR INCONTINENCE

Kamran Sajadi, MD and Howard Goldman, MD

Cleveland, OH

(Presented by: Kamran Sajadi)

Introduction and Objectives: Social networks, which are resources that allow users to connect with each other and share content, are a widely popular resource on the Internet. Resources such as Facebook, Twitter, YouTube, and blogs attract millions of users with widely variable demographics, but social media is relatively underused in the healthcare industry. Our goal was to assess the resources available were a patient to search for “incontinence” among these media.

Methods: A search for the keyword “incontinence” was performed on Facebook.com, Twitter.com, and YouTube.com in September 2010. The first 30 English–content results were reviewed for each. The results were catalogued according to content, with categories including health care professionals, commercial medical products, complementary and alternative medicine (CAM) resources, and humor–based content. For Twitter, both a live search of “tweets”by users, as well as a search of Twitter users, was performed.

Results: On Facebook, 7 results (23%) were user–created “Community Pages” which had no discernible health–related information, 2 (7%) were humor–based, 3 (10%) were created by health care professionals, 12 (40%) advertised for commercial incontinence products, and 1 (3%) linked to an incontinence health–care related blog. Of live “tweets” reviewed on Twitter, 2 (7%) were aimed at humor, 18 (60%) linked to incontinence–related health care information, none were from or referred to health care professionals or organizations, 9 (30%) advertised for incontinence–related commercial products, and 1 (3%) advertised CAM resources. There were only 4 results for Twitter users, of which 1 was humor–based, 1 provided incontinence–related health information, and 2 were incontinence medical supply companies. Of YouTube videos, 3 (10%) were intended as humorous, 9 (30%) came from health care professionals, 12 (40%) were commercial in nature, 1 (3%) advertised CAM resources, and the remaining 5 (17%) were informational in nature.
Conclusions: Great potential exists for patients with incontinence to connect with each other and medically informative resources. However, in its current state, the amount of incontinence information from health care professionals and incontinence organizations is relatively low. Medical professionals and societies should target these relatively new avenues to reach patients and advance their ideas.

Poster #NM3
CAN VIDEOURODYNAMICS PREDICT SLING LOCATION IN PATIENTS WITH SUI FOLLOWING MIDURETHRAL SLING?
Alienor Gilchrist, MD, Colin Goudelocke, MD and Rovner Eric, MD
Department of Urology, Medical University of South Carolina, Charleston, SC
(Presented by: Alienor Gilchrist)

Introduction: Persistent or recurrent stress urinary incontinence due to failure of a mid-urethral sling (MUS) may result from incorrect location of the sling relative to the midurethra. Proximal placement may result in distortion of the urethral closing mechanism and persistent SUI. This may require extensive dissection to locate and remove the sling. This study evaluated whether pre-operative videourodynamic study (VUDS) parameters and radiographic findings of the bladder neck (BN) could predict intraoperative MUS sling location (proximal to or at the BN vs suburethral location) in patients with SUI following MUS undergoing sling excision, and/or urethrolysis.

Methods: An IRB approved retrospective review of records and VUDS identified women treated for recurrent SUI after synthetic MUS (transobturator or retropubic approach) at one institution by one surgeon. Recurrent SUI diagnosis was confirmed by patient report, physical exam and/or VUDS. Patients undergoing sling excision for other indications (e.g. outlet obstruction, urinary tract erosion) were excluded. Pre-operative VUDS parameters were examined. Operative reports provided the anatomic location of the sling prior to excision.

Results: 15 women with SUI following MUS underwent VUDS and subsequent re-operation. The MUS was found proximal to or at the BN in 8 women and suburethral in 7. Women with BN or proximal sling location were equally likely to have an open (4/8 patients) or closed BN (4/8 patients) at rest on filling cystography. The radiographic finding of an open BN pre-operatively was not predictive of BN or more proximal sling location intraoperatively nor was it associated with lower valsala leak point pressure (VLPP) (p=0.4). There was no difference in pre-operative urge, VLPP, PdetQmax or Qmax between MUS at the BN or proximal compared with suburethral slings. MUSs found at the BN or proximal were more likely to be retropubic slings (7/8 patients) than in the suburethral group (3/7 patients) with results approaching statistical significance (p=0.06). Rates of concomitant prolapse repair did not differ between the groups with BN vs suburethral MUS location.

Conclusions: While VUDS help guide management of patients with post surgical voiding dysfunction, we were unable to demonstrate its pre-operative benefit in determining anatomic location of the failed MUS. Furthermore, location of the sling does not appear to affect voiding parameters on VUDS.

Poster #NM4
PREDICTORS OF SUCCESSFUL VOIDING PRIOR TO HOSPITAL DISCHARGE AFTER STRESS URINARY INCONTINENCE SURGERY
Barbara Robinson, MD¹, Gena Dunivan, MD², Brent Parnell, MD², Allison Serra, BA² and AnnaMarie Connolly, MD²
¹University of North Carolina; ²University of North Carolina, Chapel Hill, NC
(Presented by: Barbara Robinson)

Introduction and Objective: Women considering urinary incontinence surgery may benefit from identification of variables associated with catheter usage upon discharge, as many patients are apprehensive about the potential need to catheterize after discharge. The objective of this study was to identify variables associated with successful voiding prior to hospital discharge in women undergoing stress urinary incontinence surgery.

Methods: Medical records of women who underwent urinary incontinence surgery at a single institution between July 1997 and December 2009 were reviewed. Demographic data, urodynamic findings, and surgical procedures were reviewed. The primary outcome was successful voiding defined as a woman not requiring bladder catheterization at hospital discharge.
Results: Of 953 consecutive women who underwent urinary incontinence surgery, 943 (99.1%) had primary outcome data and 349 women (36.7%) successfully voided before hospital discharge. Burch procedure was performed in 462 women (49%), minimally invasive pubovaginal sling in 431 women (46%), and autologous fascial sling in 50 women (5.0%). The two groups, successful voiders versus nonsuccessful voiders, were similar regarding demographics, prior surgeries, urethral hypermobility, leak point pressures, flow patterns, and EMG sphincter activity during voiding studies. Successful voiding was positively associated with lower postvoid residual at time of urodynamics (45.2ml vs. 60.6ml, p=0.014), operative day hysterectomy (46.1% vs. 34.3%, p<0.001), and Burch procedure (61% vs. 42%, p<0.001). Women with a history of prior incontinence surgery (8.3% vs. 12.5%, p=.049), or who underwent traditional fascial sling (2.9% vs. 6.9%, p=.004), minimally invasive sling (36.4% vs. 51.2%, p<0.001) or anterior colporrhaphy (17.8% vs. 25.8%, p=.005) were less likely to successfully void prior to discharge. Logistic regression demonstrated that only performance of a minimally invasive sling retained its significant association with a higher likelihood of catheter use seen at time of discharge (OR 2.3, 95% CI 1.2−4.2).

Conclusion: Successful voiding prior to discharge was positively associated with performance of a Burch procedure. Minimally invasive and autologous fascial slings were associated with a higher likelihood of catheter use upon hospital discharge. These data may facilitate pre-operative counseling which may impact patient expectations and contribute to overall patient satisfaction.

Poster #NMS
COMPLEX REPETITIVE DISCHARGES ARE COMMON IN NORMAL WOMEN
Olga Ramm, MD¹, Elizabeth Mueller, MD, MSME¹, Linda Brubaker, MD, MS¹, Lior Lowenstein, MD² and Kimberly Kenton, MD, MS³
¹Loyola, Maywood, IL; ²Rambam, Haifa, Israel
(Presented by: Olga Ramm)

Objective: Complex repetitive discharges (CRD) in the urethral sphincter on concentric electromyography (EMG) are associated with voiding dysfunction. Our aim was to report the frequency of CRD during filling cystometry in women with and without symptoms of urinary incontinence (UI) and voiding dysfunction.

Methods: We recruited women without UI symptoms and incontinent women to undergo multichannel urodynamics (UDS) with urethral sphincter EMG. Women completed the Pelvic Floor Distress Inventory (PFDI) to assess symptoms of UI and voiding dysfunction. Participants who responded affirmatively to PFDI items: “Do you have difficulty emptying your bladder?”or “Do you experience a feeling of incomplete bladder emptying?”were classified as having voiding dysfunction. Women with postvoid residual volumes >100 ml, active urinary infection, >stage II prolapse, or neurologic disease were excluded. UDS were performed with microtip catheters and maximum urethral closure pressures (MUCP) obtained at 300 ml. Urethral EMG was done using a concentric needle electrode positioned in the striated sphincter and processed using Interference Pattern Analysis software by Medtronic Keypoint.net. SPSS Version 16 (Chicago, IL) was used for data management and analysis.

Results: The 87 participants (31 controls, 56 with UI symptoms) had a mean age of 48±15 years and a median vaginal parity of 1 (range 0–2). None of the control women demonstrated UI on UDS; UDS diagnoses of the UI group were: 31 (56%) urodynamic stress incontinence, 17 (30%) detrusor overactivity, 8 (14%) mixed incontinence. The mean MUCP was 72±39 cmH2O and was higher in the control group than in UI women (101±40 vs 55±26, p<.0005). 26 participants (32%) met our definition of voiding dysfunction; nearly all (96%) reported a “feeling of incomplete bladder emptying”while 53% reported “difficulty emptying the bladder”. CRD were present in only one (4%) woman with voiding dysfunction, but in 9 (15%) women without voiding dysfunction. 9 of 30 (30%) control and 1/56 (4%) incontinent women had CRD during bladder filling. Controls were significantly more likely to have CRD than incontinent women (P<.0005).

Conclusion: Complex repetitive discharges are a common finding on urethral sphincter EMG in normal women, appearing in 30% of women without symptoms of voiding dysfunction, urinary retention or UI. Urodynamic and EMG measures of urethral neuromuscular function were not related to presence of CRD.

Poster #NMS
TEN-YEAR OUTCOMES OF THE TENSION-FREE VAGINAL TAPE PROCEDURE FOR TREATMENT OF FEMALE STRESS URINARY INCONTINENCE
Ji-Yeon Han, MD¹, Ha Na Lee, MD², Kyung-Sung Lee, MD, PhD² and Myung-Soo Choo, MD, PhD¹
¹Asan Medical Center; ²Samsung Medical Center
(Presented by: Myung-Soo Choo)

Purpose: The aim was to evaluate the long-term efficacy and the safety of the tension-free vaginal tape (TVT).
Materials and Methods: We retrospectively analyzed the results of 129 female patients with urodynamic SUI who underwent TVT between 1999 and 2000. The evaluation included a Sandvik questionnaire, satisfaction, changes of voiding symptom, complications and other interview included recommendation to other patient who have same symptoms, willingness to same procedure. The subjective cure rate was defined as no leakage on Sandvik questionnaire. Median follow–up period was 10.6 (9.8–11.6) years.

Results: The mean age at operation was 55.4 (38–78) years, SUI Stamey grade I 40.9% (36/88), II 58.0% (51/88), III 1.1% (1/88). At postoperative 10 years, 79.5% (70/88) were cured, 18.2% (16/88) had improved and 2.2% (2/88) had failed according to Sandvik questionnaire. And the satisfaction rate with treatment result was positive in 84.3 %. 85.5% of all patients recommended other patients who have same symptoms, and 76.1% were willing to same procedure when same symptoms recur. There was no significant difference in the success rates according to age, VLPP (VLPP<60 vs VLPP≥60), MUCP (MUCP< 40 vs MUCP≥40), BMI, and the SUI grade. Urge/urge incontinence was presented by 53.4% (47/88) pre−operatively, but it improved in 46.8% (22/47) post−operatively. De novo urge/urge incontinence appeared in 24.4% (10/41) post−operatively At follow−up, complications that patients complained were only de novo urgency (24.4%, 10/41) and frequent urinary infection (4.5%, 4/88).

Conclusion: The TVT procedure is effective and safe treatment for female SUI in long−term follow−up more than 10 years.
Methods: Repeated voiding studies with free flow rate (FF) and p/Q studies in 168 females were analyzed using various nomograms (provisional ICS, Schaefer (SCH), Blaivas–Groutz (BG), Salvatore, Lemack & Zimmern, Kuo) (1)), and numbers (BOOI and obstruction coefficient OCO = pdet,Qmax/(40+2Qmax) DECO, (2). We also assess the fit of pressure/flow data to the underlying concepts, and how straining and use of FF affect classification.

Results: Mean values for p/Q data: Qmax 18 ml/s (higher FF in 63%); Vv 417 ml, PVR 88 ml, pdet,Qmax 25 cmH2O. By ICS nomogram 2 were obstructed, 3 equivocal; in BG, 3 were moderately obstructed, 38 mildly obstructed; in SCH nomogram, 5 were Grade II obstructed, 25 Grade I, rest in Grade 0. Mean BOOI = –16 and OCO = 0.35. Combining pressure from the p/Q study with higher FF or flow at straining resulted in higher contractility, DECO 116 to 140.

Conclusions: There is agreement that 2–3% may be obstructed. Using a higher flow at straining or FF in combination with pressure (BG) mimics an increase in contractility to unrealistically high values, and will mislead in nomograms with Qmax cut-off. BOOI shows significant variability, with sensitivity to maximum flow and straining, and thus to volume voided. Fit between BOOI and the actual p/Q plot in women is poor with calculated mean opening pressure of –16 cmH2O compared to measured 15.9 cmH2O. For OCO mean calculated opening pressure is 14.9 cmH2O, indicating good agreement. Mean OCO 0.35 is close to BG cut-off for “mild obstruction” and SCH grade I. In addition, OCO enables for the first time realistic grading of outflow conditions in females and males on a continuous scale and is only little affected by straining. In males, flow is usually driven by pdet. This is not generally true in women where the effectiveness of straining demonstrates that flow rate is driven by pves. This needs to be taken into account for voiding analysis in females using an additional Q/pves analysis.

1. 2nd ICI 2002 p 345

Poster #NM9
WITHDRAWN

Poster #NM10
WITHDRAWN

Poster #NM11
RELATIONSHIP BETWEEN BODY MASS INDEX AND OVERACTIVE BLADDER IN WOMAN CORRELATED WITH URODYNAMIC EVALUATION
Tariq Al-Shaiji, MBChB, FRCS, Brenda Caley, RN¹, Blayne Welk, MD, FRCS², Sender Herschorn, MD, FRCS² and Sidney Radomski, MD, FRCS¹
¹Toronto Western Hospital, Toronto, ON, Canada; ²Sunnybrook Health Science Centre, Toronto, ON, Canada
(Presented by: Tariq Al-Shaiji)

Introduction and Objective: Overactive bladder (OAB) is a common disabling condition that affects health–related quality of life. OAB may be characterized urodynamically by the presence of involuntary bladder contractions that occur during bladder filling. In women, a number of epidemiological studies have shown that the prevalence of OAB symptoms is positively related to increasing body mass index (BMI). To our knowledge, there has been no published data correlating BMI and OAB in woman using an objective tool. Our objective was to define a relationship between BMI and OAB in women and to correlate it with urodynamic (UD) findings.

Methods: A prospective clinical study was conducted at our Urology out–patient clinic and cystoscopy clinic. Ambulatory females aged ≥ 18 years of age who had symptoms of OAB ≥ 3 months in duration were enrolled. Patients answered a self–administered questionnaire (modified Overactive Bladder–Validated 8–question Screener [OAB–V–8]), had their weight and height recorded to calculate the BMI, and underwent video or non–video UD test. Patients were categorized into 3 groups. Group 1 BMI < 25 (underweight & normal weight), group 2 BMI 25–29.9 (overweight), and group 3 BMI ≥ 30 (obesity).

Results: A total of 113 patients were examined (group 1 [n=32], group 2 [n=40], group 3 [n=41]). The mean age was 50, 55, and 59 for groups 1, 2, and 3 (P < 0.05). Group 3 showed a significant increase in the incidence of subjective mixed leakage (p < 0.05) and the number of pad used (p < 0.05) when compared with groups 1 & 2. There was no significant difference among the groups in duration of symptoms, OAB–V–8 score and the incidence of subjective urgency or stress leak. UD parameters of groups 1, 2 & 3 showed no statistically significant differences in most variables including: sensation, compliance, involuntary contractions, pressure amplitude, detrusor leak point pressure, stress leakage, and valsalva leak point pressure. However, group 3 showed a significant increase in the incidence of UD urge leak (p < 0.05) when compared to group 2 but not group 1.
Conclusions: Increasing BMI was age related. BMI ≥ 30 appears to be associated with a higher incidence of patient’s reported urinary mixed leakage and pad use. UD assessment did not show significant correlation between OAB and any BMI category for most UD parameters except for urgency leakage. A larger series is warranted in order to define the relationship between BMI and OAB and UD findings.

Poster #NM12
ACELLULAR CADAVERIC DERMAL ALLOGRAFT PUBOVAGINAL SLINGS: INTERMEDIATE OUTCOMES AFTER 2 YEARS FOLLOW UP
Sara Lenherr, MD, John Bresette, MD, Arthur Mourtzinos, MD and John Stoffel, MD
Lahey Clinic Department of Urology, Burlington, MA
(Presented by: Sara Lenherr)

Introduction: Although infrequently used in contemporary pubovaginal sling procedures, many women in the past 10 years were treated with human cadaveric dermal allograft (CDA) slings for symptomatic stress urinary incontinence (SUI). Initial outcomes for this material appeared favorable, but there is little information regarding efficacy after extended follow up. Our objective was to assess outcomes for women treated at our institution with CDA slings and identify risk factors for failure.

Methods: Between 1998 and 2003, 257 women with SUI were treated with CDA transvaginal bone anchor slings at our institution. Patients with a minimum of 12 months follow-up, or evidence of procedural failure, were analyzed. Outcomes were assessed by comparing pre and post operative Urogenital Distress Inventory (UDI), Incontinence Impact Questionnaire (IIQ) scores and pad per day (ppd) usage. For this retrospective analysis, procedural failure was defined as any patient using >1 ppd at follow up or requiring another procedure for incontinence.

Results: Of the 257 total patients, 142 (55%) met inclusion criteria and mean follow up for this group was 28 months. By study definition 34 patients (24%) were considered procedural failures. Of these, 20 received a second sling procedure (n=11) or suburethral injection (n=9) for recurrent symptoms at a mean of 20.5 months after initial CDA sling. Patients with failed sling procedures had higher post mean operative ppd usage (2.3 ppd vs 0.3, p <0.0001) and significantly higher mean post operative UDI (6.8 vs 4.2, p=0.0099) and IIQ (6.8 vs 3.2, p=0.0018) scores. Compared to successful sling patients, failed sling patients had significantly lower pre operative Valsalva leak point pressures (54 vs 75.5 cmH20, p=0.005) and higher preoperative pad per day usage (3.7 vs 2.6 ppd, p=0.003) but had otherwise similar age, parity, prevalence of previous incontinence/prolapse surgery, preoperative UDI & IIQ scores and operative data. Ten patients in the entire cohort (7%) experienced a significant intra or post operative complication, including bladder/vaginal injury (n=5), infection (n=3) and perioperative anesthesia complications (n=2).

Conclusions: CDA transvaginal sling for SUI has a relatively high reoperative rate for patients followed for more than 1 year but an overall low incidence of complications. Patients who failed had a low pre operative VLPP and higher ppd usage but were otherwise demographically similar to those remaining dry.

Poster #NM13
LONG TERM FOLLOW-UP DATA ON THE MINIARC™ SINGLE INCISION SLING SYSTEM FOR THE TREATMENT OF STRESS URINARY INCONTINENCE
Ryan Pickens, MD¹, Adam Stewart, MD², Wesley White, MD³, Joe Mobley, MD, MPH² and Frederick Klein, MD
UTMCK, Knoxville, TN
(Presented by: Ryan Pickens)

Introduction and Objectives: There is a paucity of data with respect to long-term follow-up data for single incision slings for the treatment of stress urinary incontinence (SUI). We present longitudinal surgical and quality of life outcomes in an observational cohort of patients that underwent treatment of their SUI with the MiniArc™ Single Incision Sling System.

Methods: A prospective analysis of patients with stress urinary incontinence who underwent surgical intervention with the MiniArc™ Single Incision Sling System was performed. Patients were sent an envelope and asked to fill out and return: a quality of life questionnaire, a female sexual function index (FSFI), an IIQ–7 form, and an UDI–6 form. We compared our first month follow-up IIQ–7 and UDI–6 scores to those who returned them after being at least two years out from having the procedure performed. We used our quality of life questionnaire to determine how many patients would now be considered treatment failures at two years.
Results: From September 2007 to August 2008, a total of 120 patients underwent placement of the MiniArc™ Single Incision Sling System at our institution for stress urinary incontinence. 105 patients (88%) completed follow-up. Mean patient age was 58.4 (range 26−87). Forty−two (35%) patients had concomitant urge incontinence pre−operatively. Mean Body Mass Index (BMI) of our patients was 27.2. Preoperative pad usage was 2.40 per day per patient. Mean IIQ−7 and UDI−6 scores pre−op were 2.6 and 2.5 respectively. At a mean follow−up of 24 months, 98 of the 105 responders (90%) denied having any symptoms of SUI, 8% reported occasional leakage and 2% reported full return of symptoms of SUI. Average pads per day were 0.2 (p<0.005). Average IIQ−7 and UDI−6 scores were 0.3 (p<0.005) and 0.3 (p<0.005) respectively at two years. Twenty (19%) patients reported urge incontinence on a daily basis, five of which was de novo urgency. Average quality of life scores went from 4.2 pre−operatively to 9.1 at two year follow−up. Based on FSFI results, 50% of our patients never have discomfort with intercourse, 4% sometimes have discomfort, and 2% always have discomfort. Forty−four percent of our patients are currently sexually inactive.

Conclusions: Based on our experience, treatment outcomes with the MiniArc™ Single Incision Sling System are durable with long term follow−up. Quality of life is significantly improved with minimal impact on sexual function.

Poster #NM14
IS "OAB-DRY" REALLY DRY?
Jennifer Anger, MD¹, Lisa Rogo-Gupta, MD², A. Behniwal³, R. Rashid¹, A. Nissim², T. Le³, Ariana Smith, MD², Mark Litwin, MD³, Sally Malitski² and Larissa Rodriguez, MD²
¹UCLA, Los Angeles, CA; Cedars-Sinai Medical Center Los Angeles, CA; ²UCLA Los Angeles, CA
(Presented by: Lisa Rogo-Gupta)

Introduction: Overactive bladder (OAB) is defined by the International Continence Society as urinary urgency with or without urge urinary incontinence, usually with frequency and nocturia. Community−based surveys have identified a predominance of OAB−dry (70%). We conducted patient focus groups and expert interviews to better understand perspectives on differences in symptoms between OAB−wet and OAB−dry.

Methods: After IRB approval was obtained, patients in Female and General Urology clinics were identified by ICD−9 codes for OAB symptoms and recruited. Patients with pelvic pain/IC, mixed stress and urge incontinence, prolapse, or recent pelvic surgery were excluded. Medical records were reviewed to assure that patients in the OAB−dry groups had no history of urge incontinence. Five focus groups totaling 33 patients (3 OAB−wet and 2 OAB−dry groups) were conducted. Non−clinician moderators conducted the focus groups incorporating topics related to patients’ perceptions of OAB symptoms, treatments, and outcomes. Twelve expert interviews were conducted in which they were asked to describe their views on OAB−wet and OAB−dry. Qualitative data analysis was performed on verbatim transcriptions using grounded theory methodology as described by Charmaz.

Results: Extensive chart review was performed. Difficulty was encountered identifying pure OAB−dry patients. Women with OAB−dry shared the knowledge that they will leak if no toilet is available based on a history of past leakage episodes. Most women with OAB−dry wore light protective pads. Those few patients with no history of leakage had a clinical picture more consistent with bladder hypersensitivity/IC than OAB. Physician expert interviews revealed the belief that OAB−dry may be an early, milder form of OAB−wet.

Conclusions: Our findings from patient focus groups and expert interviews shed light on problems with defining OAB. Questionnaires may identify anyone with polyuria, bladder hypersensitivity, and even OAB−wet with rare leakage episodes as OAB−dry. Qualitative data from focus groups and expert interviews suggests that women with OAB−dry may not, in fact, be truly dry. Rather, a spectrum exists between very mild OAB−wet to more severe OAB−wet.
POSTER #NM15
PRE-OPERATIVE EVALUATION OF PATIENTS WITH SYMPTOMS OF OBSTRUCTION UNDERGOING SLING EXCISION – RETROPUBIC MESH SLINGS ARE MORE OBSTRUCTIVE THAN TRANSOBTURATOR SLINGS
Benjamin Dillon, MD, Sunshine Murray, MD, Rashel Haverkorn, MD, Philippe Zimmern, MD and Gary Lemack, MD
UT Southwestern Medical Center, Dallas, TX
(Presented by: Benjamin Dillon)

Introduction: Stress incontinence (SUI) is treated surgically by sling, often with mesh (midurethral sling– MUS). A feared complication of MUS is urethral obstruction and incomplete emptying/retention (UR) which may require sling removal or urethrolysis. We review pre-operative symptoms/evaluations in patients having MUS excision for UR.

Materials and Methods: Following IRB approval, data were derived from patients who had MUS removal from 1996–2010 for urinary obstruction by symptoms with a minimum of 6 month follow-up. Demographics, clinical information (symptoms – urgency/urge incontinence UUI, weak stream/hesitancy– LUTS, incomplete emptying– IE), surgical history) and UD results (detrusor pressure at max flow– pdetQmax, max flow– Qmax, post–void residual– PVR) were recorded and analyzed for correlations between sling technique (retropubic– RP, obturator– OB).

Results: 92 females had MUS removal; excluded were 20 with concomitant incontinence procedure, 6 with removal for pain/extrusion, 12 with less than 6 months follow-up. 54 remained for review. Mean age was 61 years with chief complaints of new onset or worsening: UUI (55.6%), recurrent UTI (20.3%), LUTS (48.1%), IE (29.6%). 30 (55.5%) had prior RP MUS, 17 (31.5%) OB MUS, and 7 (13.0%) with unknown type of MUS. Visual confirmation of urethral distortion was noted by voiding cystogram (57.4% with urethral kinking) or cysto (70.3% with urethral indentation). No significant difference was noted in demographics or presenting symptoms between RP and OB groups (age: 60v63, p=.319; UUI: 53.3%v47.1%, p=.766; UTI 26.7%v7.0%, p=.127; 43.3%v52.9%, p=.588; 33.3%/v23.5%, p=.529). However, the RP group was more obstructed than the OB group on UD with higher pdetQmax (35.7v14.1, p=.000), lower Qmax (10.9v13.2, p=.528), and higher PVR (112.0v42.7, p=.026). There was overall improvement in PVR after surgery (83.7v26.9, p=0.04) in all patients.

Conclusions: Though similar in clinical presentation, patients with voiding dysfunction after undergoing RP MUS appear to have more significant changes in UD parameters than those with OB MUS. This reinforces the generally perceived notion that the retropubic slings are more obstructive than mid–urethral slings placed via the transobturator technique. However, regardless of technique, sling excision is effective in promoting improved bladder emptying.

Poster #NM16
DOES PAD USAGE REFLECT THE SEVERITY OF URINARY INCONTINENCE?
Mazyar Ghanaat, BS¹, Johnson Tsui, BS¹, Jerry Blaivas, MD¹,²,³, Milan Shah, BA¹,², Jeffrey Weiss, MD¹,², Rajveer Purohit, MD¹,²,³ and Matthew Rutman, MD⁴,⁵
¹SUNY Downstate College of Medicine, Brooklyn, NY; ²Institute for Bladder and Prostate Research, New York, NY; ³Weill Cornell Medical College, New York, NY; ⁴Columbia University Medical Center, New York, NY; ⁵Institute for Bladder and Prostate Research, New York, NY
(Presented by: Mazyar Ghanaat)

Hypothesis/Aims of Study: It is widely assumed that there is a correlation between the number of pads used and the severity of urinary incontinence. Based on this assumption, many authors utilize a pad count to quantify urine loss and/or assess treatment outcome. As far as we know, this correlation has not been studied before and we wanted to find out if one exists.

Study Design, Materials, and Methods: This is a retrospective study of consecutive incontinent patients who wore pads on a daily basis. All were instructed to complete a 24–H pad test. They were told to use their usual pads, change them as they usually do and place each in a separate plastic bag the day before their scheduled appointment. All pads were weighed and total urine loss was calculated by subtracting the dry pad weight from the wet pad weight assuming that 1 gram of weight increase is equivalent to 1 mL of urine loss. Spearman’s rank correlation coefficient was utilized because of the non–parametric nature of the data.

Results: There were 116 patients comprised of 51 men (age range 39–89, mean 66) and 65 women (age range 27–95, mean 72). The Spearman’s rho comparing the number of pads used to grams of urine loss was 0.26. (p=0.005) Results are summarized in the Table. Conclusion: There was, at best, a weak correlation between number of pads used and severity of urinary incontinence (r = 0.26). These data suggest that pad counts should not be used as an objective measure of incontinence severity.
Poster #NM17
ARE THE NEWER SINGLE INCISION SLINGS ARE AS EFFECTIVE AS THE RETROPUBIC MIDURETHRAL SLINGS FOR FEMALE STRESS URINARY INCONTINENCE?
Amit Chakrabarty, MD
Urologic Clinics of North Alabama, Huntsville, AL
(Presented by: Amit Chakrabarty)

Introduction and Objectives: Mid urethral sling (MUS) is the preferred minimally invasive option for surgical treatment of female stress urinary incontinence (SUI). Among the various minimally invasive procedures for treatment of female stress urinary incontinence, single incision slings (SIS) offer less invasiveness with presumed less morbidity. This retrospective study was designed to assess if the single incision slings are equally effective as the retropubic (RP) midurethral slings.

Methods: A cohort of 159 patients with a mean age of 57.89 years, who underwent placement of a midurethral sling between March, 2008 and December, 2009 by a single surgeon, was reviewed retrospectively. Pre-operatively, all patients filled out a incontinence questionnaire, underwent a physical exam, cough test and a complete urodynamic study. Postoperatively the patients filled out questionnaire regarding their subjective continence status and satisfaction rates. All patients had a post operative physical exam and cough test. Subjective cure rate was defined as no use of pads and objective cure rate was negative cough test and/or negative leak on post-operative urodynamics.

Results Obtained: Total 92 women had undergone SIS (MINIARC), 61 RP (SPARC 36, BIOARC 15, LYNX 8, REPLIFORM 2) and six Transobturator Slings (MONARC). The latter group was excluded from analysis due to small number of cases. Mean leak–point pressures were similar between groups (65.5±31.8cmH2O vs. 66.8±40.9cmH2O; p>0.05); however, urethral closure pressures were significantly lower in RP group (48.2±33.6cmH2O vs. 61.5±33.7cmH2O; p=0.018 t-test). Overall 72% patients underwent additional pelvic floor repair at the time of MUS (74.1% SP & 68.5% SIS; p>0.05). Mean follow up was 22.4±24.5 weeks (median 12; maximum 120 weeks). Objective success rates (98.9% vs. 93.6%; p=0.09) and subjective satisfaction rates (95.6±6.5 vs. 94.1±18.3; p>0.05) were similar between groups. Transient urinary retention was seen in 11 patients all in the RP group. There was no significant association between success rate and measures of intrinsic sphincter deficiency (leak point pressure <60cmH2O and urethral closure pressure <20cmH2O) in either groups.

Conclusion: Success rates of SIS are comparable to RP midurethral sling in the short term. Success rate is not adversely affected by urodynamic evidence of intrinsic sphincter deficiency. Longer follow up studies might be helpful to assess its long term efficacy.

Poster #NM18
CARDIOVASCULAR RISK FACTORS AND DISEASE IN WOMEN WITH OVERACTIVE BLADDER VS STRESS INCONTINENCE CONTROLS
W. Stuart Reynolds, MD, Michelle Koski, MD, Ekene Enemchukwu, MD, MPH, Melissa Kaufman, MD, PhD and Roger Dmochowski, MD
Vanderbilt University Medical Center, Nashville, TN
(Presented by: W. Stuart Reynolds)

Objectives: To investigate associations between overactive bladder (OAB) and cardiovascular disease (CVD), the prevalence of CVD co–morbidities were determined in women with OAB and compared to women with stress urinary incontinence (SUI).

Methods: A retrospective review of women with pure OAB or SUI was performed analyzing CVD co–morbidities and urinary symptoms. CVD Manifestations included coronary artery disease (CAD), cerebrovascular disease (CVA), and peripheral vascular disease (PVD), while risk factors included age≥65, family history of CAD, smoking, hypertension (HTN), diabetes (DM), dyslipidemia (DysL), and body mass index (BMI)≥30. Metabolic syndrome was defined as any 3 of preceding 4 risk factors.

Results: 124 OAB and 100 SUI patients were included, with mean ages 50.6 (range 18–85) and 50.6 (range 26–78), respectively. CVD manifestations were identified in 16 (13%) OAB and 7 (7%) SUI patients (p=0.15). CVA was more common in OAB patients (8% vs. 1%, p=0.013). Of risk factors, age≥65 and family history of CAD were more prevalent in OAB patients, while DM, DysL, HTN and smoking were more common in SUI patients, however not statistically different. Significantly more SUI patients had a BMI≥30 (50% vs. 25% OAB, p=0.008) and metabolic syndrome (17% vs. 6% OAB, p=0.008).

Conclusions: CVD manifestations are more prevalent in OAB patients, particular CVA, while CVD risk factors are more common in SUI patients, including metabolic syndrome and obesity. Differences in CVD and risk factors appear to exist between OAB and SUI patients, however greater numbers of patients are needed to substantiate these findings.
DEPRESSION IN WOMEN WITH DETRUSOR OVERACTIVITY AND URODYNAMIC STRESS INCONTINENCE

Cynelle Murray, MD¹, Shazia Malik, MD², Vanessa Sun, MD³, Christina Danz, MD³ and Begum Ozel, MD⁴
¹LAC-USC Medical Center, Los Angeles, CA; ²Keck School of Medicine, University of Southern California, Los Angeles, CA
(Presented by: Cynelle Murray)

Introduction: Women with urinary incontinence (UI) are at high risk for depression. Women with symptoms of overactive bladder or urgency incontinence may be at higher risk compared to women with only stress incontinence symptoms. However, there is limited data on depressive symptoms in women with urodynamic diagnoses of detrusor overactivity (DO) and urodynamic stress incontinence (USI).

Objective: To compare depressive symptoms in women with DO and women with USI.

Methods: Women who had symptoms of UI were prospectively recruited from the Urogynecology clinic at LAC–USC Medical Center. Participants were administered the patient health questionnaire (PHQ–9), a validated depression questionnaire, and urodynamics were performed. Statistical analysis was performed using the two−sided Student’s t test, the Mantel–Haenszel Chi−square test, and Pearson’s correlation as appropriate. Institutional review board approval was obtained.

Results: Thirty women with DO and 161 women with USI were included. There was no statistically significant difference between women with DO and women with USI in age [49.6 (6.9) vs. 49.4 (7.8) years, p=0.91], parity [3.7 (1.9) vs. 3.3 (1.7); p=0.32], Latina ethnicity [28 (93.3%) vs. 152 (94.4%); p=0.82], or presence of medical co−morbidities [21 (70.0%) vs. 107 (66.5%); p=0.82]. Women with DO were found to have higher scores on the PHQ–9 compared to women with USI [12.5 (7.4) vs. 9.4 (6.5); p=0.041]; however, there was no difference in the percentage of women who met criteria for major depression as assessed by the PHQ–9 between women with DO and those with USI [10 (33.3%) vs. 32 (19.9%); p=0.10]. There was a statistically significant but weak inverse correlation between PHQ–9 score and volume at first desire to void (r=−0.3; p<0.001) as well as maximum bladder capacity (r=−0.2; p=0.0055).

Conclusions: Women with an urodynamic diagnosis of DO have higher scores on the PHQ–9 indicating greater depressive symptoms; however, there was no statistically significant difference in the number of women who met criteria for major depression as assessed by the PHQ–9 between women with DO and those with USI. PHQ–9 scores inversely correlate with volume at first urgency and maximum bladder capacity.

FLUID INTAKE AND RISK OF STRESS, URGENCY, AND MIXED URINARY INCONTINENCE

Ying Jura, MD¹, Mary Townsend, ScD², Gary Curhan, MD³, Neil Resnick, MD⁴ and Francine Grodstein, ScD³
¹Massachusetts General Hospital, Boston, MA; ²Harvard School of Public Health, Boston, MA; ³Brigham and Women’s Hospital, Boston, MA; ⁴School of Medicine, University of Pittsburgh, Pittsburgh, PA
(Presented by: Ying Jura)

Introduction and Objectives: Many women with urinary incontinence restrict their fluid intake in an effort to manage their urinary symptoms. Additionally, women without incontinence might limit their fluid intake hoping to prevent incontinence, despite the lack of evidence regarding fluid consumption and incontinence onset. Because low fluid intake is associated with increased risks of several chronic diseases, more studies are needed to characterize the relation between fluid intake and development of urinary incontinence. We prospectively investigated the relation between total fluid intake and incident urinary incontinence in the Nurses’ Health Study cohorts.

Methods: We calculated daily fluid intake using data reported on validated food frequency questionnaires among 65,167 women, aged 37−79 years, without urinary incontinence at study baseline. Women reported incident incontinence on questionnaires during 4 years of subsequent follow−up (2000–2004 in the Nurses’ Health Study and 2001–2005 in Nurses’ Health Study II). Multivariable−adjusted hazard ratios and 95% confidence intervals were calculated using Cox proportional hazards models, controlling for potential confounding factors including age, cohort, body mass index, parity, cigarette smoking, race, physical activity, and caffeine intake.

Results: We found no association between total fluid intake and risk of incident incontinence (multivariable−adjusted HR 1.04, 95% CI 0.98−1.10 comparing the top to the bottom quintile of fluid intake). In analyses of incontinence type, total fluid intake was not associated with risks of incident stress, urgency, or mixed incontinence (HR 0.91, 95% CI 0.77 − 1.06 for stress; HR 1.13, 95% CI 0.88 − 1.44 for urge; and HR 1.12, 95% CI 0.89 − 1.42 for mixed incontinence comparing the top to the bottom quintile of fluid intake). We also found no associations between specific beverages (e.g. milk, juice, soda etc.) and incontinence risk.

Conclusions: No significant risk of incident urinary incontinence was found with higher fluid intake in women. These findings suggest that women should not restrict their fluid intake to prevent incontinence development.
DISPARATE TERMINOLOGY USED BETWEEN HEALTHCARE WORKERS AND SPANISH-SPEAKING LATINAS WITH PELVIC FLOOR DISORDERS: LOST IN TRANSLATION?
Claudia Sevilla ¹, Aqsa Khan MD¹, Rezoana Rashid ¹, Cecilia Wieslander MD², Sally Maliski RN, MPH³, Rebecca Rogers MD⁴ and Jennifer Anger MD, MPH⁴

¹UCLA Dept of Urology, Los Angeles, CA; ²UCLA Dept of OB/GYN, Los Angeles, CA; ³UCLA School of Nursing, Los Angeles, California; ⁴University of New Mexico, Alburquerque, NM; ⁵Cedars-Sinai Medical Center and UCLA Dept of Urology, Los Angeles, CA

(Presented by: Claudia Sevilla)

Objective: To evaluate differences in urologic terms used by healthcare workers, interpreters, and Spanish-speaking Latinas with pelvic floor disorders (PFDs).

Methods: Healthcare workers in urology clinics and licensed interpreters were recruited from different hospitals in the greater Los Angeles area. Interviews were conducted and subjects were asked to interpret female urologic terms involving pelvic anatomy, disease processes, symptoms, and treatments. Healthcare workers and physicians were then asked to give examples of words that Spanish-speaking patients would use to describe a specific urologic term. The terms used by healthcare workers and patients were compared to Spanish medical textbooks and analyzed.

Results: Seven healthcare workers and three interpreters were recruited and enrolled in this study. After interviewing healthcare workers and interpreters it became evident that Spanish-speaking patients have poor understanding of common urologic terms, but are able to navigate through interactions with medical personnel by describing their symptoms instead of naming the actual diagnosis. In addition, patient lack of understanding of PFDs was further complicated by the lack of Spanish translations for many urologic terms. Although there are direct translations in the medical dictionary for common urologic terms, it became apparent through our interviews that many healthcare workers and interpreters were unable to interpret these words. As a result, the direct interpretation of the word is commonly omitted during patient interactions and a description of the urologic term is used in its place.

Conclusion: Our findings demonstrate that Spanish-speaking patients and interpreters alike have a poor grasp of urologic terminology and, as a result, do not understand PFDs. In addition, the lack of directly-translated urologic terms by healthcare workers and translators creates barriers in communication for Spanish-speaking patients. Further studies are needed to determine how to improve communication with Spanish-speaking women with pelvic floor disorders.
Funding: Funded by a Career Development Award from NIDDK (1 K23 DK080227–01, JTA) and an American Recovery and Reinvestment Act (ARRA) Supplement

<table>
<thead>
<tr>
<th>English Urology Term</th>
<th>Medical Spanish Textbook Translation</th>
<th>Translation by Spanish-speaking Healthcare Worker and/or Translator</th>
<th>Translation by Patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress incontinence</td>
<td>Incontinencia urinaria de esfuerzo</td>
<td>Incontinencia urinaria (urinary incontinence)</td>
<td>“Se me sale la orina cuando estomudo.” (My urine leaks when I sneeze.)</td>
</tr>
<tr>
<td>Urogenital incontinence</td>
<td>Incontinencia urinaria de urgencia</td>
<td>Incontinencia urinaria (urinary incontinence)</td>
<td>“Se me sale la orina de repente.” (My urine leaks suddenly.)</td>
</tr>
<tr>
<td>Pelvic organ prolapse</td>
<td>Prolapso de órganos pélvicos</td>
<td>Prolapso Pélvico (pelvic prolapse)</td>
<td>“Tengo una bola allá abajo.” (I have a ball down there.)</td>
</tr>
</tbody>
</table>

POSTER #NM23
LOWER URINARY TRACT SYMPTOM PROGRESSION IN WOMEN WITH MULTIPLE SCLEROSIS IS NOT INEVITABLE REGARDLESS OF SEVERITY OF NEUROLOGICAL DISEASE
Benjamin Dillon MD¹, Rashel Haverkorn MD², Sunshine Murray MD², Elliot Frohman MD², Philippe Zimmern MD² and Gary Lemack MD²
¹UT Southwestern Medical Center; ²UT Southwestern Medical Center, Dallas, TX
(Presented by: Benjamin Dillon)

Introduction and Objectives: Lower urinary tract symptoms (LUTS) are common in patients with Multiple Sclerosis (MS). To better understand the factors that predict progression of LUTS in women with MS, this study investigated the demographic predictors of LUTS progression in these patients.

Methods: In this IRB approved study, we reviewed our longitudinally collected MS database (2000–Present) of patients with LUTS for MS classification, age at Urodynamics and Expanded Disability Status Scale (EDSS), (0–10). Urogenital Distress Inventory Short Form (UDI–6) (0–18) was used to assess LUTS.

Results: A total of 359 patients with MS were seen from 01/2000 through 08/2010. Baseline UDI–6 score was obtained in 122 subjects, mean total UDI–6 was 8.3±4.2. Of the 122 patients, forty eight patients met inclusion criteria of having more than one UDI–6 score, separated by a minimum of 4 months, average of 26.3 months (4–123), median of 15 months. A significant drop in UDI–6 total from 9.3±4.1, to 7.5±4.8 (p= 0.02) was noted. Classification of MS was available for 39 patients. In total 24 patients had Relapse Remitting MS (RRMS) and 15 had Secondary Progressive MS or Primary Progressive MS, (PMS). UDI–6 decreased from 9.7±4.2, to 6.8±4.7 (p=0.03), in the RRMS group and from 10.8±3.3 to 7.5±5.9 (p=0.03) in the PMS group. Twelve patients had less severe MS (EDSS score <6), and 19 patients had scores > 6. Patients with milder MS had a significant reduction in UDI–6 score, 9.8±4.1 vs 5.8±3.8 (p=0.006), while those with more severe MS went from 10.1±4.0 to 7.9±5.0 (p=0.08). Duration of MS and age at UDS was not associated with a significant change in symptom score.

Conclusion: Progression of LUTS in the MS population is not inevitable. With appropriate intervention, overall symptoms can be improved, regardless of, disease duration or age. Furthermore, LUTS can be improved in patients with milder MS, and stabilized in those with more severe disease.

Poster #NM24
WITHDRAWN
**Poster #NM25**

**PATIENT SATISFACTION AFTER INTRAVESICAL BOTULINUM TOXIN TYPE A INJECTION FOR REFRACTORY DETRUSOR OVERACTIVITY**

Hala Imam, MD, PhD
Gastroenterology Unit, Internal Medicine Department, Assiut University Hospital, Assiut, Egypt

(Presented by: Hala Imam)

**Introduction and Objectives:** Few studies have attempted to examine Botox (BTX) therapy from the patients’ point of view. The aim of this study was to assess satisfaction of subjects with refractory overactive bladder (OAB) after BTX–A therapy. The secondary aim was to assess the subjective and objective therapeutic outcomes after BTX therapy.

**Methods:** The study included subjects with OAB symptoms > 6 months with urodynamic diagnosis of DOA and who failed anticholinergics and CIC whether etiology was neurogenic (NDOA) or idiopathic (IDOA). Subjects completed UDI−6, urinalysis, urodynamics and postvoid residual urine. Before therapy, all subjects had incontinence. Subjects with NDOA were injected with 300 U Botox while IDOA subjects were given 200. Subjects were followed 6 weeks, and 3, 6, 9, 12 months after injection. Satisfaction with BTX–A treatment was assessed using Surgical Satisfaction Questionnaire (SSQ). Primary outcome measure was subject satisfaction that was assessed using SSQ. Secondary outcome measures were subjective improvement as determined by the changes in the UDI−6 and urodynamic parameters after treatment.

**Results:** 31 subjects (mean age 27.9) were treated, 21 with NDOA and 10 with IDOA. 6 weeks after injection, 30% of IDOA subjects (n=3) and 33.3% of NDOA (n=7) were completely dry, while 5 IDOA subjects and 10 NDOA were improved. One case (12.5%) with IDO and 4 cases (50%) with NDOA required de novo CIC after injection. Including only patients who had good response after BTX injection (total n=25; NDOA=17 and IDOA=8), 8 patients out of the 25 improved subjects (32%) were not satisfied with BTX therapy, while 28% (n=7) of patients would not recommend BTX therapy for others. Documented reasons for being unsatisfied with BTX therapy were the need to be injected with BTX on regular basis every 6–9 months, the need to perform CISC after injection, and high cost of the drug.

**Conclusions:** BTX therapy had beneficial effects in refractory neurogenic and idiopathic DOA as early of 6 weeks post−treatment. Therapeutic benefits of BTX declined gradually with symptom returning to baseline values by 6 months. About 32% of patients with DOA were not satisfied with BTX therapy despite having good response after injection. Reasons were the need to inject BTX on regular basis, higher expectations about the therapeutic effects of BTX, the need to perform CISC after injection, and the high cost of BTX.

---

**Poster #NM26**

**MINIARC SINGLE-INCISION SLING FOR STRESS URINARY INCONTINENCE**

Sneha Vaish, MD¹, Jannah Thompson, MD² and Suzette Sutherland, MD³
¹Metro Urology; ²Grand Rapids, MI; ³Plymouth, MN

(Presented by: Sneha Vaish)

**Introduction and Objectives:** MiniArc single-incision sling, is a minimally invasive treatment for stress urinary incontinence (SUI) due to urethral hypermobility(UHM). Our study examines sling efficacy for SUI and impact on sexual function.

**Methods:** A registry of MiniArc slings performed by a single surgeon from Feb 2008−2010 was reviewed. Patients were evaluated at baseline, postoperatively at 3−5 days, 2 weeks, 3, 6, & 12 months. F/U included physical exam, direct vision stress test (DVST), catheterized postvoid residual (PVR) & urinalysis(UA)/urine culture(UCx) if indicated. Patients completed validated questionnaires: Urinary Distress Inventory (UDI−6), Incontinence Impact Questionnaire (IIQ−7), Female Sexual function Inventory (FSFI), Sexual Distress Scale (SDS), Prolapse-Incontinence-Sexual Questionnaire (PISQ−12), & Quality of life(QOL).

**Results:** A total of 367 slings were performed. Mean age was 53 years (26−). All patients were outpatient except with concurrent prolapse, 71 cases. Median surgery time was 10 minutes and EBL was <10 cc. 9 UCx culture proven UTIs at 2 weeks. Mean PVR was 23 cc (gtt−cc). Sling revision due obstruction were seen in 10(2.7%)—slings were loosened, 3 cut, and 1 removed/replaced with TOT. 361 patients were seen in f/u at 2 weeks, 261 at 3 months, 175 at 6 months, and 85 at 12 month. Cure rates were 96% at 3 months (251/261), 91% at 6 months (160/175) and 91% at 12 months (77/85). De novo urge incontinence was seen in 1.5% of patients. At baseline, 206 complained of overactive bladder/urge incontinence and 97 took anti−cholinergic medications. Postoperatively, at 3 months 47 patients continued with medication, at 6 months 30 patients continued with medication, & at 12 months 10 patients continued on medication. Significant improvements were seen on pre and post UDI−6, IIQ and QOL of questionnaires (p < 0.05). No mesh related extrusion/erosion/infecteds were seen. No reports of dyspareunia related to the sling were reported. No significant differences were noted on FSFI (totals or domain specific subtotals) or SDS(p < 0.05). Significant improvement in total PISQ−12 was noted due to improvements in incontinence and prolapse domains (p<0.05).

**Conclusion:** The MiniArc single-incision sling is an excellent treatment (subjectively and objectively) for SUI due to UHM. It is not associated with dyspareunia or impediments to sexual function. Results appear to be durable. Our registry continues to assess longer term (2 year) outcomes.
**Poster #NM27**  
**PATIENT-REPORTED SURGERY OUTCOMES FOR STRESS URINARY INCONTINENCE DIFFER DEPENDENT ON QUESTIONNAIRE**  
Jason Kim, MD, Alvaro Lucioni, MD, Gjanje Smith, MD, Fred Govier, MD and Kathleen Kobashi, MD  
Virginia Mason Medical Center, Seattle, WA  
(Presented by: Jason Kim)

**Introduction:** The assessment of outcomes following medical or surgical treatment of incontinence remains difficult. The purpose of this study is to demonstrate the variability in patient-reported outcomes of stress urinary incontinence (SUI) procedures from mailed post-operative questionnaires.

**Methods:** We examined the results of patient-reported outcomes following anti-incontinence surgery at our institution. Post-operative questionnaires, including the Urogenital Distress Inventory—Short Form (UDI–6) and the Incontinence Questionnaire (IQ), were mailed to all patients at approximately yearly intervals to assess outcomes. Both questionnaires are validated and had specific items assessing SUI (table 1). We compared the results of these similarly worded questions to determine the variability of the results between the 2 questionnaires.

**Results:** We identified 563 patients who had anti-incontinence procedures with at least 12 month follow-up. 519 of 563 patients (92.2%) answered the SUI items described above using both instruments. Average follow-up was 44.2 months. There was a significant difference in the percentage of patients who reported no SUI following sling surgery using the UDI–6 vs. the IQ (43.6% (224/519) and 31.6% (164/519), respectively, χ²<0.00001). Of the 164 patients who reported “never” leaking with coughing, sneezing or physical activity using the IQ, 98.8% answered “not at all” on question 3 of the UDI–6. Conversely, of the 224 patients who reported “not at all” on UDI–6, only 72.3% answered that they “never” leaked on the IQ.

**Conclusion:** Even subtle differences in questions attempting to assess degree of patient-reported SUI following sling surgery have tremendous variability. The results of this study strengthen the argument for the need of standardization of outcomes instruments.

<table>
<thead>
<tr>
<th>Question 1</th>
<th>UDI–6 Question 3: Do you experience, and if so, how much are you bothered by urinary leakage related to physical activity, coughing, or sneezing?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not at all</td>
</tr>
<tr>
<td>2</td>
<td>Slightly</td>
</tr>
<tr>
<td>3</td>
<td>Moderately</td>
</tr>
<tr>
<td>4</td>
<td>Greatly</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 2</th>
<th>Incontinence Questionnaire Question 2: Do you leak when you cough, sneeze, or perform physical activities?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Never</td>
</tr>
<tr>
<td>2</td>
<td>Rarely (less than once per week)</td>
</tr>
<tr>
<td>3</td>
<td>Often (once a day)</td>
</tr>
<tr>
<td>4</td>
<td>Always</td>
</tr>
<tr>
<td>5</td>
<td>Not Sure</td>
</tr>
</tbody>
</table>

**Poster #NM28**  
**CYSTOCELE REPAIR WITH NON-FROZEN CADAVERIC FASCIA LATA: LONG-TERM RESULTS**  
Maggie Vuturo, MD, Alexis Chesrow, MD and Gary Leach, MD  
Tower Urology, Los Angeles, CA  
(Presented by: Maggie Vuturo)

**Introduction:** Since our initial description of prolapse repair with sling (CaPS) utilizing solvent dehydrated non-frozen cadaveric fascia lata in 2000, we have continued to perform cystocele repair utilizing the same technique. Our long-term data suggests that utilizing cadaveric fascia provides results with a high patient satisfaction and a low recurrence rate.

**Objective:** Our objective is to present the updated and long-term data for the repair of cystocele with non-frozen cadaveric fascia lata.

**Methods:** A retrospective review of 336 patients who underwent cystocele repair with non-frozen cadaveric fascia lata between 1995–2008 was performed. The outcomes measured included pelvic examination for prolapse recurrence and complications, a validated subjective continence and patient satisfaction questionnaire, and a quality of life score. SEAPI scores were obtained pre-and post-operatively. Failure was defined as recurrence of cystocele grade 3 or higher using the Baden-Walker system or re-operation for prolapse. The Kaplan-Meier method was used to generate a time to failure curve.
Results: The average follow-up period was 3.5 years (range 12 – 130 months) with 87 of 336 (26%) patients having at least five-year follow-up. 279 of 336 (81%) patients underwent additional prolapse surgery at the time of cystocele repair. Prolapse failure rate in patients with more than 5-year follow-up was 54/336 (16%). Mean time to failure was 37 months. 35/54 (65%) required re-operation for prolapse. Of the women who were sexually active, less than 5% reported discomfort with intercourse and less than 10% reported issues with pelvic pain. Durable and statistically significant percent improvement was observed in total SEAPI score as well as each individual component. The mean SEAPI score improved 65% (p<0.001); pre-operative SEAPI score was 6.82 and post-operative score decreased to 2.35. Self-reported patient satisfaction on a visual analogue scale was high as well.

Conclusions: With a maximum follow-up of more than 10 years and an average follow-up of over three years, patients undergoing cystocele repair with non-frozen cadaveric fascia lata have excellent and durable results. There is a low recurrence rate and high patient satisfaction with no significant morbidity.

Poster #NM29
INITIAL EXPERIENCE WITH ELEVATE REPAIR SYSTEM FOR PELVIC ORGAN PROLAPSE
Corey Johnson, MD¹, Ashley King, MD¹, Adam Klausner, MD³ and David Rapp, MD¹²
¹Virginia Commonwealth University School of Medicine, Richmond, VA; ²Virginia Urology Center for Incontinence and Pelvic Floor Reconstruction, Richmond, VA
(Presented by: Corey Johnson)

Introduction: The ElevateTM prolapse repair system comprises a polypropylene mesh anchored through sacrospinous ligament and obturator fascia fixation points. We present our initial experience, focusing on safety, feasibility, and early subjective/anatomic outcomes.

Methods: Twenty-seven women underwent repair of anterior/apical compartment prolapse using the Elevate system, with 20 undergoing concurrent mid-urethral sling placement. Baseline anterior/apical POP-Q staging comprised stage II(n=10), III(n=15), and IV(n=2) anterior, and stages I(n=6), II(n=14), and III(n=7) apical defects. Anatomic outcomes were assessed using POP−Q staging. Subjective outcomes were assessed using the International Consultation on Incontinence Questionnaire Symptoms (ICIQ−VS) and the Incontinence Impact Questionnaire (IIQ−7). Additional focus was placed on operative characteristics and complications.

Results: Patient age was 68 years (±11), with mean follow−up of eight months. Mean blood loss and operative time was 94 cc (±39) and 65 min (±25), respectively. Post−operative examination demonstrated resolution (stage 0) of anterior/apical prolapse in all patients, and absence of mesh erosion. Total IIQ−7 scores improved from 6.9 (±3.2) to 2.7 (±1.7) at baseline and post−operative assessments (p<.001). ICIQ−VS domain scores for dragging pain and vaginal bulge improved from 1.1 (±1.1) to 0.2 (±0.6) and 2.5 (±1.4) to 0.3 (±0.7), respectively (p<0.05, both comparisons). Twenty−five patients reported subjective satisfaction. Two remaining patients denied satisfaction due to persistent incontinence. No early major complications were identified.

Conclusions: The ElevateTM system is associated with significant improvements in validated symptom and quality of life indices. Early anatomic restoration is excellent. No complications were noted in our early experience. Further patient accrual and follow−up is ongoing.

Poster #NM30
PERIOPERATIVE EXPERIENCE WITH THE ELEVATE PROLAPSE REPAIR SYSTEM
Dmitriy Nikolavsky, MD, Larry T. Sirls, MD, Kim Killinger, RN, MSN, Judith A. Boura, MS and Kenneth M. Peters, MD
William Beaumont Hospital, Royal Oak, MI
(Presented by: Dmitriy Nikolavsky)

Introduction and Objective: The Elevate® polypropylene mesh system corrects pelvic organ prolapse (POP). Direct insertion of tined tipped mesh anchors into the sacrospinous ligament and pubococcygeus muscle avoid groin/perineal incisions and blind trocar passage. We report the Elevate® systems operative time, blood loss, post−operative pain, length of stay and peri−operative complications.

Methods: Retrospective review of inpatient/computerized records provided baseline, operative, and post−operative data. Operative data included compartment repaired, concurrent vaginal hysterectomy, operative time (OT), estimated blood loss (EBL), and adjacent organ injury. Post−operative data included changes in hemoglobin and hematocrit, blood transfusion, self reported pain scale, length of stay (LOS) and complications. Data were analyzed for each procedure type (anterior, posterior or total Elevate®) and separately for those having concurrent hysterectomy.

205
Results: Elevate® was used in 43 women between August 2009 and August 2010. Mean age was 68.4 ± 10.2 years and body mass index (BMI) was 26.6 ± 4.2. All patients had grade 3 or 4 prolapse. Anterior Elevate® was placed in 31, posterior Elevate® in 4, and 8 had a total Elevate®. Concurrent hysterectomy was done in 11 and these patients had anterior Elevate® only. Median OT for anterior, posterior, or total Elevate® without hysterectomy was 61, 57 and 101 minutes, EBL was 50, 75, and 100cc respectively, median hemoglobin drop was 2.3, 2.6 and 2.3 gm respectively and LOS was 1, 1, 2 days respectively. Post-operative complications included 4 women discharged with foley catheter, 3 urinary tract infections (UTI), 1 hematoma and 1 pelvic abscess requiring drainage but not mesh removal. First 24 hour visual analog scale mean pain scores were 2.7, 2.8 and 0.6 on a 0–10 scale. Concurrent hysterectomy patients median OT and EBL were longer at 148 minutes and 200 cc but LOS was similar to the total mesh group at 2 days. There were no UTI's or urethral catheters at discharge in this group. There were no adjacent organ injuries and no Elevate® patient required transfusion.

Conclusions: POP repair with Elevate® avoids trocar passage, has short OT, minimal EBL, and few complications. Patients have little pain and many are discharged home on the first post-operative day. Long-term observations are needed to assess Elevate mesh complications, failure rates and compare the outcomes with other mesh repair kits.

Poster #NM31
AN ALTERNATIVE TO MESH: CYSTOCELE REPAIR USING POLYPROPYLENE SUTURES
Ngoc-Bich Le, MD¹, Zachary C. Baxter, MD², Lisa Rogo-Gupta, MD¹, Una Lee, MD¹, Shelby Morrisroe, MD¹, Ja-Hong Kim, MD¹, Larissa Rodriguez, MD¹ and Shlomo Raz, MD¹
¹UCLA, Los Angeles, CA; ²North Shore-Long Island Jewish, New Hyde Park, NY
(Presented by: Ngoc-Bich Le)

Introduction: Although more durable, mesh repairs of cystoceles are associated with many risks. We have developed a new technique for cystocele repair using polypropylene sutures. Our objective is to describe the surgical technique and present preliminary data.

Methods: Patients received preoperative evaluation with a history, physical, POP–Q exam, validated questionnaires (UDI–6, ISS, PFDI–20, PFQI, and PISQ12), videourodynamic, cystoscopy, and dynamic pelvic MRI. Patients are reevaluated postoperatively at 3, 6, 12 and 24 months. Description of procedure: A vertical incision is made from the bladder neck to the vaginal cuff and carried out laterally. If indicated, 2−0 polypropylene sutures are used to incorporate the obturator and perivesical fascia for lateral support. Mattress sutures of 2−0 polypropylene are placed to repair the central defect. If both lateral and central sutures were placed, they are interlocked before being tied. When we tied the sutures, the cystocele was reduced. The vaginal wall is excised asymmetrically and closed as a rotational flap.

Results: Between 1/2009 and 3/2010, 135 procedures were performed, including central-only and central–lateral repairs. Mean pt age was 69.3 yrs (41–88). Mean follow–up was 5.8 months (3–10). There were no cases of suture exposure requiring re–operation. However initially, 4 patients had 2–3 mm exposure of suture, requiring office removal. Therefore an asymmetric vaginal flap closure was utilized and there have been no cases of suture exposure since this technique was modified. 1 patient had a ureteric obstruction which was treated endoscopically. Since then, the sutures are tied prior to cystoscopy. 2 patients have developed recurrent cystoceles. 1 underwent successful repeat repair, while the other opted for conservative management. Questionnaires showed improvement in quality of life due to urinary symptoms (decreased from 4.7/6 to 2.3/6 (p<0.0001). PFQI score improved from 20 to 7.8 (p=0.010). PFDI–20 score improved from 47 to 34 (p=0.009). Difficulty Emptying score improved from 10 to 6 (p=0.006). Pain/Discomfort/Vaginal Fullness score improved from 10 to 4 (p=0.004). Bowel dysfunction score improved from 21 to 8 (p=0.027).

Conclusion: Polypropylene sutures are a promising alternative to mesh. Preliminary data shows symptomatic improvement and improved quality of life. Modifications to the technique have addressed early complications. Long–term data is forthcoming

Poster #NM32
SHORT-TERM OUTCOMES OF ROBOTIC-ASSISTED ABDOMINAL SACROCOLPOPEXY FOR THE REPAIR FOR PELVIC ORGAN PROLAPSE
Ryan Pickens, MD¹, Adam Stewart, MD², Joe Mobley, MD, MPH², Robert Elder, MD² and Wesley White, MD²
UTMCK, Knoxville, TN
(Presented by: Ryan Pickens)

Introduction and Objectives: We present short term surgical and quality of life outcomes in a cohort of patients that underwent robotic-assisted abdominal sacrocolpopexy (RSCP) for repair of symptomatic pelvic organ prolapse (POP).
Methods: A prospective analysis was performed to evaluate perioperative and quality of life outcomes following RSCP for the treatment of symptomatic POP. All patients underwent multi-disciplinary history and physical including pelvic examination. Prolapse was graded using the Baden-Walker classification system. Appropriate candidates underwent RSCP with or without concomitant supracervical hysterectomy and/or mid-urethral sling. Salient demographic and perioperative data was recorded. Patients were followed post-operatively for evidence of immediate and delayed adverse events as well as durability of the repair. Additionally, all patients completed disease-specific quality of life questionnaires (FSFI, IIQ−7, UDI−6) pre-operatively and at one month following surgery. Statistical analysis was performed.

Results Obtained: From November 2009 to August 2010, a total of 16 patients with symptomatic apical pelvic organ prolapse underwent RSCP. Fourteen patients underwent concomitant mid-urethral sling placement and 5 patients underwent concomitant supracervical hysterectomy. Mean patient age was 66.5 years (range 51 –78 years). Mean EBL was 60mL. Mean operative time was 142 minutes. Mean preoperative stage of prolapse was 2.25. There were no intraoperative or post-operative complications and no conversions. Mean duration of follow−up was 5 months. No patients demonstrated recurrence on follow-up examination. Patients demonstrated a significant improvement in quality of life following surgery based on mean UDI−6 (9.1 vs 0.6, p < .05) and IIQ−7 (9.25 vs 0.3, p < .05) scores, respectively. Based on FSFI results, no new onset dyspareunia has been reported.

Conclusions: Based on our experience, RSCP is a safe and highly efficacious treatment option for women with symptomatic pelvic organ prolapse. Patients report a significant improvement in their quality of life following treatment with no reported new onset dyspareunia.

Poster #NM33

COLPOCLEISIS FOR ADVANCED PELVIC ORGAN PROLAPSE
Michelle Koski, MD¹, Denise Chow, MD², Ahmet Bedestani, MD³, Joanna Togami, MD⁴, Ralph Chesson, MD³ and J. Christian Winters, MD²
¹Louisiana State University/Ochsner Clinic Foundation Departments of Urology, New Orleans, LA; ²LSU and Ochsner Departments of Urology; ³LSU Department of Gynecology; ⁴Ochsner, Department of Urology
(Presented by: Michelle Koski)

Purpose: Several apical prolapse repairs exist, but for advanced prolapse in older women who do not seek to preserve vaginal coital function, colpocleisis offers high anatomic success rates and patient satisfaction. This repair has not been documented broadly in the urologic literature and we sought to characterize our experience with the procedure.

Methods: Retrospective review of demographics, preoperative urodynamics, presenting symptoms, complications and outcomes for patients undergoing colpocleisis from 11/2001 to 7/2010 was performed. Patients with prior hysterectomy underwent total colpocleisis; those with uterus in situ underwent the Le Fort variation.

Results: 53 patients identified, mean age 80 (range 67−90), mean parity 3.2 (0−11), mean BMI 25.6 (18.9−33.7), and mean followup 9.2 months. 11.3% had undergone prior continence surgery and 9.4% prior prolapse repair. 66% presented with primary chief complaint of bulge. On history, 38 patients had incontinence: 8 stress (SUI), 8 urge, 22 mixed. Ten had bowel symptoms (7 fecal incontinence, 3 constipation). Exams were all POP−Q stage 3 or greater or Baden Walker grade 3 or higher. 54.5% of patients undergoing urodynamics had SUI with mean abdominal leak point pressure of 35.8 (17−128). 71.7% underwent total colpocleisis and 28.3% Le Fort. 56.6% underwent concomitant sling. Complications included 1 patient requiring transfusion, 1 pulmonary embolus, 1 clot evacuation, and 1 cystotomy. There was no postoperative de novo urgency, no recurrence of prolapse, and no chronic urinary retention. There was no postoperative de novo urgency, no recurrence of prolapse, and no urinary retention requiring chronic catheterization or surgical management. In patients not undergoing sling, SUI persisted in 3 patients, and occurred de novo in 2. Of these, 1 patient was treated successfully with sling and 1 with urethral bulking.

Conclusions: In a selected patient population, colpocleisis is safe and efficacious. Sling may be performed safely at the time of colpocleisis. De novo SUI may result from colpocleisis alone and patients should be screened for occult SUI with their prolapse reduced to determine those who will benefit from concomitant sling placement. In an aging patient population with expected increase in demand for pelvic floor reconstruction, colpocleisis is a useful approach for the urologist.
**Poster #NM34**

**SIMPLE CYSTECTOMY: OUTCOMES OF A NEW OPERATIVE TECHNIQUE**

Michael Rowley, MD, J. Quentin Clemens, MD, Jerilyn Latini, MD and Anne P. Cameron, MD

University of Michigan Health System, Ann Arbor, MI

(Presented by: Michael Rowley)

**Introduction and Objective:** Urinary diversion for benign indications is a relatively rare procedure. It is performed in refractory cases of radiation cystitis, neurogenic bladder, interstitial cystitis, recalcitrant bladder neck obstruction or incontinence. However, diversion alone without accompanying cystectomy results in a significant risk of complications such as pyocystis, hematuria, pain and secondary carcinoma. We present a more efficient technique for simple cystectomy.

**Methods:** We retrospectively reviewed our institutional experience with this simple cystectomy technique, which included 23 patients from 2007 to 2010 performed by three surgeons. There were 14 females and 9 males. All patients had exhausted all other possible conservative therapies. Indication for the procedure included neurogenic bladder and resulting complications in 9 patients, complications from prostate radiation therapy in 5 patients, refractory interstitial cystitis in 5 patients, and refractory incontinence in 4 patients. Our operative technique is as follows. The lateral peritoneal attachments and pedicles of the bladder are divided using an electrothermal bipolar tissue sealing system (LigaSure, Valleylab Inc., Boulder, Colorado, USA). The bladder is then bivalved from anterior to posterior using the LigaSure. Each lateral segment is then amputated in a similar fashion. The trigonal mucosa is then peeled off piecemeal and cauterized. The peritoneal flaps are re-approximated to cover the urethra.

**Results:** The average patient age was 63.3 years old and had undergone 2.7 prior abdominal or pelvic surgeries and 3.3 prior urinary operations. The average operative time was 27.5 minutes for the simple cystectomy portion of the case (recorded in 19 cases) and average blood loss was 46.7 ml (recorded separately in 12 cases). For the entire procedure including diversion with bowel segment the average blood loss was 231.5ml. The mean entire operative time was 318.5 minutes. There were no complications noted intra-operatively or post-operatively specifically attributed to the cystectomy portion. All pathology specimens revealed no evidence of malignancy. Mean follow up was 7 months (range 0–33 months).

**Conclusion:** This simple cystectomy technique, in the majority of cases of urinary diversion for benign indications, can be performed quickly with minimal blood loss and complications.

---

**Poster #NM35**

**MANAGEMENT OF FEMALE URETHRAL DISTRACTION INJURIES: A SYSTEMATIC REVIEW OF THE LITERATURE**

Cynthia Fok, MD¹, Elizabeth Mueller, MD, MS¹ and Jennifer Anger, MD, MPH²

¹Urology & Obstetrics/Gynecology, Loyola, Maywood, IL; ²Urology Cedars-Sinai and UCLA, Los Angeles, CA

(Presented by: Cynthia Fok)

**Introduction and Objectives:** Non-obstetrical injury to the female urethra is uncommon and most often associated with pre-pubertal age, blunt trauma, and pelvic fracture. The aim of this study was to systematically review the literature to determine the optimal management of this rare injury.

**Methods:** Using Meta-analysis of Observational Studies in Epidemiology (M.O.O.S.E.) criteria, we searched Cochrane, Pubmed and OVID databases for articles published before September 3, 2010 using the terms “female pelvic fracture urethroplasty,”“female urethral distraction,”“female pelvic fracture urethral injury,”“female pelvic fracture urethra girls.” Titles and subsequently abstracts were independently reviewed by two reviewers (CF, JA). We excluded articles that were based on animal models, transgender surgery, obstetrical trauma, cancer or did not pertain to female urethral injuries. References from articles were also obtained and included in the analysis.

**Results:** We identified 137 articles from the databases. Eighteen articles were excluded based on the titles, 47 articles were excluded based on the abstracts, and 40 articles were not in English. The review consisted of 38 articles, including 6 obtained from articles’ references. There were a total of 131 female patients with urethral trauma, 37 adults (>18 years old), 79 children (≤18 years old), and 15 not specified. Of these 131 urethral injuries, 52 underwent primary anastomotic repairs within one week of the injury, 12 underwent primary realignments, and 67 underwent delayed repairs at various intervals after the trauma. Those patients that underwent delayed urethral repair were more likely to undergo more extensive surgery, often requiring urinary diversion or flap-based urethral reconstruction than those that underwent primary repair.

**Conclusions:** There is a paucity of data in the literature on the optimal management of female urethral distraction defects. Based on our review of the available literature, primary sutured anastomotic repair of the female urethral distraction defect, once the patient is hemodynamically stable, appears optimal for women. It is unknown whether primary realignment can feasibly re-establish continuity of the female urethra and allow continence. This contrasts the management of male pelvic fracture related urethral distraction defects; in which primary anastomotic repair is considered injurious and primary alignment is considered preferable.
LONG-TERM EFFICACY OF REPEAT INCISION OF BLADDER NECK/EXTERNAL SPHINCTER IN PATIENTS WITH SPINAL CORD INJURY SUSTAINED PRIOR TO 1990
Viet Tran, MD¹, Polina Reyblat, MD², Priyanka Kadam, Medical Student³, Cathia Vazquez, Medical Student³ and David Ginsberg, MD¹
¹USC Institute of Urology, Los Angeles, CA; ²Kaiser Permanente, Los Angeles, CA; ³USC, Los Angeles, CA
(Presented by: Viet Tran)

Introduction: Bladder Neck Incision (BNI) with or without external sphincterotomy (ES) is commonly used for management of neurogenic bladder in selected spinal cord injury (SCI) patients. Repeat BNIES although frequently performed, never have been evaluated for its efficacy.

Materials and Methods: Using IRB−approved SCI database we identified 25 patients who underwent at least 2 BNI/ES in the past. Charts were retrospectively reviewed and analyzed.

Results: Mean age 55 (range 26−75), mean age at injury is 21 (range 11−33), mean follow up 34 (9−45). Mean time elapsed from injury to the first BNIES was 9 yrs (ranging from 1 to 29).
Indications for the repeat BNIES were elevated residual and recurrent UTI's in 14, autonomic dysreflexia in 5, persistent high bladder pressures in 4 and recurrent UTI's in 2. Mean time from the initial to repeat procedure was 10 years (range 1− 26 years). Improvement or resolution of symptoms was documented in 8 out of 25 patients (32%). Remaining 17 patients were offered repeat sphincterotomy. 3 patients decided to employ once−a day intermittent catheterization to evacuate residual urine. 14 proceeded to the second repeat procedure (BNIES #3). Indications in this group were elevated residual in 7, autonomic dysreflexia in 4, persistent high bladder pressures in 2 and recurrent UTI's in one. Mean time to the third procedure was 9 years (range 1−20). Resolution of the symptoms after the third resection was documented in 6 out of 14 patients (43 %). Among 8 patients that failed after three procedures, 4 manage residual urine by intermittent catheterization at the time of external catheter change, 2 tolerate mild dysreflexia and 2 use indwelling catheter.
Overall, 1st re−do sphincterotomy had 32% (8 out of 25 patients) success rate, and second re−do is effective in 43% (6 out of 14 patients). Overall, 56% (14 out of 25) of patients achieved desired result after repeat surgeries.

Conclusion: Long−term bladder management in patients with SCI often presents a challenge for the practicing urologist. We turn to repeat sphincterotomy when other pharmacological options are exhausted and patient remains unsatisfied. It appears from the small sample of data presented that repeat sphincterotomy has a significant failure rate. It is important to communicate with the patient that a repeat surgery or alternative bladder management might have to be explored in case of BNIES failure.

ASSESSMENT OF VITAMIN B12 LEVEL AFTER AUGMENTATION ILEOCYSTOPLASTY IN PATIENTS WITH NEUROGENIC BLADDER DUE TO SPINAL CORD INJURY
Viet Tran, MD¹, Vannita Simma-Chiang, MD¹, Polina Reyblat, MD² and David Ginsberg, MD¹
¹USC Institute of Urology, Los Angeles, CA; ²Kaiser Permanente, Los Angeles, CA
(Presented by: Viet Tran)

Introduction: Vitamin B12 is an important micronutrient for metabolism, DNA and fatty acid synthesis, affecting function of the nervous system and blood cell formation. Deficiency of B12 due to resection of the terminal ileum segment is a concern, as it can cause a myriad of symptoms from sleep disturbance to psychosis and myelopathy. Ileocystoplasty performed for neurogenic bladder (NGB), uses a smaller segment of ileum than routine bladder substitution. We examined serum level of B12 in a small cohort of patients that underwent ileocystoplasty.

Methods: B12 serum level was determined with the routine laboratory exams during annual visits in patients with NGB who underwent cystoplasty with an ileal segment at least 5 years prior.

Results: Our initial group of 18 patients included 15 males and 3 females. Etiology of NGB was spinal cord injury for all 18 patients. Average age at the time of injury was 24.8 years (range 8−56) and mean time from injury to augmentation was 8.8 years (range 0−32). Mean follow−up time post−cystoplasty was 11 years,(range 6 – 20 yrs).
Serum level of B12 in this group ranged from 195 to 978pg/ml, mean 419.7 pg/ml (normal 211 – 911 pg/ml at our institution).
83.3% (15/18 patients) have vitamin B12 levels below the 561pg/ml (2nd quartile, with 50%(9/18 patients) below 386 pg/ml (1st quartile).
When evaluating patients who had cystoplasties of 10 years or longer, the level of B12 ranged from 195 to 408 pg/ml, mean 303.8 pg/ml (1st quartile).
This sub−group of patients all had vitamin B12 levels in the low normal range, with 83% (10/12 patients) with levels below 386 pg/ml (1st quartile).
Conclusions: It is generally believed that ileocystoplasty is unlikely to cause B12 deficiency as the ileal segment used is usually shorter. Serum levels of B12 were above the low normal level (>211 pg/ml) in all patients except for one (195 pg/ml). This initial evaluation has prompted us to further investigate B12 levels in this patient population in an attempt to further understand the potential risks of B12 deficiency post-cystoplasty.

Quartiles (Based on the normal serum range in our institution)

<table>
<thead>
<tr>
<th>Quartile</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>211–386</td>
<td>first quartile  low</td>
</tr>
<tr>
<td>387–561</td>
<td>second quartile low</td>
</tr>
<tr>
<td>562–736</td>
<td>third quartile high</td>
</tr>
<tr>
<td>737–911</td>
<td>fourth quartile high</td>
</tr>
</tbody>
</table>

Poster #NM38
INITIAL EXPERIENCE WITH THE ELEVATE® MESH SYSTEM FOR THE TREATMENT OF PELVIC ORGAN PROLAPSE
Shannon Stout, MD and Kurt McCammon, MD
EVMS, Norfolk, VA
(Presented by: Shannon Stout)

Introduction and Objective: The Elevate® prolapse repair system uses a polypropylene mesh anchored to the sacrospinous ligaments as well as the obturator fascia to correct apical, anterior and posterior prolapse through a single vaginal incision. We report our initial experience using the Elevate® system.

Methods: We retrospectively reviewed 42 consecutive patients who underwent prolapse repair with either the Elevate® Anterior, Posterior or both the Anterior and Posterior systems between September 2009 and September 2010 performed by a single surgeon. Peri-operative, short-term complications and outcomes were reviewed.

Results: Mean patient age was 68 (42–94). Mean BMI was 25.9 (18.3–38.6). Mean follow up was 16 weeks (2.5–47 wks). 36 patients had a cystocele (8 with grade 2, 17 with grade 3 and 11 with grade 4.) 18 patients had a rectocele (2 with grade 1, 9 with grade 2, 5 with grade 3 and 2 with grade 4.) 14 patients had an enterocele (5 with grade1, 2 with grade 2, 1 with grade 3 and 6 with grade 4.) Prolapse symptoms included: vaginal bulge (74%), dyspareunia (10%), pelvic pressure (19%), incomplete bladder emptying (24%), SUI (48%), UUI (50%) and irritative voiding symptoms (57%). A Monarc® subfascial hammock was placed concurrently in 38 patients. 88% of patients had no prolapse noted on follow up physical exam. UUI resolved in 62% of patients. SUI resolved in 85% of patients. Irritative voiding symptoms improved or resolved in 40% of patients. Mean pad per day usage decreased by 1.2 pads from baseline. Post op complications included transient urinary retention (11.9%), hematoma (7.1%), mesh erosion (4.7%) UTI (2.38%) and DVT (2.38%). 2 patients required further surgery; 1 for urethrolysis and the other for drainage of a labial hematoma as well as placement of a TVT sling. There were no transfusions required in any patients.

Conclusions: We conclude that the Elevate® prolapse repair system is a feasible option for pelvic organ prolapse repair with acceptable morbidity and short term outcomes. Patients should be counseled appropriately pre-operatively regarding risks and potential complications associated with mesh. Long-term follow up is necessary to assess long-term efficacy and patient satisfaction.

Poster #NM39
INITIAL OUTCOMES OF ELEVATE ANTERIOR® APICAL SYSTEM FOR REPAIR OF ANTERIOR AND APICAL VAGINAL PROLAPSE
Victor Grigoriev, MD¹, David Abramowitz, BS² and Joseph Candela, MD, MPH¹
¹Desert Urology Incontinence Center, Las Vegas, NV; ²Sackler School of Medicine at Tel Aviv University
(Presented by: Victor Grigoriev)

Objectives: To examine the efficacy, pain and mesh extrusion rates of the Elevate Anterior® (EA) Apical system with type–1 Polypropylene mesh (American Medical Systems, Inc., Minnetonka, MN) for the repair of Pelvic Organ Prolapse.

Materials and Methods: This is a retrospective study conducted by a Urology practice specializing in Urogynecology on the first 43 patients that were implanted with EA. All postoperative data were taken from patient follow ups conducted at one week, one month, six months and one year where a physical examination, patient interview and POP–Q staging were conducted. All patients preoperatively had a stage 3 or 4 prolapse. Post operative pain was determined by any pain that was outside of 30 days of the operation and was due to the presence of the EA device and not pain associated with the surgical incision. Data are reported as proportions and means (±SD).
Results: The mean patient age at time of operation was 63.5 years (±10.7) and mean follow up time was 151.4 days (range 37–). 18 (41.9%) patients had prior pelvic organ surgeries. Concurrent procedures included 4 hysterectomies (9.3%), 33 suburethral slings (76.7%) and 3 posterior repairs (7.0%). None of the patients required transfusion, mean operating time (excluding hysterectomy) was 42 minutes (±15). Exposure of the mesh through the vaginal wall was noted in 2 (4.7%) patients, both of which had a second operation to remove the exposed mesh. Both cases of exposed mesh occurred with concurrent hysterectomies. No de novo stress incontinence was noted. Pain was seen in 15 patients, 12 resolved within 10 days and 3 (7.0%) patients pain persisted. Of the patients with persistent pain, 2 of them had concurrent posterior repairs that involved fixation of the repairing device into the sacrospinous ligament as well. One of these cases of pain required a second operation to remove the arm of just the posterior repair device which resolved the pain. The other 2, pain resolved after 6 months. All patients had no recurrent prolapse and demonstrated a more physiologic vaginal vault upon physical exam at last follow up.

Conclusion: The EA demonstrated excellent apical support and a low exposure rate, thus indicating that the EA mesh kit is safe and efficacious for anterior prolapse repairs. Mesh exposure and persistent pain may be increased with concurrent repairs should be investigated further. We look forward to presenting longer term results at subsequent meetings.

Poster #NM40

COITAL INCONTINENCE: RELATION TO DETRUSOR OVERACTIVITY AND STRESS INCONTINENCE
Hala Imam, MD, PhD
Gastroenterology Unit, Internal Medicine Department, Assiut University Hospital, Assiut, Egypt
(Presented by: Hala Imam)

Introduction and Aim: Many theories have been proposed regarding UI pathophysiology of coital incontinence (CI) but none has been proven. The aim of this study was to assess functional (demographic, clinical, and urodynamic) and anatomical (MRI) abnormalities associated with CI.

Materials and Methods: All consecutive married and sexually active women with urinary incontinence (UI) were included. Evaluation included history, administration of UDI–6 questionnaire, POP–Q, and urodynamics. Women were asked about any experience of UI during intercourse. They were asked if they leak urine during having sexual intercourse. If they do, they were asked if the leakage occurs during orgasm or with penetration, and how much urine they usually leak during sex. The MRI examination was done for a selected group of women using 1.5 tesla superconducting magnet (Gyroscan NT 1.5; Philips) in supine position and during two phases: static and dynamic phases using multiplanar T2−weighted turbo spin−echo and single shot T2−weighted images.

Results: 90 consecutive women with UI were included; 60 with and 30 without CI. 38 women (42.2%) had Stress incontinence (SUI), 33 (36.7%) had overactive bladder (OAB) symptoms, and 19 (21.1%) had mixed incontinence. The prevalence of CI was significantly higher among women with SUI (89.4%) compared to those with OAB (33.3%). On univariate analysis, factors significantly associated with CI were parity, anterior vaginal wall prolapse and SUI. Among the variables studied by pelvic MRI, there was no factor that was significantly associated with CI. CI showed significant positive correlation with the severity of SUI as reported by the patients (r = .327, p = .05) and significant negative correlation with ALPP (r = −.362, p = .01). SUI (patient reported and urodynamically) was significantly associated with CI at penetration. For women with urodynamic detrusor overactivity (DOA), 66.7% did not have CI at all, 24.2% had CI at orgasm and 9% had CI at penetration. Although 33.3% of women with DOA had CI, comparison between women with DOA and CI and those with DOA without CI did not show any difference between the 2 groups. The amplitude of UDC (urodynamically), complaint of urge incontinence, cystocele (Aa point) did not correlate with the severity of CI.

Conclusions: CI seems to be in the spectrum of stress incontinence and pelvic organ prolapse. CI is almost invariably a symptom of SUI with urethral sphincter incompetence, even when it occurs during orgasm.

Poster #NM41

URETHRAL DIVERTICULA IN WOMEN: THE UNIVERSITY OF MICHIGAN EXPERIENCE
Nina Casanova, MD¹, John DeLancey, MD², Edward McGuire, MD² and Anne Pelletier Cameron, MD²
¹University of Michigan; ²University of Michigan, Ann Arbor, MI
(Presented by: Nina Casanova)

Introduction: Urethral diverticula are rare and have a wide range of presenting symptoms that mimic other urologic conditions; hence women often experience a troublesome delay in diagnosis. Currently there is a paucity of sizeable case series in the literature describing this population and the outcomes of definitive surgical management.

Objective: To evaluate the presentation, management, and follow up of patients presenting to the University of Michigan for urethral diverticulum over the past decade, adding to the fund of knowledge about this challenging condition.
Methods: This is a retrospective review of 34 patients identified to have a urethral diverticulum by ICD 9 codes at our institution. Results: The average age at presentation to our institution was 40 (range 17–65) with an average of 2 vaginal deliveries. 15 patients had undergone previous urethral surgery, with 9 of those patients having had previous interventions on their diverticulum and 5 having had slings. Symptoms at presentation ranged from 5 patients who were asymptomatic with a palpable mass only, 8 patients with dyspareunia, 12 with dribbling or discharge, and 18 with pelvic pain. 14 patients also had complaints of recurrent urinary tract infections. Multiple methods of diagnosis were used ranging from exam only, to extensive radiologic evaluations including VCUG, US, and MRI. 8 patients had confirmed stress urinary incontinence with video urodynamics and half underwent PV sling at the time of surgery or later. The majority of patients underwent primary excision however, 4 patients underwent marsupialization secondary to comorbidities or pregnancy. 50% if those patients needed subsequent definitive excision for recurrences. The 6 patients with pseudodiverticula all had previous urethral surgery. They were treated with plication of the sac and 50% of those patients recurred, needing additional intervention. The success rate of initial surgery for all comers was 65% with an increase to 73% after one additional surgery. Previous urethral surgery did not seem to have bearing on operative success. Finally, pathology results revealed that all excised tissue was benign.

Conclusions: Urethral diverticular disease in women is a complicated and unique problem with variable presentation, making the diagnosis and care of these patients challenging. With the proper index of suspicion and right diagnostic tools, these patients can be diagnosed and treated with a reasonable success rate.

Poster #NM42
WHEN ARE VIDEO URODYNAMICS REALLY NECESSARY IN PATIENTS WITH SPINAL CORD INJURY? PREDICTORS OF POSITIVE FLUOROSCOPIC FINDINGS DURING URODYNAMIC TESTING
Sunshine Murray, MD, Benjamin Dillon, MD, Rashel Haverkorn, MD and Gary Lemack, MD
UT Southwestern, Dallas, TX
(Presented by: Sunshine Murray)

Introduction and Objectives: Spinal cord injury (SCI) can result in disturbances of lower urinary tract function along with resultant upper tract deterioration. The urologic care of these patients is quite variable; however it is widely agreed that urodynamics are a mainstay in the workup and surveillance of these patients. The role of video urodynamics (VUDS) in contrast remains debated due to the risks of radiation exposure, increased cost and limited availability. We attempt to define predictors of positive video findings that would allow better patient selection for VUDS.

Methods: A retrospective review of patients seen in our ambulatory clinic with the diagnosis of SCI between 3/2007 and 2/2010 was performed following IRB approval. Those patients undergoing VUDS were then further analyzed to determine which patients had positive fluoroscopic findings including detrusor sphincter dyssynergia (DSD), vesicoureteral reflex (VUR) and bladder diverticulum. Demographic and baseline characteristics of patients with and without fluoroscopic findings on VUDS were then compared to determine which factors were associated with the presence of findings.

Results: 99 SCI patients were seen during the reviewed time period. 55 patients underwent at least 1 VUDS. 31 patients had at least one positive finding on initial VUDS. These included 7 patients with VUR, 29 with DSD and 3 with diverticulum. Mean BMI, age in years, and length of injury in months at time of VUDS was similar in those with and without video findings (23vs26, 41vs43 and 121vs107 respectively). When comparing other variables including gender, race, injury level, ASIA classification, incontinence and use of anticholinergic at the time of study, no significant predictor of positive finding on VUDS was identified (see table). This remained true even when DSD was excluded as a positive fluoroscopic finding.

Conclusions: Positive findings on fluoroscopy at the time of VUDS were common in this SCI population. No significant predictors were found to help guide selection of patients for VUDS suggesting that fluoroscopic imaging is an appropriate adjunct to urodynamic testing in all SCI patients.

<table>
<thead>
<tr>
<th></th>
<th>Gender</th>
<th>Race</th>
<th>Injury Level</th>
<th>ASIA</th>
<th>Incontinence</th>
<th>Anticholinergic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nc Video Findings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F 6(27)</td>
<td>M 16(72)</td>
<td>AA3(17)</td>
<td>V15(63)</td>
<td>H 0(0)</td>
<td>A 13(62.5)</td>
<td>B 4(25)</td>
</tr>
<tr>
<td>Positive Video Findings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>p-value</td>
<td>0.6</td>
<td>0.5</td>
<td>0.4</td>
<td>0.5</td>
<td>0.6</td>
<td>0.4</td>
</tr>
</tbody>
</table>
Poster #NM43
LOWER URINARY TRACT DYSFUNCTION AFTER DEEP BRAIN STIMULATION IN PATIENTS WITH PARKINSON’S DISEASE
Kelly Johnson, MD and Hari Tunuguntla, MD
UMDNJ/ Robert Wood Johnson University Hospital, New Brunswick, NJ
(Presented by: Kelly Johnson)

Introduction and Objectives: Advances in deep brain stimulation in the management of movement disorders, such as Parkinson’s disease, have led to investigation of treatment effects on lower urinary tract function. The most common manifestation of bladder dysfunction in Parkinson’s disease is detrusor overactivity with non-relaxing external urethral sphincter. While current literature highlights amelioration of bladder dysfunction after deep brain stimulation by significantly increasing bladder volume at first desire to void, and increasing maximum cystometric capacity, we present five cases of de novo voiding dysfunction status post deep brain stimulation.

Methods: Our urodynamics database of 152 patients was retrospectively reviewed to isolate patients with a new onset of voiding dysfunction after undergoing deep brain stimulation for treatment of Parkinson’s disease. Five patients were identified who never had lower urinary tract symptoms prior to this treatment. Gender, age, clinical presentation, bladder capacity, detrusor overactivity with leak point pressure and post void residual were analyzed. No financial funding was provided for this study.

Results Obtained: All patients presented with new onset of urinary frequency and urgency, following deep brain stimulation. Four of five patients experienced de novo nocturia and urgency incontinence, with demonstrable detrusor overactivity on urodynamics. One experienced new onset of incomplete emptying with an elevated post−void residual. (See table; dimensions 517 x 228).

Conclusions: While current literature supports amelioration of bladder dysfunction after deep brain stimulation for Parkinson’s disease by increasing bladder capacity and delaying first desire to void, our retrospective urodynamics database review revealed five patients who previously experienced no lower urinary tract symptoms who developed voiding dysfunction after this treatment. Further research is necessary to delineate causation and mechanism in support of these findings.

---

Poster #NM44
URODYNAMIC PREDICTORS OF LOWER URINARY TRACT SYMPTOM PROGRESSION IN MULTIPLE SCLEROSIS: DO SPECIFIC FINDINGS PREDICT THOSE DESTINED TO PROGRESS?
Benjamin Dillon, MD, Rashel Haverkorn, MD, Sunshine Murray, MD, Elliot Frohman, MD, Benjamin Greenberg, MD, Philippe Zimmern, MD and Gary Lemack, MD
UT Southwestern Medical Center, Dallas, TX
(Presented by: Benjamin Dillon)

Introduction and Objectives: Urodynamics (UDS) may be helpful in elucidating the causes of LUTS in Multiple Sclerosis (MS). This study sought to determine if UDS parameters could predict symptomatic progression in MS patients.

Methods: In this IRB approved study, we examined our longitudinally collected MS database (2000–Present) of patients with LUTS and MS for assessment of symptom severity and UDS findings. Video UDS with EMG patch electrodes was generally performed using the Laborie Aquarius TT and variables included presence of detrusor overactivity (DO), presence of detrusor sphincter dyssynergia (DSD), maximum cystometric capacity (MCC), maximum flow rate (Qmax), presence of detrusor overactivity incontinence (DOI) and residual volume (PVR). Symptom severity was determined by Urogenital Distress Inventory (UDI–6) at a minimum of 4 month follow up. Possible interventions included permutations of anti–muscarinics, CIC or intravesical botox.
Results: From 01/2000 through 08/2010, 359 patients with MS were referred for Urologic evaluation. Initial UDI scores were available for 122 patients, with mean total UDI–6 of 8.4±4.3. Data from 44 patients with at least two sets of questionnaires separated by 4 months, and UDS is shown in the table. On UDS, 17 patients did not demonstrate DO – their mean UDI–6 dropped from 10.3±3.8, to 6.6±4.9 (p= 0.005) with an average of 26.3 (4–123) and median 15 months between questionnaires. Twenty seven patients had no DSD while 16 had DSD. Mean UDI–6 scores for DSD negative patients dropped from 10.1±3.6, to 6.3±4.60 (p=0.001) at follow-up. Similar improvements were noted in patients with only modest PVR, while those without DOI showed a trend toward improvement. Patients with DO, DSD, and elevated PVR all showed stabilization of UDI–6 scores.

Conclusion: Our findings suggest that patients without DO and DSD show not only stabilization, but symptomatic improvement. Patients with DO or DESD do not appear, on average, to have inevitable symptomatic progression but do not fare as well overall.

<table>
<thead>
<tr>
<th>Patients with DO</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n=26)</td>
</tr>
<tr>
<td>UDI-6 at baseline</td>
</tr>
<tr>
<td>9.3±2.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patients without DO</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n=17)</td>
</tr>
<tr>
<td>UDI-6 at baseline</td>
</tr>
<tr>
<td>10.3±2.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patients with DSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n=16)</td>
</tr>
<tr>
<td>UDI-6 at baseline</td>
</tr>
<tr>
<td>9.1±2.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patients without DSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n=27)</td>
</tr>
<tr>
<td>UDI-6 at baseline</td>
</tr>
<tr>
<td>10.0±3.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patients with PVR&lt;50% of CC</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n=28)</td>
</tr>
<tr>
<td>UDI-6 at baseline</td>
</tr>
<tr>
<td>9.1±2.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patients with PVR&gt;50% of CC</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n=10)</td>
</tr>
<tr>
<td>UDI-6 at baseline</td>
</tr>
<tr>
<td>9.9±2.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patients with UD DOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n=15)</td>
</tr>
<tr>
<td>UDI-6 at baseline</td>
</tr>
<tr>
<td>10.4±2.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patients without UD DOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n=17)</td>
</tr>
<tr>
<td>UDI-6 at baseline</td>
</tr>
<tr>
<td>9±4.9</td>
</tr>
</tbody>
</table>

Poster #NM45

DOES REPRODUCTION OF SYMPTOMS ON URODYNAMICS INFLUENCE PATIENT OUTCOMES AFTER TREATMENT?
Andrew Colhoun, BS, Colin Goudelocke, MD and Eric Rovner, MD
Medical University of South Carolina, Charleston, SC
(Presented by: Andrew Colhoun)

Introduction: While urodynamic testing (UDS) is a valuable tool in the assessment of incontinence and voiding dysfunction, it is unknown whether this testing should alter management. UDS may fail to demonstrate stress urinary incontinence or detrusor overactivity in up to 50–60% of individuals who complain of symptoms suggestive of these diagnoses. Historically, it has been suggested that reproducing patient symptoms during UDS provides added diagnostic value to the procedure and may improve outcomes in such cases. We sought to determine if reproducing patient symptoms during UDS influenced outcomes after intervention.

Methods: Following IRB approval, a retrospective chart review was conducted for female patients who underwent UDS over the prior 10 months with documented, subsequent medical or surgical intervention. UDS was performed in accordance with ICS recommendations. During UDS, notation had been made of primary and secondary symptoms as well as if these stated symptoms were reproduced during the urodynamic procedure. Included patients had completed questionnaires including Quality of Life (QoL), Patient Global Impression of Severity (PGI–S), and the Incontinence Symptom Severity Index (ISS–I) both prior to urodynamic testing and after intervention.

Results: A total of 143 UDS studies were performed. Thirty–three women had complete outcome data following intervention and had non–neurogenic etiology. Of those, 29 (87.8%) reported their urinary symptoms were reproduced upon urodynamic testing (Group 1) and 4 reported no reproduction of symptoms (Group 2). Mean PGI–S scores prior to treatment were 2.2 and 1.0 (p=0.06) for Groups 1 and 2, respectively, with mean decreases after treatment of 0.9 and 0.5 (p=0.31), respectively. Mean QoL scores prior to treatment were 4.8 and 4.5 (p=0.7) for Groups 1 and 2, respectively, with mean decreases after treatment of 2.2 and 2.5 (p=0.69), respectively. Mean ISS–I scores prior to treatment were 15.2 and 10.5 (p=0.003) for Groups 1 and 2, with mean decreases of 6.6 and 3.8 (p=0.35).

Conclusions: Reproduction of patient symptoms during UDS appears to occur commonly. However, reproduction of symptoms was not associated with improvement in response to treatment in this series which may be due to the very small number of patients in whom symptoms were not reproduced. A larger series which allows stratification by symptom type may also show a relationship that is not demonstrated here.
SYSTEMATIC REVIEW OF UROLOGICAL FOLLOW UP AFTER SPINAL CORD INJURY
Anne Cameron, MD¹, Katherine Schomer, MA² and Gianna Rodriguez, MD¹
¹University of Michigan, Ann Arbor, MI; ²University of Washington, Seattle, WA
(Presented by: Anne Cameron)

Introduction and Objectives: There is no consensus on the appropriate urological follow up of individuals after spinal cord injury (SCI), but it is well known that they are at risk for renal deterioration, bladder cancer, and stones. Our objective was to perform a systematic review of the literature to evaluate the evidence with respect to urologic screening in this population.

Methods: 340 abstracts were reviewed with 53 articles meeting inclusion criteria. Authors rated evidence using American Academy of Neurology 2004 Guidelines.

Results: 9 articles evaluated screening for bladder cancer. There is insufficient evidence to make recommendations regarding the use of urine surviving, BTA-stat or BLCA-4 and there were mixed results regarding the use of urine cytology. It is possible that annual cystoscopy and biopsy does not fit criteria for a screening test. 12 articles evaluated urinary tract infection (UTI) screening. >10² cfu/ml is established as the diagnostic criteria for bacteriuria in midstream catheterized urine. Patient reported symptoms used to predict UTI yielded mixed results. Dipstick testing of urine probably has the same accuracy as microscopy but its ability to predict UTI yielded mixed results. Routine urine cultures are possibly unnecessary in healthy asymptomatic individuals with normal urinalysis. Urodynamics probably need to be performed periodically in both adults and children with SCI (6 articles) with no information on frequency. There is sufficient evidence (9 articles) to recommend ultrasound of the urinary tract as a useful, non-invasive, and possibly cost effective method for routine long term follow up for detecting upper urinary tract problems. 5 articles evaluated radioisotope renography and evidence is sufficient to recommend it as a good method for further testing, especially if the ultrasound is positive. There is conflicting evidence on serum creatinine to detect early deterioration of renal function. Evidence is sufficient (5 articles) to recommend ultrasound of urinary tract to detect urinary tract stones with good sensitivity. Intravenous urography and CT are useful for screening, but entail the use of intravenous contrast and radiation. 2 articles have confirmed that the KUB is not reliable to assess for urinary tract stones.

Conclusions: Based on this review no definitive recommendations for screening can be made except for routine renal ultrasonography.

Funding: NIDRR #H133A060070

UTILITY OF ULTRASOUND AND URODYNAMICS IN CHILDREN FOLLOWING SPINAL CORD INJURY
Kelly Johnson, MD, Shilpa Lamba, MD and Joseph Barone, MD
UMDNJ/ Robert Wood Johnson University Hospital, New Brunswick, NJ
(Presented by: Kelly Johnson)

Introduction and Objectives: Ultrasound and urodynamics are commonly used to monitor children following spinal cord injury. The utility of each modality in the follow up of spinal cord injured children has not been evaluated. It is the purpose of this study to determine the utility of ultrasound and urodynamics for monitoring children following spinal cord injury.

Methods: We retrospectively reviewed 17 consecutive children who sustained a traumatic spinal cord injury. Patients had a mean follow up time of 4.1 years with a range from 2.3 to 7.3 years follow up. Average age at the time of spinal cord injury was 12 years with a range from 2 to 20.1 years. The utility of ultrasound versus urodynamic follow up was evaluated for each child. No financial funding was provided for this study.

Results Obtained: 8 patients had a cervical injury and 9 had a thoracic injury. The results of urodynamics and ultrasounds performed during the follow up period were compared. All patients were treated with clean intermittent catheterization once they were stable and their indwelling catheter had been removed. During the follow up period, 5 patients with cervical spinal cord injuries developed elevated end filling pressures of greater than 40 cm water with decreased bladder compliance on urodynamic testing. Also, 5 children with thoracic spinal cord injuries developed elevated end filling pressures and poor bladder compliance. No patient demonstrated evidence of hydronephrosis on ultrasound during the follow up period. Based on the results of urodynamic testing, anticholinergic medication was started in 12 patients, all 8 of the cervical cord injury patients and 4 patients with thoracic cord injury. Two patients with cervical cord injury and one patient with thoracic cord injury underwent bladder augmentation based on urodynamics results despite a normal ultrasound.

Conclusions: Regular urodynamic follow up is important for children following spinal cord injury in order to detect elevated end filling pressure and loss of bladder compliance which have been associated with decreasing GFR. Ultrasound alone is not sufficient and should not be relied upon to predict normal upper tract function in children following spinal cord injury.
Poster #NM48
RACIAL DIFFERENCES IN BLADDER MANAGEMENT METHODS IN PATIENTS WITH SPINAL CORD INJURY/DISABILITY (SCI/D)
Ashley King, MD¹, Albert Petrossian, MD¹, Blake Anderson, MD¹, David Rapp, MD¹, B. Mayer Grob, MD¹², David Gater, MD, PhD¹² and Adam Klausner MD¹²
¹Virginia Commonwealth University School of Medicine, Richmond, VA; ²McGuire Veterans Hospital, Richmond, VA
(Presented by: Adam Klausner)

Introduction: Data on the prevalence of bladder management methods (BMM) in patients with SCI/D is limited. Our goal was to provide prevalence of BMM and identify factors associated with various BMM in patients with SCI/D.

Methods: A retrospective review was performed on 876 SCI/D patients actively followed at a tertiary Veterans Affairs hospital. BMM were compared according to medical and demographic variables including mechanism of injury, level of injury, age, gender, and race and analyzed using Fisher’s Exact and t-tests with p<0.05 considered significant. Multivariate regressions were used to identify independent risk factors for BMM.

Results: Data on BMM were available on 863/876 patients (98.5%). The majority of patients were Caucasian (449/805, 55.8%). The most common BMM was spontaneous voiding (251/863, 29.1%), followed by intermittent catheterization (IC) and indwelling catheterization [221/863 (25.6%) for both groups]. Of the 440 patients (51.0%) requiring some form of catheterization, IC was less commonly employed than indwelling catheterization for patients with cervical injuries (78/221, 35.3%) vs. patients with lower injuries (143/221, 64.7%; p<0.05). Non–Caucasians used spontaneously voiding (188/356, 52.8%) more commonly than Caucasians (177/449, 39.4%; p<0.05). Caucasian race was an independent risk factor for indwelling catheterization (OR = 1.46, CI: 1.024–2.073; p<0.05).

Conclusions: Our study provides prevalence data for BMM in a large population of SCI/D patients. In our population, Caucasians were more likely to use indwelling catheters and less likely to use spontaneous voiding, which may suggest that there are racial differences in perceptions regarding BMM and access to urologic care.

Poster #NM49
PATTERN OF LOWER URINARY TRACT DYSFUNCTION IN PATIENTS WITH DIABETES MELLITUS, MENTAL RETARDATION AND CEREBROVASCULAR ACCIDENTS
Kelly Johnson, MD and Hari Tunuguntla, MD
UMDNJ/ Robert Wood Johnson University Hospital, New Brunswick, NJ
(Presented by: Kelly Johnson)

Introduction and Objectives: Classic patterns of lower urinary tract dysfunction, including a large bladder capacity with poor sensations in advanced diabetic cystopathy, as well as detrusor overactivity and/or urgency incontinence in patients with either mental retardation or stroke have been described. We set out to determine how commonly these classic patterns exist in these subsets of patients.

Methods: We retrospectively analyzed our urodynamics database of 152 patients to investigate the pattern of lower urinary tract dysfunction in patients with diabetes mellitus (20 patients), mental retardation (six patients) or history of a cerebrovascular accident (six patients). The detailed urodynamic study reports were reviewed to determine the urodynamic diagnosis. No financial funding was provided for this study.

Results Obtained: Our diabetic population ranged from ages 40–83 years, with 60% being males. 25% of patients had classic diabetic cystopathy, manifested by large bladder capacity with poor sensations and overflow incontinence. 35% of patients had bladder outlet obstruction, 15% had stress urinary incontinence, 15% had detrusor overactivity and 10% had a small capacity bladder with early sensations. Our mentally retarded population ranged from ages 15–63, with 67% males. 15% of these patients had classic detrusor overactivity with leak, 33% had detrusor external sphincter dyssynergia, and 50% had bladder outlet obstruction. Our stroke subset ranged in age from 55–83 (all males) and 50% had classic detrusor overactivity with leak, while 50% had bladder outlet obstruction.

Conclusions: Despite expected lower urinary tract dysfunction patterns, patients with diabetes mellitus often exhibit other urodynamic abnormalities. Although detrusor overactivity is the commonly anticipated abnormality in mentally challenged patients and those with CVA, associated conditions such as bladder outlet obstruction should be carefully considered in the diagnostic and therapeutic algorithm. This reinforces the importance of thorough urodynamic testing, since associated urodynamic findings often change management options in these populations.

Poster #NM50
WITHDRAWN
Poster #NM51

OUTCOMES OF ARTIFICIAL URINARY SPHINCTER PROSTHESIS IMPLANTATION FOR TREATMENT OF STRESS URINARY INCONTINENCE IN PATIENTS WITH ILEAL NEOBLADDER

Dominic Lee, MD, Peter Hinh, MD and O. Lenaine Westney, MD
MD Anderson Cancer Center, Houston, TX
(Presented by: Dominic Lee)

Aims: A review on outcomes of artificial urinary sphincter (AUS), AMS−800 (American Medical Systems, Minnetonka, Minnesota) performed in men with severe stress urinary incontinence (SUI) following cystoprostatectomy and orthotopic ileal neobladder formation in a single institution.

Methods: This is a retrospective analysis of nine (9) men who had an AUS implanted for severe stress urinary incontinence following cystoprostatectomy and ileal neobladder formation. Two Validated questionnaires: ICS male (SF) questionnaire and Incontinence Symptom Index (ISI) score was used to quantify the incontinence and quality of life symptoms. The length of stay, operating time, estimated blood loss, urinary symptom and peri-operative pad use, quality of life (QOL) scale and postoperative complications were evaluated.

Results: The mean age of patients was 69 years and the mean duration of follow up was 28.8 months (range 3.8 to 81.7). Five (50.6%) of 9 patients underwent a cuff placement via trans−scrotal route and four (44.4%) via perineal route. Eight (88.9%) out of 9 patients had single cuff insertion while the remaining patient had a tandem cuff. Seven (77.8%) patients had 4.0 cm cuff size implanted and one patient had a 4.5 cm cuff and the tandem cuff patient had 4.0/4.5 cm cuff. Average pad use decreased from 6 to 1 per day (p< 0.005). The mean score on the ICS male(SF) scale was 13.7 and the mean for the ISI symptom score index was 14.2. Complications included 2 cases of explantation for erosion from infection and severe penile tip pain. Mean time to explantation was 3.5 months post AUS implantation. No revisions were required in the remaining patients.

Conclusions: AUS is a feasible option for management of severe stress urinary incontinence in men with orthotopic ileal neobladder following radical cystoprostatectomy. With intermediate term follow up, there is a significant decrease in pad use with concurrent improvement in quality of life. In addition the complication rate is low and is comparable to most series with non high risk features.

Poster #NM52

MALE SLINGS: A COMPARATIVE STUDY OF TWO TECHNIQUES

Melanie Crites, DO and Gamal Ghoniem, MD
Cleveland Clinic Florida, Weston, FL
(Presented by: Melanie Crites)

Objective: Post−prostatectomy incontinence (PPI) can be a devastating side effect after radical prostatectomy, and prior studies have attempted to determine contributing factors to incontinence severity. The objective of this study is to determine the efficacy of bone anchored male sling (BAMS) versus transobturator male sling (TOMS) and attempt to identify pre-operative risk factors contributing to success and/or failure.

Methods: A retrospective chart review was performed from 2000−2010 of patients who underwent BAMS and TOMS placement. Patients with follow−up time <1.5 months were excluded. Data examined included demographics, urodynamic parameters, pad usage, presence of detrusor overactivity (DO), and presence of previous urethral disease. Failure was defined as subjectively reported pad usage of ≥ 4 pads/day post−sling or by < 50% improvement. Pre-operative risk factors for failure were analyzed using Student t test, Wilcoxon test, Fisher’s Exact test, and logistical regression. A p-value <0.05 was considered statistically significant.

Results: Fifty−nine of 64 patients with a mean age of 69.4 years ± 9.3 were analyzed. Five patients were excluded. Forty−one patients received BAMS and 18 patients received TOMS with median follow up of 9 months (1.5−96) and 7 months (1.5−) respectively (p= 0.1). Table I illustrates pre-operative characteristics for male slings. Peri−operative decrease in pad usage was statistically significant for TOMS (3 to 1.5, p<0.004) compared to BAMS (4 to 3.5, p=0.3). Failure rate was 46.3% (19/41) in BAMS and 16.7% (3/18) in TOMS (p=0.03). Analysis of pre-operative risk factors demonstrated LPP, MUP, and UI to be significant for treatment failure in both groups (Table II).

Conclusion: Our cohort demonstrates PPI patients undergoing TOMS have a lower failure rate compared to BAMS. However, this may be secondary to improved patient selection. Additionally, patients with pre-operative risk factors such as increased pad usage, low MUP, low LPP, and presence of UI may not be appropriate candidates for male sling.
Poster #NM53
INFLUENCE OF PREOPERATIVE PELVIC FLOOR MUSCLE STRENGTH ON POST-PROSTATECTOMY INCONTINENCE
Mary Henderson, MD¹, Davina Petrakos, PhD², Erin Glace, PT³ and Robert Given, MD¹
¹Eastern Virginia Medical School, Norfolk, VA; ²Urology of Virginia, Norfolk, VA
(Presented by: Mary Henderson)

Introduction and Objective: Urinary incontinence following radical prostatectomy is a significant clinical problem that compromises patient quality of life. Pelvic floor muscle training (PFMT) has been shown to reduce continence recovery time. There is currently a lack of data regarding preoperative variables that may predict which patients will have earlier return to continence. The objective of this study was to determine whether preoperative pelvic floor strength influences the degree and duration of post-prostatectomy incontinence.

Methods: All patients scheduled for robotic assisted laparoscopic radical prostatectomy were referred to a certified pelvic floor physical therapist. Pelvic floor strength was assessed using EMG evaluation with peri-anal electrodes. Patients were educated and given a home training program. Chart review was performed to obtain post-operative continence data from 6 week and 3 month visits measured by reported pad per day (PPD) usage. Quality of life (QOL) data was obtained using the UCLA Prostate Cancer Index questionnaire. Univariate and cox-proportional hazards analysis were performed.

Results: Baseline data was available for 94 patients. There were 83 patients with 6 week follow-up, 55 patients with 6 week and 3 month follow-up, including 28 which had had 1 and 3 month QOL data available for analysis. No significant correlation was found between pelvic floor strength variables and rates of continence at 6 weeks and 3 months when defining continence at PPD=0. When defining continence as PPD≤1 a higher resting tone was associated with return to continence at the 3 month mark. (p=.0125). The mean preoperative resting tone for those patients who had achieved continence was 6.3 microvolts compared to 3.7 microvolts in those patients with persistent incontinence. As expected those patients who had earlier return to continence had improved urinary function and urinary bother quality of life scores.

Conclusion: Post-prostatectomy incontinence (PPI) is a common complication following radical prostatectomy that significantly affects patient quality of life. PFMT in the pre and post-operative setting has been shown to decrease the time to recovery of continence. We found no significant correlation between pelvic floor muscle strength as a predictor of PPI in this small study, although there did appear to be a trend towards higher pelvic floor muscle resting tone being associated with quicker return to continence.

Poster #NM54
A NEW QUADRATIC SLING FOR MALE STRESS INCONTINENCE
Craig Comiter, MD¹, Eugene Rhee, MD² and Victor Nitti, MD³
¹Stanford University, Stanford, CA; ²Kaiser Permanente, San Diego, CA; ³NYU, New York, NY
(Presented by: Craig Comiter)

Introduction: Objective methods of assessing stress urinary incontinence (SUI) are essential for proper evaluation of post-prostatectomy incontinence (PPI) and for measuring the response to therapy. While symptom score and pad weight may be the most useful methods to evaluate pre-operative vs post-operative SUI status, neither can be used for intra-operative guidance regarding proper sling tensioning. The VIRTUE quadratic sling is a new device for treating PPI that consists of a 5.5 cm x 7 cm large pore polypropylene mesh with two pre-attached inferior (trans-obturator, TO) extensions and two superior (pre-pubic, PP) extensions. We examine the resistance of the sling via measurement of retrograde leak point pressure (RLPP) during the key intra-operative fixation steps.

Methods: As part of the evaluation of a new surgical technique for treating PPI, 8 consecutive men who elected VIRTUE sling surgery were evaluated with RLPP prior to surgery, and at critical stages of sling fixation during surgery. RLPP was measured via perfusion sphincterometry. With a 12F Foley catheter in the penile urethra, and the balloon inflated with 1 cc water, a 1-liter saline bag was connected to the catheter via cystoscopy tubing. The RLPP was recorded in cm water as the height of the fluid column above the symphysis at which fluid flow commences. RLPP was measured: 1) at baseline; 2) after the TO arms were tensioned and secured; 3) after the PP arms were tensioned (assistant pulling PP arms); and 4) after PP arms were secured.

Results: Mean age=71 yrs. Mean baseline RLPP=30±2.9 cm water. After TO fixation, mean RLPP increased to 44±3.4 cm water. After PP tensioning, mean RLPP= 53±4.9, and final RLPP after PP fixation increased to 68±6.4 cm water. Each mean RLPP value for the cohort was significantly higher than the preceding value.

Conclusions: The VIRTUE sling provides urethral compression using a PP approach, and ventral elevation of the bulbous urethra using a TO approach. The four extensions allow for a long segment of urethral compression while avoiding the risks associated with bone screws and retropubic needle passage. Both the TO and PP components of the quadratic fixation contributed to increasing urethral resistance, as measured by intra-operative RLPP. The quadratic fixation technique appears to have a potentially greater ability to provide urethral compression than does a purely prepubic or trans-obturator sling.

Funding: Coloplast
**Poster #NM55**  
**ADVANCE MALE SLING IN IRRADIATED PATIENTS WITH STRESS URINARY INCONTINENCE**  
Jack Zuckerman, MD, Britton Tisdale, MD and Kurt McCammon, MD  
Eastern Virginia Medical School, Norfolk, VA  
(Presented by: Jack Zuckerman)

**Introduction:** Stress urinary incontinence (SUI) is a common complication following radical prostatectomy. The AdVance male sling is an effective, well-tolerated, minimally invasive treatment option with encouraging results. The complication rate and efficacy of its use in patients with a history of prior pelvic radiation is unknown.

**Methods:** A retrospective chart review of all men at our institution with a history prostate cancer and subsequent radiation therapy who were also treated with an AdVance sling for SUI.

**Results:** Between February 2007 and July 2009 an Advance sling was performed in 26 patients who had prior radiation therapy for prostate cancer (22 external beam [EBRT], 2 brachytherapy plus EBRT, 2 brachytherapy alone). The mean patient age was 73.2 years (range 58–89) and the mean body mass index was 27.8 (range 23.5–34.0). Two patients had previous artificial urinary sphincters (AUS), one of which was explanted for erosion prior to the Advance sling; all patients failed conservative management. At an average follow up of 12.1 months (range 0.6–39.7) 22 patients (84.6%) were claiming benefit from the operation. Average pre and post-operative pad use per day was 4.5 and 1.2, respectively. One patient had worsening symptoms, and 3 had no change. Intraoperative complications occurred in two patients (7.7%), both of which were urethral injuries during needle passage and both were repaired primarily and the procedure completed. There were two (7.7%) early complications, including a urinary tract infection (successfully treated) in one and urinary retention requiring clean intermittent catheterization in another. Two late complications occurred (7.7%), including continued retention requiring catheterization in the previously mentioned patient and hematuria (negative cystoscopy) in one of the patients with an intraoperative urethral injury. There were no mesh erosions or infections. Eight patients (30.7%) had some decreased efficacy over time (average 12.5 months) and four of those patients (15.4%) underwent subsequent incontinence procedures (AUS in 3 and redo AdVance in 1). The patient with worse incontinence had his AdVance explanted and subsequent Botox bladder injections.

**Conclusions:** The AdVance male sling can be safely and effectively performed in men who have had previous radiation therapy. Our results are encouraging but long-term follow-up is needed especially in light of the decrease efficacy in 30% of our patients.

---

**Poster #NM56**  
**SURGICAL MANAGEMENT OF URETHRAL COMPLICATIONS FOLLOWING ARTIFICIAL URINARY SPHINCTER EROSION**  
David Hadley, MD and Brian Flynn, MD  
University of Colorado Division of Urology, Aurora, CO  
(Presented by: David Hadley)

**Introduction and Objectives:** Urethral erosion after artificial urinary sphincter (AUS) cuff placement can occur in as many as 5% of patients. Customary practice is to completely remove the AUS and allow the urethra to heal over a Foley catheter. Subsequent, urethral complications and their management, including urethral stricture, diverticulum and fistula, have not been reported. We examined our experience with surgical management of urethral complications following AUS erosion.

**Methods:** A prospectively maintained database of AUS cases, performed by a single surgeon, was analyzed. From 2004–2010, nine men were identified, at a mean age of 76 years, who had significant urethral complications after AUS erosion. Urethral complications were defined as: urethral stricture, urethral diverticulum, and/or fistula. Bladder neck contractures were excluded. All patients had post-prostatectomy incontinence.

**Results:** Mean duration from prostatectomy to first erosion was 7.5 years. A mean of 3.8 incontinence procedures were performed prior to the urethral complication. These included AUS placement, AUS removal, AUS revision, or male sling. Urethral complications included (5) urethral strictures, (1) urethrococutaneous fistula, (1) urethral diverticulum, and (2) with both a fistula and diverticulum. Surgical management of the complication included a ventral onlay buccal mucosa graft in (5), urethral diverticulum and fistula were excised and primarily repaired in multiple layers (one patient had buccal mucosa and a tunica vaginalis flap). At a mean follow-up of 29 months (range 2–72), (5) patients have had successful tertiary AUS cuff placement at a different site, (2) patients are managed with a chronic catheter after tertiary AUS placement and subsequent erosion required explant, (1) patient with a history of radiation required cystectomy, and (1) patient had a stroke after reconstruction and has declined further surgery.

**Conclusions:** AUS erosion can result in complex urethral complications requiring surgical management. While the urethra can heal properly over a Foley catheter, some erosions may require urethral reconstruction at the time of AUS explant. If future urethroplasty is required to repair the defect, tertiary AUS cuff placement in a different location is feasible.
ANALYSIS OF FACTORS AFFECTING EARLY RECOVERY OF CONTINENCE AFTER ROBOT-ASSISTED LAPAROSCOPIC RADICAL PROSTATECTOMY

Jeongyoon Jeong¹, Eun Choi¹, Dong Kang¹, Kelly Johnson, MD² and Isaac Kim, MD, PhD²
¹Cancer Institute of New Jersey, New Brunswick, NJ; ²UMDNJ/ Robert Wood Johnson University Hospital, New Brunswick, NJ
(Presented by: Kelly Johnson)

Introduction and Objectives: Urinary incontinence after radical prostatectomy remains one of the most troublesome surgical complications which can profoundly worsen quality of life of the patient. We have investigated the independent factors affecting early recovery of continence following robot-assisted laparoscopic radical prostatectomy (RALRP).

Methods: After performing more than 500 RALRP over a 4-year period by a single surgeon, we reviewed retrospectively the medical records of 323 patients whose continence recovery was precisely documented. Patients were divided into three groups: patients who became continent within 1 week after urinary catheter removal (Group I), patients who gained continence between 1 week and 3 months after catheter removal (Group II) and patients who became continent after 3 months following catheter removal (Group III). We defined continence as being pad free. Using univariate and multivariate analyses, we evaluated the influence of several different factors related to the operation. No financial funding was provided for this study.

Results Obtained: There were 87 patients (26.9%) in Group I, 169 (52.4%) in Group II and 67 (20.7%) in Group III. Overall, 256 men (79.3%) achieved continence within 3 months after catheter removal. Preoperative sexual health inventory for men (SHIM) score, operative time, intraoperative blood loss, resection of neurovascular bundles and the time interval from the first case of RALRP were associated with early recovery of continence in univariate analysis. Among these factors, SHIM score, intraoperative blood loss and the time interval from the first case were the factors showing significant associations in multivariate analysis.

Conclusions: Almost 80% of the patients gained early recovery of continence after RALRP. The factors which were independently associated with increased chance of early recovery of continence were increasing SHIM score, decreasing intraoperative blood loss and shorter time interval from the first case.

PRESENTATION AND MANAGEMENT OF COMPLICATIONS OF THE ADVANCE MALE SLING

John Stoffel, MD and Arthur Mourtzinos, MD
Lahey Clinic Medical Center, Burlington, MA
(Presented by: Arthur Mourtzinos)

Introduction and Objectives: Although surgical techniques for radical prostatectomy (RP) have been refined, a significant number of patients, even in minor or moderate degrees, suffer from persistent postprostatectomy stress urinary incontinence (PPI). In order to minimize surgical morbidity and costs, perineal sling procedures have been proposed. The AdVance male sling is a treatment option for PPI, with the goal of eliminating urinary incontinence without affecting voiding parameters. A concern of any procedure in treating men with PPI is the presence of significant complications. The purpose of this study was to report the presentation and treatment of complications from this minimally invasive treatment to a tertiary referral practice and to highlight complications reported in the food and drug administration (FDA) device failure database.

Methods: The study was approved by our institutional review board and no financial funding was received. From January 2008 through September 2010, we reviewed all cases of Advance slang complications that presented to our institution. The FDA manufacturer and user facility device experience (MAUDE) database was queried for self-reported complications. We also report our complications related to the procedure.

Results Obtained: A total of 3 patients were referred to the Lahey Clinic Continence Center with voiding dysfunction and pain after sling placement that were found to have a perineal abscess. Treatments required a combination of surgical exploration, drainage and irrigation with antibiotics, as well as mesh excision. The MAUDE database contained 10 complications that were reported for the AdVance male sling. These complications range from intractable pain to unrecognized urethral perforation and subsequent erosion. In our series to date, we have had two patients with persistent post-operative urinary retention after 1 week, one patient with a superficial perineal wound infection treated with antibiotics, one patient with unresolving scrotal pain and another patient with an obturator nerve injury.

Conclusions: Although rare, complications of the AdVance male sling do occur. Devastating complications involving urethral perforations can present with mild urinary symptoms and thus are likely to be under-diagnosed. Many of these cases may require additional reconstructive surgery and subsequent procedures for treatment of underlying incontinence.
MARK YOUR CALENDARS!

SUFU at the AUA 2011
May 14, 2011
Renaissance Washington, DC
Washington, DC

SUFU 2012 Annual Meeting
February 28 – March 3, 2012
The Roosevelt
New Orleans, LA

SUFU 2013 Annual Meeting
February 26 – March 2, 2013
Caesar’s Palace
Las Vegas, NV
PODIUMS

Podium #1

A PENNY FOR YOUR THOUGHTS: A NATIONAL SURVEY OF UROLOGISTS’ VIEWS, ATTITUDES AND PRACTICE PATTERNS IN THE MANAGEMENT OF INTERSTITIAL CYSTITIS/PAINFUL BLADDER SYNDROME
Helen R. Levey, DO, MPH, Leah Nash and Robert Moldwin, MD
The Arthur Smith Institute for Urology North Shore-Long Island Jewish Health System, New Hyde Park, NY
(Presented by: Helen R Levey)

Introduction and Objectives: Interstitial Cystitis/Painful Bladder Syndrome (IC/PBS) is a complex condition characterized by perceived bladder pain and irritative voiding symptoms. The aim of this study was to elicit the views, attitudes, practice patterns and comfort level of urologists managing patients with IC/PBS across the United States (US).

Methods: A validated questionnaire was electronically mailed to 1,000 urologists in 50 states in academic, community, and private practice settings. Physician demographics, beliefs, views and practice patterns with interstitial cystitis/ painful bladder syndrome (IC/PBS) were collected.

Results: We received 212 completed questionnaires (response rate, 21.2%) representative of all 50 states. The mean age range of this study cohort was 27−39 years (35.9%) with 82 responses being from females (40.4%). Most respondents obtained their knowledge base of IC/PBS from residency (83%) or from journal articles (75%). Seventy percent of respondents stated that they were aware of IC/PBS, however 30% either did not feel comfortable diagnosing/treating it, or had doubts whether IC/PBS was a real condition. The most commonly used diagnostic tools were cystoscopy with bladder hydrodistention (70%), voiding diary (60.8%) and the PUF questionnaire (58%). The most common treatments for IC/PBS were pentosanpolysulfate sodium for oral therapies (83%), dimethylsulfoxide (DMSO) for intravesical therapies (69%), and Interstim for surgical treatment (54%). The most common reasons reported for not treating IC/PBS patients in practice, were that it was too time consuming or too costly for their practice (33%), they did not enjoy working with these patients (42%), and inability to cure these patients (35%).

Conclusion: Although most urologists indicate familiarity with IC/PBS and manage patients in a similar fashion, they have variable interests to treat this patient population.

Podium #2

TEMPORAL ASSOCIATION BETWEEN INTERSTITIAL CYSTITIS/BLADDER PAIN SYNDROME (IC/BPS) AND NON-BLADDER CONDITIONS
J. Quentin Clemens, MD, Marc Elliott, PhD, Marika Suttorp, MS, Sandra Berry, MA
RAND Corporation, Santa Monica, CA
(Presented by J. Quentin Clemens)

Introduction: IC/BPS frequently coexists with other chronic conditions such as fibromyalgia (FM), irritable bowel syndrome (IBS), chronic fatigue syndrome (CFS) and depression. However, the temporal association between these various conditions is not well understood.

Methods: As part of the RAND Interstitial Cystitis Epidemiology (RICE) study, we identified 534 women who met a validated case definition for IC/BPS symptoms and also self-reported a diagnosis of “interstitial cystitis” or “painful bladder syndrome”. Each completed a survey which asked about a prior diagnosis of: IBS, FM, CFS, migraines, panic attacks, and depression. If a positive response was received, subjects were asked to provide the date of symptom onset. All subjects were also asked about the onset of IC/BPS symptoms. The temporal order of symptom onset (before or after) for the seven conditions was assessed.

Results: Results are provided in the Table. The bold values indicate the proportion of women diagnosed with the condition. The nonbold values indicate the proportion of women where the symptoms of the column condition started before the row condition. Asterisks indicate values that are significantly different from 0.5, at a significance level of 0.05.

Conclusion: These findings confirm the common co-occurrence of IC/BPS with chronic non-bladder conditions. In women with IC/BPS and coexistent conditions, these data suggest that migraine symptoms occur early, while FM and CFS symptoms occur later. Symptom onset of the mental health conditions (panic attacks and depression) was not consistently earlier or later than the symptoms of the other conditions.

Funding: NIDDK UO1 DK070234
Podium #3
A QUALITATIVE ANALYSIS OF SYMPTOM CLUSTERING AMONG WOMEN DIAGNOSED WITH INTERSTITIAL CYSTITIS/BLADDER PAIN SYNDROME, ENDOMETRIOSIS, VULVODYNIA, AND OVERACTIVE BLADDER

Sarah Outcault, MSc¹, J. Quentin Clemens, MD, FACS, MSCI², Gery Ryan, PhD¹ and Sandra Berry, MA¹
¹RAND Corporation, Santa Monica, CA; ²University of Michigan Medical Center, Ann Arbor, MI

(Presented by: Sarah Outcault)

Background: Women present to physicians with complaints expressed in the form of symptoms. Physicians are faced with the problem of deciding what diagnosis to assign to symptom clusters.

Methods: A total of 599 women with diagnoses of interstitial cystitis/bladder pain syndrome (IC/BPS) and/or endometriosis, vulvodynia, or overactive bladder (OAB) were recruited from the clinical practices of urologists (n=8) and gynecologists (n=15) across the United States and interviewed by telephone. Subjects who reported pain, pressure or discomfort in the lower abdomen or pelvic area were asked to describe exactly what these sensations felt like. Responses were recorded verbatim, coded and analyzed. Network analysis methods were employed to assess the associations among multiple descriptors simultaneously to determine the extent of heterogeneity in patient experience within and across diagnoses. The analysis was restricted to the 473 women who provided codable comments (IC/BPS=215, endometriosis=49, vulvodynia=34, OAB=68, IC plus other=92 and Mixed, not IC=15).

Results: Most diagnoses were associated with at least one clear and interpretable symptom. For example, endometriosis was associated with cramping, vulvodynia with burning and itching, OAB with accidents and unproductive urination, and IC/BPS with urgency, pain before and after urination, pain all or much of the time, and pain located in the urinary tract or bladder. Pain, pressure, bloating, and discomfort were associated with all of the conditions and did not associate closely with any one of them. Burning was associated with being diagnosed with IC/BPS and another condition, possibly due to a co-occurrence of IC/BPS and vulvodynia in some patients.

Conclusions: While some conditions were associated with symptoms that were distinctive, many common symptoms that women describe were associated with many of the conditions. This may make it difficult to assign a clear diagnosis.

Funding: NIDDK U01 DK070234

Podium #4
DOES THE PELVIC FLOOR DISTRESS INVENTORY QUESTIONNAIRE (PFDI-20) ADEQUATELY REFLECT THE VISUAL ANALOGUE SCALE FOR PELVIC PAIN IN WOMEN?

Jason Gilleran, MD¹, Donna Carrico, NP² and Kenneth Peters, MD²
¹MI; ²Royal Oak, MI

(Presented by: Jason Gilleran)

Introduction and Objectives: The visual analogue scale (VAS), a commonly used pain scale for acute and chronic pain, and its relationship to the pelvic floor distress inventory (PFDI) has not been studied in women with pelvic pain (PP). Our objective is to study if the PFDI and individual pain question scores correlate with severity of pain based on the VAS.

Methods: A retrospective review of consecutive women seen at the Beaumont Women’s Urology Center with PP from March to August 2010 was performed. Pelvic pain diagnoses included interstitial cystitis (n=10), vulvodynia (6), pelvic floor muscle dysfunction (14), and other pelvic pain (16). All women completed a PFDI, VAS, Health-Related Quality of Life (HRQoL), and Symptom Severity (SS) at initial visit. Patients were divided into 2 groups: mild pain VAS < 3, and moderate-severe pain VAS > 3. Total PFDI and subset scores, as well as individual questions 1, 2, and 20 were recorded and analyzed, with a score of ‘moderately’ or ‘quite a bit’ considered positive, and compared between women in each VAS group. Pearson’s Chi-square test, when applicable, or Fisher’s Exact test were used for statistical comparison.

Results: A total of 45 women with PP and complete VAS and PFDI data were identified, with a mean age of 55 yrs, of whom 17 and 28 were classified as mild and moderate-severe pain by VAS. Although not statistically significant, there was a trend towards higher rate of positive scores for PFDI questions 1, 2, and 20 for each group. Mean total PFDI scores for mild and moderate-severe pain were 62+46, 94+59, respectively (p=0.09). Mean Pelvic Organ Prolapse Distress Inventory-6, Colorectal-Anal Distress Inventory-8, and Urogenital Distress Inventory-6 scores for mild pain were 26+17, 12+15, and 24+30, while for moderate-severe pain were 32+22, 19+20, and 44+30, with a statistically significant difference observed in UDI-6 scores between those with VAS < 3 and > 3 (p<0.05). Mean SS and HRQoL scores were 31+30 and 70+28 in the mild, and 41+26 and 54+32 in the moderate-severe pain groups, respectively (p=0.20 and 0.17).

Conclusions: Individual pain-related questions, total PFDI, SS, and HRQoL may not correlate with a single VAS score at initial visit for pelvic pain. There was a higher total UDI-6 score in those with moderate-severe pain. Women presenting with symptoms of urinary distress should also be assessed for PP comorbidities.
INCREASING POPULATION USE OF MEDICATION CHANGES INDICATIONS AND FREQUENCY OF SURGERY FOR BPH. THE ICELANDIC EXPERIENCE

Johann Ingimarsson, MD¹, Helgi Isaksson, MD², Hermann Sigbjarnarson, MD¹ and Gudmundur Geirsson, MD, PhD²
¹Dartmouth-Hitchcock, Lebanon, NH; ²Landspitali-University Hospital, Reykjavik, Iceland
(Presented by: Johann Ingimarsson)

Introduction: Studies have shown a declining rate of surgery for Benign Prostatic Hyperplasia (BPH) worldwide since the introduction of BPH medication. The correlation of increasing population use on changing surgical indications, surgical population demographics, cost and complications is less clear.

Methods: Information on numbers of surgeries from 1984 to 2008 was obtained from hospital registries where such procedures were done. The number and cost of Defined Daily Doses (DDD) of BPH medication sold was obtained from the Icelandic Medicines Control Agency. Operation costs were calculated based on Diagnostic Related Groups information from Landspitali University Hospital. Charts of all BPH surgical patients in Iceland from 1998 to 2008 were retrospectively reviewed. Demographic variables, indications, prior medication use, complications etc. were recorded.

Results: Since the introduction of BPH medication in 1989, sales increased by a near linear annual rate of 2.3 and 0.5 DDDs/1000 men above the age of 40 (M40+), for alfa−blockers and 5−alfa reductase inhibitors respectively. In 2008, 52 of 1000 M40+ used BPH medication, while 2.2 of 1,000 M40+ had BPH surgery, down from 19.3, fifteen years earlier. Specifically, in the last decade, surgeries for lower urinary tract symptoms and resolving urinary retention decreased significantly. Meanwhile, the number of surgeries for hematuria, cystolithiasis and chronic retention, did not decrease. Furthermore, a significant increase in the indications hydronephrosis and recurrent urinary tract infections (UTI) was observed. These changes led to decreased cost of BPH management in Iceland. Neither type of surgery (TURP in 94% of cases) nor median age of surgical patients (70.9) changed. Among men operated for absolute indications, a history of failed medical therapy was more common in the later years of the study. Complication rates rose, primarily due to significant increase in post operative UTIs.

Conclusion: At the same time as increasing number of men are seeking medical treatment for BPH symptoms, the frequency of surgery continues to decrease, in large part as less advanced disease is treated medically. In Iceland, the majority of BPH medication prescribed is alfa−blockers, which do not affect prostatic growth. This may in part explain why the absolute number of surgeries for advanced disease has not decreased and a higher proportion of surgical patients present with more advanced disease.

DOES THE EXTENT OF EVALUATION OF LOWER URINARY TRACT SYMPTOMS (LUTS) IMPACT THE SUCCESS OF BLADDER OUTLET REDUCTION SURGERY (BORS)?

Matthew McIntyre, MD, Scharan Clarke, Samuel Nickles, MD, Amy Wahlquist, MS and Stephen Savage, MD
MUSC, Charleston, SC
(Presented by: Matthew McIntyre)

Introduction: The evaluation of LUTS prior to BORS varies among surgeons. Although many voiding dysfunction specialists advocate pressure−flow testing, this is not mandatory by AUA guidelines. Herein, we present our experience in a contemporary cohort of 187 patients undergoing BORS by multiple providers to see if extent of preoperative evaluation affected surgical outcome.

Methods: We performed a retrospective chart review of a series of 187 patients undergoing BORS by 7 providers. Preoperative factors including history, extent of evaluation and medical therapy were recorded. Post−operative length of catheterization, recatheterization, hospital stay, flow rate (FLO), PVR, AUASS, medical therapy, and UTI were recorded.

Results: The mean age was 70 and 8 patients had neurologic disease. 91 patients had UDS, 48 had FLO/PVR, 48 had no formal evaluation (NFE). After listing providers by numbers, the percentage of each evaluation by providers (UDS, FLO, NFE) revealed #1 (16%, 46%, 38%), #2 (46%, 10%, 45%), #3 (95%, 0%, 5%), #4 (75%, 15%, 10%), #5 (39%, 44%, 17%) with providers 6 and 7 contributing only one patient each. The groups showed no significant differences in AUASS or FLO pre−operatively. Retention was seen in 24, 2, and 3 patients respectively. Incontinence was found in 6, 2, and 2 respectively. The percent of each BORS (TURP, PVP, TUIP) performed by cohort was 40%, 53%, 8%, for CMG; 30%, 66%, 4% for FLO and; 56%, 38%, 2% for NFE. There was no difference in catheterization time. Re−catheterization was seen in 16, 5, and 2 patients respectively. Table I illustrates the changes in symptoms and flow rates. Twenty patients (21%) in the UDS group restarted outlet reducing medical therapy compared to 4 (8%) in the FLO and 1 (2%) in NFE group.
Conclusions: In our series the evaluation for BORS did not make a clinically significant difference in patient outcomes, although it varied widely by provider. This would suggest that invasive urodynamic testing is not a requirement for successful surgical intervention. Further prospective evaluation may better indicate those patients who would benefit from more invasive testing.

Introduction and Objectives: The relationship between non-neurogenic urgency incontinence (UUI) and detrusor overactivity (DO) is unclear; both etiology and mechanism underlying therapeutic response are unknown. We enrolled older women with UUI in a prospective, clinical-urodynamic (UD) study to identify physiological parameters that predict/mediate response to biofeedback pelvic floor muscle training (BFB), so revealing therapeutic mechanism.

Methods: Cognitively and functionally intact, community-dwelling women > 60 yrs with > 2 UUI episodes (UUIE) per week underwent detailed clinical evaluation, bladder diary, pad test and comprehensive videourodynamics before and after therapy by EMG-based BFB (4 clinic visits + home practice). Therapeutic response was based on bladder diary. Potential predictors and mediators were selected a priori, grouped into 4 physiological domains (bladder proprioception, contractility, DO characteristics, and sphincter adequacy), with 7 additional confounding variables.

Results: In 183 subjects (mean 74yrs) BFB reduced UUIE from 3.6 to 2.0 and leakage from 43g to 19g per 24 h. 55% had ≥ 50% reduction in UUIE; 13% were completely dry. Baseline UUIE was a significant confounding predictor (P = 0.04). With <1 UUIE per 24h, chance of becoming dry was 35%, therefore prediction/mediation results were controlled for baseline UUIE. BFB led to significant changes in 6 UD variables (P = 0.001–0.047) in 2 domains (proprioception and DO characteristics) and in 4 potential confounders. Only 4 UD variables were significant predictors (proprioception (P = 0.05), DO characteristics (P = 0.007), sphincter adequacy (P = 0.05), contractility (P = 0.03)); only 2 (DO characteristics) were significant mediators (P = 0.01, 0.04). DO was elicited in 43% at baseline; high DO velocity and amplitude predicted poorer outcome. DO presence did not predict response, but was a mediator: clinical improvement was associated with reduction in DO prevalence from 40 to 31%.

Conclusions: BFB is effective, especially in those with less frequent UUI—helpful information for patient counseling. UD changes can be detected among responders: proprioception and characteristics of DO are altered; correspondingly, voiding is less frequent, reducing pre-emptive voiding. The main mechanism of improvement is reduction in DO elicitability, reflecting how BFB improves control of continence and voiding.

Funding: by the NIH 5RO1AG020629–02
DEFINING OAB: DISAGREEMENT AMONG THE EXPERTS

Una Lee, MD¹, Victoria Scott¹, R. Rashid¹, A. Behniwal¹, Sally Maliski¹ and Jennifer Anger, MD, MPH²
¹Los Angeles, CA; ²Cedars-Sinai, UCLA, Los Angeles, CA
(Presented by: Una Lee)

Objectives: Overactive Bladder (OAB) is defined by the International Continence Society as a urinary urgency, with or without urge urinary incontinence, usually with frequency and nocturia. Under the current definition, people with very different clinical conditions, including urge incontinence, bladder hypersensitivity/pain without leakage, and even polyuria, fall under the OAB umbrella. With the goal of improving the care for women with OAB, we sought to better understand experts' perceptions of OAB as it is presently defined.

Methods: Twelve interviews with leading experts in urinary incontinence and OAB were performed. Practitioners with expertise in both urology and gynecology were interviewed. Questions were asked about their perception and agreement with the current definition of OAB, as well as their preferred diagnostic work-up. Interviews were audiotaped and transcribed verbatim. Grounded theory methodology, as described by Charmaz, was used to analyze the data qualitatively. Briefly, this includes initial line-by-line coding of transcripts utilizing key phrases, followed by a grouping together of similarly-coded phrases into preliminary themes. Preliminary themes were then grouped together to develop categories, from which core categories, or emergent concepts, were derived.

Results: Overall, there was a great deal of variability in defining OAB. Four categories of definitions were derived from the qualitative analysis. The corresponding expert quotes are shown in Table 1. There was great variability in work-up. Ten diagnostic tests used in the work-up of OAB were frequently mentioned by experts as either mandatory or unnecessary. The most pronounced emergent themes was that there remains a lack of consensus over the current definition of OAB.

Conclusions: It appears that few experts agree on the present definition and work-up of OAB. Although the currently used definition of OAB may possibly allow for better patient understanding of the condition, its utility in both clinical and research settings may be limited.

THE VIRTUE SLING FOR POST-PROSTATECTOMY INCONTINENCE – SAFETY, EFFICACY, AND URODYNAMIC CHANGES AT 6 MONTHS FOLLOW-UP

Craig Comiter, MD¹, Eugene Rhee, MD² and Victor Nitti, MD³
¹Stanford University, Stanford, CA; ²Kaiser Permanente, San Diego, CA; ³NYU, New York, NY
(Presented by: Craig Comiter)

Introduction: The Virtue Male Sling (Coloplast, Humlebaek, Denmark) is indicated for the surgical treatment of male stress urinary incontinence (SUI), and is designed to provide a broad area of urethral compression and to achieve proximal relocation of the membranous urethra. We report on the initial cohort undergoing implantation of this new device.

Methods: A prospective, multi-center study was performed to assess the efficacy and safety of the Virtue Male Sling. A 24-hour pad test, uroflowmetry, measurement of post void residual urine (PVR), the International ICIQ-SF, and the incontinence section from the UCLA–RAND questionnaire were completed pre-operatively and at 1.5, 3, and 6 months postoperatively. Query regarding adverse events and the Patient Global Impression of Improvement (PGI-I) questionnaire was administered post-operatively.
**Results:** Mean age was 67 years. 80 men with 6 month follow−up were studied. 24−hour pad weight improved from median=200 to 71 g (p<0.001). Overall, 79% of men realized a decrease in pad weight, and 54% had >50% reduction in pad weight at 6 months. On the PGI-I, 67% of patients reported subjective improvement at 6 months, while 23% had no change, and 10% had worse incontinence. UCLA−RAND scores improved in the domains of bother (mean 38.9±34.1 vs 13.7±20.7, p<0.001) and function (mean 37.7±28.1 vs 17.1±12.6, p<0.001) at 6 months compared to baseline. ICIQ−SF scores also improved (mean 11.7 ± 6.5 vs 16.6±3.2). There was no significant change in maximum urinary flow rate following surgery (mean =20±10 vs 23 ±18 ml/s) or in PVR (16±27 vs 15±48 ml). Adverse events included 1 instance each of bladder perforation, wound infection, hematoma, urinary infection, and urinary retention requiring recatheterization, all of which were managed non−operatively. 11% and 13% of patients reported paresthesias and post−operative perineal pain, respectively.

**Conclusions:** The Virtue sling is associated with significant improvements pad weight, pad use, and quality of life. The sling is associated with few complications, and does not adversely affect voiding function. Longer−term follow−up will determine the ultimate success of this novel quadratic sling, which combines a trans−obturator and prepubic approach, providing urethral elevation and compression. Modifications of the surgical technique, including improved sling fixation, should improve outcome even more than is observed in this initial cohort study.

**Funding:** Coloplast

---

**Podium #10**  (*Not CME Accredited*)

**THE EFFECT OF EXTERNAL BEAM RADIATION ON URODYNAMIC PARAMETERS AND PATIENT SATISFACTION IN MEN WITH POST-PROSTATECTOMY INCONTINENCE**

Eva Fong, MD, Benjamin Brucker, Abdullah Demirtas, MD, Daniela Kaefer, BA, Nirit Rosenblum, MD and Victor Nitti, MD

NYU Medical Center

(Presented by: Benjamin Brucker)

**Aim:** To compare urodynamic findings and patient satisfaction following post-prostatectomy incontinence surgery for men with and without a history of pelvic external beam radiation.

**Method:** Retrospective review of urodynamic and clinical data of men in a post-prostatectomy database who had undergone artifical urinary sphincter or male sling from a single institution January 2004 to January 2009. Prospective questionnaire study of urinary incontinence symptoms and patient satisfaction of subjects from the same database. External beam radiotherapy (XRT) given after radical prostatectomy or transurethral resection of the prostate, salvage prostatectomies after XRT were excluded. SPSS was used to perform chi−square, correlations and the Fisher Z−transformation where appropriate.

**Results:** 51/274 men had undergone both external beam radiation and PPI treatment. The radiation group was slightly older (mean 71) than those who had not (67). (p=0.05). There was no significant difference in the pre-operative pad test; radiation 364g vs no radiation 255g (p= 0.557). Those with radiation were more likely to have detrusor overactivity than those without, (Chi−square= 22.2, p =0.001). Radiated men had a lower mean maximal cystometric capacity (251cc) those who had not, 335cc (p=0.012). There was no significant difference in mean Valsalva leak-point pressure (VLPP) in radiated (78.6 cmH20) vs non-irradiated subjects (80.6 cmH20). (p=0.794). Questionnaire response rate was 47% in radiated versus 45% in non-irradiated subjects. In the non-irradiated group 75% had a PGI-I of 1 or 2 compared to 63% in the radiation group. There was no significant difference in success on PGI-I between the radiated and non-irradiated groups. (chi square 1.6, p = 0.203).

There was no difference in the mean total MESA-stress incontinence score (MESA-SUI, Q 1-9): 11.7 in the radiation group versus 11.6 in non-radiation group. (p=0.922 There was a difference in the mean MESA-total UUI score, (MESA-UI Q10-15) which was higher in the radiation group (7.3) versus non-radiation (4). (p=0.038)

**Conclusion:** Men who had undergone radiation in addition to prostatectomy had more detrusor overactivity prior to and higher MESA-UI component scores after PPI treatment. However there was no difference in stress incontinence severity either prior to or after surgical PPI treatment and overall global improvement assessed by PGI-I was equivalent to that in non-irradiated men.

---

**Podium #11**

WITHDRAWN

**Podium #12**

WITHDRAWN
Podium #13
DURABILITY OF SUBJECTIVE OUTCOMES OF THE ADVANCE SLING: INITIAL INSIGHTS

Bradley Gill, BSE, Hanhan Li, BS, Amy Nowacki, PhD, Hadley Wood, MD and Sandip Vasavada, MD
Cleveland Clinic, Cleveland, OH
(Presented by: Bradley Gill)

Introduction and Objectives: The male transobturator sling is an option for treating mild to moderate post-prostatectomy incontinence (PPI). Studies have shown its success in treating PPI. This study investigated the durability of its efficacy.

Methods: Chart review and telephone follow-up survey was conducted of all patients who received an AdVance sling prior to 2010 from either of 2 surgeons at our tertiary center. This included 23 men given previous follow-up surveys in 2008. Chart review collected demographics and details of prostate and PPI management. The telephone survey included the Patient Global Impression of Improvement (PGI-I) and Severity (PGI-S), questions on pad type, quantity, and usage habits, and questions on durability and change in sling efficacy.

Results: A total of 55 patients (mean age 68, BMI 27) received the sling at median 24[Q1–Q3: 14–69] months post-prostatectomy, with 38% being open abdominal, 49% laparoscopic/robotic, 4% perineal, and 9% of unknown type. Prior PPI treatments included Kegel exercises (27%), external clamp (9%), anticholinergics (27%), collagen (11%), durasphere (2%), bone-anchored sling (2%), and artificial urinary sphincter (9%). At baseline, a mean 2.6 pads were used daily with a 24-hour pad weight of 141[56–367] g and valsava leak-point pressure of 85[55–111] cmH2O. Follow-up was successful in 50(91%) of patients at an average 21 months after sling with a mean 1.6(2.4) pads used daily (p<0.0001 vs baseline). Patients reported their PPI was “very much” (40%), “much” (18%), and “a little” (16%) better, with 14% “unchanged”, and the rest being “a little” (4%), “much” (6%), and “very much” (2%) worse than baseline. A total of 26% (14) patients pursued further PPI treatment with bulking injections (3), AUS (4), external clamps (3), exercises (3), medications (2), and acupuncture (1). Change in efficacy from post-op to survey was “much better” (12%), “a little better” (14%), “unchanged” (41%), “a little worse” (12%), and “much worse” (10%) per patients, with 10% noting it “did not help any”. No patients felt anything “slip or give out” or “tear or pull” with lost efficacy. Men surveyed twice (N=20, mean 6.6 & 28.1 months) reported increased mean daily pad use (1.3 to 2.3, p=0.03) in the interim, yet interestingly more gave improved (6) than worse (3) PGI-I responses on second survey.

Conclusions: The AdVance sling can improve PPI, but may require subsequent therapy and its perceived benefit decreases in some patients with extended follow-up.

Podium #14
URODYNAMIC CHANGES 12 MONTHS AFTER RETROPUBIC AND TRANSOBTURATOR MIDURETHRAL SLINGS

Stephen Kraus, MD, Gary Lemack, MD, Toby Chai, MD, Wendy Leng, MD, Michael Albo, MD, Elizabeth Mueller, MD, Lary Sirls, MD, Tracy Wilson, MD, Liyuan Huang and Heather Litman, PhD
1University of Texas Health Science Center, San Antonio, TX; 2University of Texas Southwestern, Dallas, TX; 3University of Maryland, Baltimore, MD; 4University of Pittsburgh, Pittsburgh, PA; 5University of California San Diego Medical Center, San Diego, CA; 6Loyola Medical Center, Maywood, IL; 7William Beaumont Hospital, Royal Oak, MI; 8University of Alabama, Birmingham, AL; 9New England Research Institutes, Watertown, MA
(Presented by: Stephen Kraus)

Introduction and Objectives: To determine if changes in urodynamics (UDS) parameters after midurethral sling (MUS) differ between retropubic midurethral sling (RMUS) and transobturator midurethral sling (TMUS) procedures and whether they are associated with successful treatment outcomes.

Methods: The Trial of Midurethral slings (TOMUS) was a prospective randomized equivalence trial conducted at 9 sites, comparing 12 month subjective and objective outcomes of RMUS and TMUS. 597 women were randomized to RMUS or TMUS and underwent standardized UDS before and 12 months after surgery. UDS parameters are listed in table. Objective outcomes included: 300 cc bladder stress test, 24 hour pad test and stress urinary incontinence (SUI) retreatment. Subjective outcomes included: self report of SUI, 3 day voiding diary and retreatment of SUI. Linear models were fit to assess change in UDS measures from baseline to 12 months by treatment group and success status. Contingency tables were constructed for categorical measures; chi-square tests were used to test for associations.

Results: See Table. After MUS, both maximum (Qmax) and average uroflow rates were decreased on noninvasive uroflow (NIF), sensations were delayed and maximum urethral closure pressure (MUCP) decreased with no change in urethral length. Qmax was deceased while Pdet@Qmax slightly increased. No differences in UDS parameters between procedures were seen and no changes in UDS parameters correlated highly with either subjective or objective outcomes. Rates of denovo detrusor overactivity (DO) was similar between both procedures (p=.61) and no difference was seen in the rates of resolution of DO (p=.79).
**Conclusions:** MUS procedures were associated with decreased flow rates and minimal increases in voiding pressures. Interestingly, no changes in urethral closure pressures were seen. Changes in UDS parameters did not differ by treatment group and were not associated with MUS subjective or objective outcomes.

---

**Podium #15**

**URODYNAMIC DIFFERENCES BETWEEN DYSFUNCTIONAL VOIDING AND PRIMARY BLADDER NECK OBSTRUCTION IN WOMEN**

Benjamin Brucker, MD, Eva Fong, MD, Christopher Kelly, MD, Sagar Shah, MD, Nirit Rosenblum, MD and Victor Nitti, MD

Department of Urology New York University Langone Medical Center, New York, NY

(Presented by: Benjamin Brucker)

**Objectives:** The two most common causes of “functional” bladder outlet obstruction (BOO) in women are dysfunctional voiding (DV) and primary bladder neck obstruction (PBNO). Traditionally the diagnosis is made by video urodynamics (UDS) which requires simultaneous fluoroscopy. We sought to determine differences in the clinical and UDS presentations of these entities and the value of simultaneous fluoroscopic imaging.

**Methods:** A retrospective review of a single institution video UDS database (3/03–8/09) was conducted. Patients were excluded if there was no pressure flow study available. A diagnosis of DV was made when there was increased external sphincter activity during voiding noted on EMG or fluoroscopy. PBNO was diagnosed when there was a sustained voluntary detrusor contraction with a failure or delay of bladder neck opening on fluoroscopy. Flow patterns were confirmed on non-invasive uroflowmetry. Demographic data, symptoms, and UDS parameters were collected. Comparisons were made utilizing chi-squared and two tailed t-tests.

**Results:** From 157 women diagnosed with BOO, DV was diagnosed in 38 and PBNO in 16. Patients with DV were younger than those with PBNO (40.9 vs. 59.2 yrs, p<0.001). UDS findings are summarized below. Patients with DV, had a higher mean Qmax and lower mean PVR. Non-invasive Qmax and PVR confirmed these findings. No significant difference was seen in the maximum Pdet or PdetQmax. There was no difference in the incidence of DO (26.3% DV vs. 31.3% PBNO, p=.71). EMG showed increase activity during voiding in 79.4% of DV and 14.3% of PBNO (p<0.001). Women with DV had clinically had more storage symptoms than PBNO (61% vs. 38%, p=0.13) and fewer voiding symptoms (53% vs. 75%, p=.13), but this was not significant.

**Conclusion:** Clinically women with DV and PBNO have similar presentations, though those with PBNO have poorer emptying. Flow rates and patterns seem to differ between DV and PBNO but voiding pressures are similar. Fluoroscopy proved to be valuable in diagnosing and differentiating the two entities. EMG alone would have given the wrong diagnosis in 20.6% of DV (false negative) and 14.3% of PBNO (false positive). Video UDS are of significant value in diagnosing and differentiating these entities.
Introduction: The aims of this study are to confirm whether or not detrusor after—contraction (DAC) is a true contraction with a new approach and to understand clinical implication of DAC.

Materials and Methods: A retrospective analysis was performed in 2,309 patients with neurogenic or non-neurogenic voiding dysfunction. Investigators asked patients to cough when a detrusor contraction occurred after cessation of urinary flow. No simultaneous change of detrusor pressure (Pdet) could confirm that the detrusor contraction was a true DAC. Patients were subcategorized according to the presence of large postvoid urine volume or dyssynergia in electromyography, the amount of Pdet change, and multiplicity.

Results: Detrusor contraction occurred after cessation of urinary flow in 245 patients (10.6%). Fifty-seven patients (23.3%) of them were regarded as artifacts. DAC was finally found in 188 patients (132 males, 5.7% and 56 females, 2.4%). Mean increase of Pdet was 22.6±11.2 cmH2O in males and 18.6±7.9 cmH2O in females. DAC occurred more frequently as males became older. The detrusor pressures at maximal flow were higher in the patients with DAC and patients with bladder outlet obstruction had an increased risk of the presence of DAC in both genders. Males with benign prostatic hyperplasia and females with multiple sclerosis had an increased risk of the presence of DAC.

Conclusions: DAC was a true contraction. The occurrence of DAC was significantly correlated with neurogenic and non-neurogenic conditions. The presence of DAC was significantly correlated to the presence of BOO.

Introduction and Objective: Abdominal straining during the voiding phase has been commonly seen among women during pressure flow studies (PFS). It has been debated if this is an artifact of urodynamic (UDS) testing or a normal variant in female voiding. Using a prospective design, we sought to evaluate whether the 7-french urethral UDS catheter is the cause of previously noted abdominal straining patterns on UDS in women.

Methods: Thirty women with various etiologies of voiding dysfunction were prospectively included for evaluation. Patients with neurogenic etiology, pelvic organ prolapse or previous anti-incontinence procedures were excluded. To evaluate for abdominal straining in the absence of a urethral catheter, all women underwent free flow uroflowmetry (FFS) with a rectal manometer balloon in place to capture abdominal pressure tracings. This same set of women then underwent standard multi-channel video UDS using a 7-french double lumen urethral catheter, rectal balloon manometer and perineal patch electrodes. Statistical analysis using a paired t-test or Chi-square test was used to evaluate differences between the testing groups.
Results: Thirty women, with a mean age of 50.8 years (range 23–78), completed both the free flow and pressure flow studies. Abdominal straining was seen in 33% (10/30) of patients undergoing FFS compared to 60% (18/30) undergoing PFS with a urethral catheter in place. Maximum abdominal pressure (Pabd) and Pabd at Qmax was significantly elevated during PFS compared to the FFS (37.7cmH20 versus 17.7cmH20, p = 0.0005) and (12.4cmH20 versus 5.8 cmH20, p = 0.001). No difference was observed for maximum flow rate (Qmax) (15.33 mL/s for FFS versus 15.97 mL/s for PFS, p=0.69). Time to Qmax was significantly longer during the PFS compared to the FFS (19.8s versus 8.26s, p = 0.0031).

Conclusion: Our data demonstrates an increase in the amplitude and frequency of abdominal straining during PFS with a urethral catheter in place when compared to FFS. The increase in the maximum abdominal pressure indicates that the catheter causes some urethral resistance that must be overcome by straining. Similarity in flow rates between the 2 groups is likely due to compensation by increased abdominal straining in the PFS to reach Qmax. This is further supported by the observation of an elevated time to Qmax in PFS study group.

Podium #18*

BOTULINUM TOXIN-A FOR REFRINGATORY DETRUSOR OVERACTIVITY IN WOMEN: A 240 PATIENT RANDOMISED PLACEBO CONTROLLED TRIAL

Douglas Tincello, BSc, MBChB, MD, FRCOG¹, Mark Slack, MBBS, FRCOG², Sara Kenyon, PhD³, Christopher Mayne, MBBS, FRCOG⁴, Philip Toozs-Hobson, MBBS, FRCOG⁵, Keith Abrams, PhD⁶ and David Taylor, MBBS, FRCOG⁷

¹University of Leicester; ²Addenbrooke’s Hospital, Cambridge; ³University of Birmingham; ⁴University Hospitals of Leicester NHS Trust; ⁵Birmingham Women’s Hospital (Presented by: Douglas Tincello)

Introduction and Objectives: Botulinum toxin (BoNT-A) has become a common treatment for refractory idiopathic detrusor overactivity (IDO) although only three small randomised trials (RCT) have been completed. This large study was conducted to examine efficacy and safety of BoNT-A for refractory IDO in women.

Methods: Women with refractory IDO & at least 8 voids & at least 2 urgency episodes/24 hours were enrolled in a double blind, randomised, placebo controlled trial. Women were randomly assigned (computer generated, pre-packaged drug packs) to receive botulinum toxin A (BoNT-A) (200iu BOTOX, 10iu/ml, 20 sites) or placebo (injection vehicle) given via flexible or rigid cystoscopy. Women were reviewed at 6 weeks, 3 months (postal) and 6 months. Primary outcome was voiding frequency/24 hours at 6 months. Secondary outcomes included daily urgency & incontinence episodes; urgency severity score (IUSS); & quality of life data (ICIQ-SF, QoL). To detect a difference in voiding frequency of 1.29 episodes/24 hours (equivalent to the published effect size of solifenacin over placebo)[1] required 240 women (80% power, 5% significance). Study funding: Wellbeing of Women & Moulton Charitable Trust. Drugs provided by Allergan. Scottish Multicentre Research Ethics Committee approval (ref: 04/MRE10/67). Trial registration: Current Controlled Trials (ISRCTN26091555). EudraCT number (2004–002981–39).

Results: 240 women were randomised (122 BoNT-A; 118 placebo). Baseline parameters were similar (mean voiding frequency 11.2 vs 11.2; urgency episodes 8.1 vs 8.0; leaks 6.4 vs 6.1). At 6 months (116 BoNT-A, 111 placebo) there were significant reductions in voiding frequency (8.7 vs 10.5), urgency episodes (4.4 vs 6.8), leakage episodes (3.3 vs 5.7) & QoL score improvements in BoNT-A treated women. 30% of BoNT-A treated women vs 12% of placebo treated women were continent.

Conclusions: This study, the largest RCT completed, confirms the efficacy of BoNT-A for IDO. BoNT-A produced 25% reduction in frequency & 50% reduction in urgency & leakage with a third of women achieving continence. There is a considerable placebo effect and long term need for self-catheterisation is about 1 in 8 women.

Podium #19

CAFFEINE INTAKE AND RISK OF STRESS, URGENCY, AND MIXED URINARY INCONTINENCE

Ying Jura, MD¹, Mary Townsend, ScD², Gary Curhan, MD³, Neil Resnick, MD⁴ and Francine Godrost, ScD³

¹Massachusetts General Hospital, Boston, MA; ²Harvard School of Public Health, Boston, MA; ³Brigham and Women’s Hospital, Boston, MA; ⁴School of Medicine, University of Pittsburgh, Pittsburgh, PA

(Presented by: Ying Jura)

Introduction and Objectives: Although caffeine consumption is common, and is generally believed to affect bladder function, little data are available regarding the association between caffeine intake and incident urinary incontinence. We prospectively investigated the relation between caffeine intake and incident urinary incontinence in 65,176 community-dwelling women aged 37 to 79 years in the Nurses’ Health Study cohorts who did not have urinary incontinence.

Method: Incident incontinence was identified from questionnaires during 4 years of follow-up in each cohort (2000–2004 in the Nurses’ Health Study and 2001–2005 in Nurses’ Health Study II). Daily caffeine intake was measured using validated food frequency questionnaires administered prior to incontinence development. Multivariable-adjusted hazard ratios for the relation of caffeine intake to incontinence risk were calculated, as well as attributable risks.

Results: Overall, women with the highest caffeine intake had a modest, significantly increased risk of developing incontinence at least weekly compared to women with the lowest intake (HR 1.19, 95% CI 1.06–1.34, comparing >450 vs. <150 mg/day). There was a significant trend of increasing risk with increasing intake (p-value for trend = 0.01). This risk appeared focused in incident urgency incontinence (HR 1.34, 95% CI 1.00 – 1.80 comparing >450 vs. <150 mg/day, p-value for trend = 0.05), but not stress or mixed incontinence (p-values for trend = 0.75 and 0.19, respectively). The attributable risk for urgency incontinence associated with high caffeine intake (>450 mg/day) was 25%.

Conclusions: Our findings suggest that high caffeine intake, but not lower levels, is associated with a modest increase in incident urgency incontinence; one-quarter of incident urgency incontinence among women with the highest level of caffeine consumption might be eliminated with caffeine reduction. If these findings are confirmed in future studies, counseling to reduce caffeine consumption may be an important component of managing urgency urinary incontinence in women.

Podium #20

EVALUATING THE QUALITY OF URINARY INCONTINENCE AND PROLAPSE TREATMENT (EQUIPT) STUDY: QUALITY INDICATOR DEVELOPMENT FOR URINARY INCONTINENCE

Aqsa Khan, MD¹, Krista Kiyosaki², Victoria Scott³, Claudia Sevilla⁴, Sarah Connor, MPH¹, Carol Roth, RN, MPH⁴, Mark Litwin, MD, MPH¹, Larissa Rodriguez, MD¹, Neil Wenger, MD⁵, Paul Shekelle, MD, PhD⁶ and Jennifer Anger, MD, MPH⁶

¹Department of Urology, University of California, Los Angeles, CA; ²University of Hawaii Medical School, Honolulu, HI; ³David Geffen School of Medicine, University of California, Los Angeles, CA; ⁴Southern California Evidence-Based Practice Center RAND Corporation, Los Angeles, CA; ⁵Department of Medicine, University of California, Los Angeles, CA; ⁶Department of Urology, Cedars-Sinai Medical Center, University of California, Los Angeles, CA

(Presented by: Aqsa Khan)

Objective: With the ultimate goal of measuring the quality-of-care provided to women with pelvic floor disorders (PFDs), we sought to develop and rate a set of quality-of-care indicators (QIs) for the work-up and management of urinary incontinence (UI).

Methods: An extensive literature review was performed to develop a set of 36 potential quality indicators for the management of urinary incontinence. QIs were modeled after those previously described in the Assessing the Care of Vulnerable Elders (ACOVE) project. Indicators specific to the management of stress urinary incontinence (SUI) and urge urinary incontinence (UUI) were also developed. Nine experts were asked to rate the indicators on a nine-point scale for both validity and feasibility. Analysis was performed on preliminary rankings of each indicator using the RAND Appropriateness Method. A forum was then held in which each indicator was thoroughly discussed by the panelists as a group, after which the indicators were rated a second time individually using the same nine-point scale. Based on the post-discussion ratings, quality indicators that received a median score of greater than or equal to seven were passed.

Results: Quality indicators were developed that addressed prevention, screening, diagnosis, work-up, and and both nonsurgical and surgical management. Sixteen indicators addressed general UI, sixteen indicators specifically addressed SUI, and nine addressed UUI. Areas of controversy included whether routine screening for UI should be performed, whether urodynamics should be performed before non-surgical management is initiated, and whether cystoscopy should be performed as part of the work-up of uncomplicated stress incontinence. Following the expert panel discussion, 27 of 41 potential indicators were determined to be valid for urinary incontinence with a median score of 7 or greater.

Conclusions: We developed and ranked 27 potential quality indicators for the care of women with urinary incontinence. Once these QIs are tested for feasibility they will be applied on a national level to measure the quality of care provided to women with UI in the United States.
Funding: Funded by a Patient-Oriented Research Career Development Award (1 K23 DK080227−01) and an American Recovery and Reinvestment Act (ARRA) Supplement Award (SK23DK080227−03, JTA).

Podium #21
DETRUSOR LEAK POINT PRESSURE (DLPP) IN NON-NEUROGENIC WOMEN WITH URGE INCONTINENCE
Ariana Smith, MD, Mary Wang, NP, William Jaffe, MD and Alan Wein, MD, PhD (hon)
University of Pennsylvania, Philadelphia, PA
(Presented by: Ariana Smith)

Introduction: When incontinence accompanies detrusor overactivity (DO), the pressure at which it occurs (measured by pDet) has important predictive and potentially therapeutic value and should be termed detrusor leak point pressure (DLPP) despite confusion with the use of this term in neurogenic bladder in the absence of DO. We hypothesize that sphincteric deficiency (stress incontinence, SUI) worsens urge incontinence (UUI) and DLPP is lower in this population correlating with greater severity of UUI.

Methods: A retrospective review of our videourodynamics (VUDS) database was performed. Two validated questionnaires (UDI−6 and Symptom Severity Index) and a QOL score were available. DLPP was defined as pDet the moment DO incontinence occurred. Statistical analysis was performed using student’s t-test.

Results: 222 patients underwent VUDS in the last year; 201 reported urgency or UUI on questionnaire. DO was found in 78 of those patients with associated leakage in 62. After excluding neurogenic and obstructed patients, 47 patients with DO + leakage and 15 with DO alone remained. All patients were female. Urgency and UUI symptoms were greater among patients with DO + leakage compared to DO alone. Several trends suggesting a link between SUI and greater severity of UUI were noted (see Table 1). In patients with DO + leakage 43% had concomitant urodynamic SUI compared to 27% in the DO alone group; mean maximum urethral closure pressure (MUCP) was 63 cmH2O in the DO + leakage group versus 72 cmH2O in DO alone; among patients with DO + leakage, those with subjective MUI had a mean DLPP of 18 cmH2O while those with pure UUI had a mean of 31 cmH2O; these trends did not reach statistical significance. The detrusor pressure at peak flow was found to be statistically lower in the DO + leakage group (27 cmH2O) versus the DO alone (42 cmH2O; p 0.05); fluoroscopy confirmed no evidence of obstruction.

Conclusion: DLPP has more than one meaning. Patients with DO + leakage compared to DO alone may have lower outlet resistance as predicted by (1) concomitant SUI, (2) lower MUCP, and (3) lower detrusor pressure at peak flow. Further study of the implications of DLPP in the non−neurogenic, urge incontinent population is warranted.

Podium #22
MANAGEMENT OF URETHRAL STRICTURES IN WOMEN
Jerry Blaivas, MD¹,²,³, Rajveer Purohit, MD²,³,⁴, Janice Santos, MD⁵, Jeffrey Weiss, MD⁴ and Johnson Tsui, BS⁵,⁴
¹SUNY Downstate College of Medicine, New York, NY; ²Weill Cornell Medical College, New York, NY; ³Institute for Bladder and Prostate Research, New York, NY; ⁴SUNY Downstate College of Medicine, Brooklyn, NY; ⁵Columbia University Medical Center, New York, NY
(Presented by: Jerry Blaivas)

Hypothesis/Aims of Study: To describe the diagnosis and treatment of urethral strictures in women.

Study Design, Materials, and Methods: This is a retrospective study of urethral strictures identified from a database of women seen between 1998−2010. Inclusion criteria included 1) a clinical diagnosis of urethral stricture, 2) stricture seen on cystoscopy, 3) urethral obstruction on videourodynamics (VUDS) according to the Blaivas-Groutz nomogram and/or 4) urethral calibration <17F. Pre- and postoperative symptoms, uroflow, and post-void residual urine were recorded for all patients; VUDS and cystoscopy were done preoperatively. Treatment was individualized. Post-operative recurrent stricture was defined by the same preoperative criteria.
Results: 16 women with strictures, ranging in age from 32–98 years (mean = 60) were identified. The stricture was idiopathic in 8, iatrogenic in 6, and traumatic in 2. VUDS could not be done in 3 women due to complete obliteration of the urethra. 9/13 satisfied VUDS criteria for obstruction; 4 had impaired detrusor contractility. The site of obstruction was proximal urethra in 7, mid in 3, distal in 5 and panurethral in 1 patient. Eight women underwent vaginal flap urethroplasty (VFU); 5 of these had concomitant biologic pubovaginal sling (PVS) and one a Martius flap. There were no recurrences at a minimum of 5 years follow-up, but there were two recurrent strictures at 5½ and 6 years postop. One underwent dorsal buccal mucosal graft urethroplasty (BMG). The two recurrent strictures also underwent BMG and all were stricture free at 12–15 months post-op. 6/7 patients treated with urethral dilation recurred and required repeated dilations for the duration of their follow-up (.5–4 years; mean 2).

Conclusion: In selected patients, VFU and BMG have high success rates; 100% at 5 and 1 year respectively. Two strictures treated with VFU recurred at 5 & 6 years for an overall success rate of 88% suggesting long term follow-up is mandatory. Urethral dilation has a success rate of 14%.

Podium #23
WITHDRAWN

Podium #24
A COMPARISON OF A USDA CERTIFIED ORGANIC VAGINAL LUBRICANT VERSUS PLACEBO IN THE ASSESSMENT OF SYMPTOMS RELATED TO VAGINAL ATROPHY
Darlene Gaynor-Krupnick, DO¹, Julie Spencer, RN, DMP² and Carol Shaffer, RN, PhD³
¹Great Falls, VA; ²Leesburg, VA; ³Reston, VA
(Presented by: Darlene Gaynor-Krupnick)

Purpose: The primary objective if this study was to evaluate the effectiveness of a traditionally prescribed water-based lubricant in comparison to a USDA certified oil-based lubricant in reducing uncomfortable symptoms related to vaginal atrophy and vaginal dryness.

Methods: A prospective, randomized, double-blinded placebo controlled experimental study evaluated vaginal tissue quality and dryness before and after the application of a nonhormonal organic vaginal lubricant compared to a medical lubricant. IRB approval was obtained to perform the study upon 30 patients who answered the Female Sexual Function Index® and 1 page questionnaire. Changes noted prior to application and one month following were assessed in 5 areas were assessed (Arousal, lubrication, orgasm, relationships, and pain). T-Test, Chi Square and Mann-Whitney were utilized in evaluating the 5 areas.

Results: The outcome of the study revealed statistical and favorable differences in 3 of the 5 areas evaluated. Arousal, lubrication and orgasm differences were favorable and no difference was noted in regards to relationship or pain. Chi Square analysis did not reveal a difference between the groups who did or did not have a hysterectomy (p>0.05). Frequencies as a whole group revealed 88.5% reported dryness and 84.6% said it affected sex. The Mann—Whitney Test assessed rank order of the 5 areas assessed and determined a significant difference in subjective physical evaluation of lubrication and surgeons’ evaluation of vaginitis. The test also revealed 4 of 5 areas of improvement regarding arousal, lubrication, orgasm, and relationship difference, but no improvement of pain difference.

Conclusions: Statistical difference was noted in the Valera lubricant compared to placebo in areas of overall vaginal dryness affecting arousal, difference of lubrication, orgasm and when ranking relationship difference. This study reveals the need for more nonhormonal, reliable vaginal lubricant options such as Valera available to the patient population.

Podium #25
LOWER BODY PLYOMETRIC EXERCISE AND PELVIC FLOOR MUSCULAR ENGAGEMENT
Bruce Crawford, MD
University of Nevada, Reno, NV
(Presented by: Bruce Crawford)

Introduction: Pelvic floor muscle exercises have long been considered the first line therapy for stress urinary incontinence in women. Pelvic floor muscle deconditioning (weakness, poor endurance, poor coordination) has been associated with stress urinary incontinence, overactive bladder, pelvic organ prolapse, anal incontinence, and sexual dysfunction. It is known that patients are poorly compliant with physician recommended programs of isometric exercises. Poor long term compliance with Kegel exercise programs illustrates this fact. Better compliance has been found for plyometric exercise programs. It may be the case that a plyometric program of pelvic floor exercise would be of better practiced and more effective in restoring and maintaining pelvic floor fitness.
Objective: To determine what plyometric movements induce the greatest degree of pelvic floor muscular engagement in women.

Methods: Between 9/08 – 9/09 real time surface EMG data was collected from the pelvic floor of 6 multiparous women ages (40 – 47) during performance of 100 different mat Pilates, Yoga, and personal training movements. All movements were simultaneously videotaped and synchronized to EMG recordings so as to identify the point of peak pelvic floor engagement. Movements were rated based on multiples of baseline resting EMG at the point of peak engagement of the pelvic floor.

Results:

<table>
<thead>
<tr>
<th>Mean Multiples of Baseline EMG</th>
<th>Point of Peak Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Side Laying Straight Leg Circles</td>
<td>21.6 Forward sweep 45 degrees above horizontal</td>
</tr>
<tr>
<td>2. Side Laying Bent Knee Lifts</td>
<td>26.1 Top of Leg Lift</td>
</tr>
<tr>
<td>3. Bridging</td>
<td>26.1 Top of Bridge Gluteals Engaged</td>
</tr>
<tr>
<td>4. Corkscrew</td>
<td>17 Hips Flexed Legs Over Body</td>
</tr>
<tr>
<td>5. Lunges</td>
<td>41.4 Deepest Point in the Lunge</td>
</tr>
<tr>
<td>6. Squats</td>
<td>18 Deepest Point in the Squat</td>
</tr>
<tr>
<td>7. Cat into Cow</td>
<td>15.7 Full Cat Pose</td>
</tr>
<tr>
<td>8. Butterfly</td>
<td>24.9 Knees Together Feet Pressed Together</td>
</tr>
<tr>
<td>9. All 4s Side Leg Lift</td>
<td>21.3 Top of the Lift</td>
</tr>
<tr>
<td>10. Hovering</td>
<td>28 Top of the Movement During Pelvic Curl</td>
</tr>
</tbody>
</table>

Conclusions: Certain plyometric movements induce effective co-recruitment of the pelvic floor musculature. These 10 movements are considered to be the most effective pelvic floor engagers from the large number of movements studied. These movements may provide an effective plyometric pelvic floor conditioning program.

Podium #26
FUNCTIONAL OUTCOMES AFTER REPAIR OF MESH EROSION INTO THE LOWER URINARY TRACT
Laura Chang Kit, MD and Roger Dmochowski, MD
Vanderbilt University, Nashville, TN
(Presented by: Laura Chang Kit)

Introduction: Mesh erosion into the lower urinary tract after pelvic surgery is a well-known complication.

Objective: To assess the functional outcomes after repair of mesh erosion in the lower urinary tract and how these were managed.

Methods: Retrospective review of medical records from January 2000 to Aug 2010. CPT codes for endoscopic or vaginal foreign body removal, urethrolysis, sling revision or removal, female urethroplasty, cystorrhaphy and cystectomy (partial/simple) were used to identify patients with erosions of any graft material into the urinary tract following pelvic surgery. We recorded age at repair, type of eroded graft material, inciting procedure, duration of follow-up, location of erosion, number of previous attempts at repair, initial management, functional outcome, subsequent procedures and overall outcome. No funding was provided.

Results: 36 females identified. Mean age at repair was 52.3 years (25–89). Mean follow-up was 1.6 ± 1.9 years. 29 patients had undergone mid-urethral slings (81%) [28 polypropylene, 1Stratisis]. Most frequent sites of erosion were urethra (42%) and bladder walls/dome (36%). 10 patients (28%) had 12 previous attempts at repair. Our initial repair involved urethroplasty (44%), partial cystectomy (28%), cystorrhaphy (17%), endoscopic techniques (8%) and abdominal vesico-vaginal fistula repair (3%). Postoperatively, 1 patient (3%) developed de novo urgency, treated with anticholinergics. 21 patients (64%) had incontinence [6 urge (17%), 4 stress (11%), 11 mixed (31%), 2 total (5%)]. 1 patient developed new pelvic pain requiring referral to pain specialists, and 3 had ongoing pelvic pain. 14 patients (39%) required secondary procedures including botox injection (2), neuromodulation (1) and bladder augmentation (1). 6 patients (17%) underwent a third procedure and 2 patients required a fourth. At last follow-up, 36% were cured of their preoperative symptoms, 36% had good control over their postoperative symptoms and 28% had significant ongoing symptoms.

Conclusion: Mesh erosion into the genitourinary tract usually requires a complex surgical approach. Polypropylene mid–urethral sling erosions of the urethra are most commonly seen. After initial repair, 2/3 will have incontinence (mostly mixed or urge) and de novo urgency is rare. Approximately 40% will require a secondary procedure. About 70% of patients will achieve either good control or resolution of their symptoms.

Podium #27
NOCTURIA TREATED WITH SACRAL NEUROMODULATION
Charles R. Powell, MD¹, Joseph Zabell, MD², Elizabeth B. Takacs, MD² and Karl J. Kreder, MD²
¹Indiana University School of Medicine; ²University of Iowa, Iowa City, IA
(Presented by: Charles R. Powell)
Purpose: We examined the role of sacral neuromodulation for the treatment of nocturia in patients with lower urinary tract symptoms.

Methods: Between January 2000 and October 2009, 82 patients (72 women, 10 men) underwent successful sacral nerve test stimulation followed by permanent generator implantation if the patient had >50% improvement in the presenting symptom. Primary outcome was the difference in nocturia between pre- and postoperative periods stratified by age, and by presence or absence of painful bladder syndrome. Severity of preoperative nocturia was also evaluated as a possible predictor for long-term success with neuromodulation.

Results: When stratified by age (<50, 50−69, ≥70), all groups experienced a significant decrease in nocturia episodes per night (1.82, 2.39, 1.63, respectively, p<0.01). Age ≥70 predicted poor response to neuromodulation with respect to nocturia (p=0.007 0). The presence of painful bladder syndrome (n=19) predicted more severe preoperative nocturia (5.66 vs. 3.44 episodes per night) when compared with patients with urinary urge incontinence or urgency/frequency without painful bladder syndrome (n=63). These patients experienced larger reductions in number of episodes postoperatively, but these failed to reach statistical significance (3.11 vs. 1.68 episodes, respectively, p=0.071). Both groups demonstrated significant decreases in nightly nocturia episodes (p<0.01). When the severity of preoperative nocturia episodes was examined as the predictor for success in treating nocturia with neuromodulation, success rates of 44.4%, 66.7%, and 69.2% for groups with <3 voids, 3−5 voids, and >5 voids per night, respectively, were noted. Patients with minimal preoperative nocturia were less likely to experience ≥50% decrease in nocturia episodes (p=0.0476, p=0.191, and p=0.448).

Conclusion: Sacral neuromodulation achieved a statistically significant reduction in the severity of nocturia in each group studied. Patients aged ≥70 and those with <3 preoperative nocturia episodes were not as likely to benefit from neuromodulation for nocturia. Success was independent of the presence of painful bladder syndrome.

<table>
<thead>
<tr>
<th>Effect of Age on Nocturia Treated with Sacral Neuromodulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age Group</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Preop</td>
</tr>
<tr>
<td>&lt;50</td>
</tr>
<tr>
<td>51−69</td>
</tr>
<tr>
<td>≥70</td>
</tr>
</tbody>
</table>

Podium #28
SUCCESS OF OFFICE-BASED SACRAL NERVE STIMULATION TRIALS IN A LARGE COHORT OF MALE AND FEMALE COMPLEX PATIENTS
Maggie Vuturo, MD and Gary Leach, MD
Tower Urology, Los Angeles, CA
(Presented by: Maggie Vuturo)

Introduction: Sacral nerve stimulation (SNS) is an FDA−approved treatment for refractory urgency-frequency and non-obstructive urinary retention. Previous studies have been mostly in women and described a significantly lower success rate for office-based percutaneous nerve evaluation (PNE) when compared to a tined-lead trial in the operating room.

Objective: Our objective is to present the outcome of 70 consecutive patients who underwent an office-based PNE.

Methods: A chart review of 70 consecutive patients who underwent PNE in the office between 8/2007 and 8/2010 was performed. The indication for PNE was refractory urgency/frequency or nonobstructive urinary retention. Bilateral PNE using non-tined leads (Medtronic, Minneapolis) was performed in the office setting with local anesthesia under fluoroscopy. Patients used the test lead on each side for 3−4 days. Success was defined as a 50% or greater improvement in the patient’s primary voiding complaint.

Results: Of the 70 patients, 38 (54%) were female and 32 (46%) were male. The average patient age was 72 years (range 29 to 92). 66 (94%) of the patients underwent PNE for urgency/ frequency; 4 (6%) underwent PNE for nonobstructive urinary retention. Overall success of PNE was 71%. The success rate varied based on the indication for PNE; 48 of 66 (73%) patients with refractory urgency / frequency had a successful trial and 2 of 4 (50%) patients with retention had a successful trial. In patients who had a successful trial, patient−defined average improvement was 69% (range 50–100%). PNE was successful in 20 of 32 (63%) men and 30 of 38 (79%) women with refractory urgency/frequency. 35 of 70 (50%) patients were complex as defined by a history of Parkinson’s, multiple sclerosis, cerebral vascular accident, history of radical prostatectomy and/or pelvic radiation. 23 of 35 (66%) complex patients and 27 of 35 (77%) non−complex patients had a successful trial. No adverse events occurred during either the PNE or test phase. Office−based PNE Medicare cost is $1800 compared to $8647 for a first stage tined-lead trial performed in the operating room.

Conclusions: Office-based PNE performed under fluoroscopy has excellent success rates and is a cost-effective trial in both men and women with complex voiding dysfunction with refractory urinary urgency / frequency. This study is unique in that it is both the largest reported series on office-based PNE and is the only study with a significant number of males.
Podium #29

A PILOT CLINICAL STUDY TO EVALUATE THE INITIAL FEASIBILITY OF NEUROMODULATION THERAPY IN TREATING PATIENTS WITH OVERACTIVE BLADDER VIA MAGNETIC STIMULATION OF THE POSTERIOR TIBIAL NERVE

Theodore Benderev, MD, Amit Rajguru, MD⁡ and Daniel Burnett, MD
EMKinetics, Inc.
(Presented by: Theodore Benderev)

**Purpose:** The purpose of this study is to evaluate the safety and efficacy of the EMKinetics neurostimulator device in treating patients with documented overactive bladder via non-invasive magnetic stimulation of the posterior tibial nerve.

**Materials and Methods:** In a prospective single center study, 8 women with diagnosed overactive bladder were treated with 12 weekly sessions of tibial nerve stimulation using the EMKinetics Transtim device. Overactive bladder questionnaires as well as 3-day voiding diaries were completed at baseline and at 7, 10, and 13 weeks. Subject global response assessments (GRA) were completed at week 7, 10, and 13. Funding for this study was provided by EMKinetics, Inc. headquartered in Campbell, CA.

**Results:** The 13-week subject GRA for overall bladder symptoms demonstrated that tibial nerve stimulation via non-invasive magnetic stimulation demonstrated moderate or marked improvement in 62.5% of patients treated with the device. Of the responders on the GRA, there was a 23% reduction in absolute frequency, a 54% reduction in urgency, and an 80% reduction in incontinence. Additionally, No serious adverse events and/or unanticipated device effects were observed in the study. Side effects were primarily limited to transient parasthesias along the course of the stimulated nerve.

**Conclusion:** Results from this pilot study show that magnetic stimulation of the posterior tibial nerve is both safe and efficacious with the EMKinetics Transtim in the treated population of women. The results from this limited study are in line with the results from needle based PTNS applications with respect to efficacy. Further testing in larger patient populations needs to be carried out to show clinical significance.

* Financial Interest and other affiliation with EMKinetics, Inc.

Podium #30*

SELECTIVE ACTIVATION OF FELINE PUDENDAL NERVE WITH A TRANSDERMAL AMPLITUDE-MODULATED SIGNAL (TAMS) USING SKIN SURFACE ELECTRODES TO INHIBIT BLADDER ACTIVITY

Bing Shen, VMD¹, Jicheng Wang, PhD, Jeyakumar Subbaroyan, PhD², James R. Roppolo, PhD¹, William C. de Groat, PhD¹ and Changfeng Tai, PhD¹
¹University of Pittsburgh, Pittsburgh, PA; ²Ethicon Endo-Surgery, Inc., Johnson and Johnson, Somerville, NJ
(Presented by: Jicheng Wang)

**Introduction:** Previous preclinical studies have shown that bladder activity can be significantly inhibited using transdermal amplitude modulated signal (TAMS) applied to surface electrodes attached to the skin close to the pudendal nerve. However, the mechanism of action (MOA) of TAMS has not been previously studied.

**Objectives:** The objective of this study was to evaluate the MOA of TAMS in a feline model.

**Methods:** TAMS was used to activate the pudendal-to-bladder inhibitory reflex non-invasively in 12 normal female cats under α-chloralose anesthesia. First, the bladder was infused with saline to a volume slightly above the micturition threshold to induce isovolumetric bladder contractions. 5 Hz transcutaneous stimulation at different intensities was applied to determine the effectiveness of different stimulation pulses in inhibiting isovolumetric bladder contractions. Second, the effect of different stimulation pulses was tested during filling cystometrograms (CMGs, Infusion rate: 1.0–2.0 ml/min) with saline starting with an empty bladder until the first micturition contraction. Finally, anal sphincter EMG and tibial nerve activity evoked by TAMS was recorded at increasing stimulation intensities in order to identify which nerve was activated. The study was conducted under an IACUC approved protocol.
**Results:** TAMS inhibited isovolumetric bladder contractions when stimulation intensity was above 2 times the threshold (T) for inducing anal sphincter twitching. The stimulation also significantly increased bladder capacity during CMG when the stimulation intensity was above 2T. Finally, stimulation with TAMS at an intensity below 2.5T did not elicit tibial nerve activity in any experiment.

**Conclusions:** This study demonstrates that the TAMS can inhibit bladder contractions and increase bladder capacity when surface electrodes are attached to the skin. The study also indicates that the pudendal nerve can be selectively activated via the surface electrodes in a feline model without activation of the tibial nerve as long as the stimulation intensity is maintained below 2.5T. The results indicate the potential utility of this transdermal neuromodulation method in the clinical treatment of overactive bladder symptoms.

**Podium #31**

**ONE-YEAR OUTCOME OF STAGED INTERSTIM IMPLANT IN THOSE WITH LESS THAN 4 ACTIVE LEADS BY SENSORY RESPONSE DOES NOT DIFFER IN THOSE WITH 4 ACTIVE LEADS**

Jason Gilleran, MD¹, Humberto Martinez-Suarez, MD² and Kenneth Peters, MD³

¹MI; ²Columbus, OH; ³Royal Oak, MI

(Presented by: Jason Gilleran)

**Introduction and Objectives:** Testing of individual leads at time of tined lead deployment during sacral nerve stimulation (SNS) includes identifying presence or absence of sensory and motor responses. Whether or not having all 4 leads ‘active’ at time of placement affects stage 1 outcome or 12-month follow-up has not yet been studied, which is the objective of this study.

**Methods:** A review of a prospective database of 532 patients who underwent neuromodulation for refractory lower urinary tract symptoms was performed, identifying only those who underwent unilateral S3 lead placement under sedation with data on sensory response in all 4 leads. Pudendal lead placements or those with incomplete data were excluded. All patients demonstrated motor response (anal bellows and/or toe curl) in at least 1 lead. The cohort was divided into 2 groups: ‘responders’ (all 4 leads with sensory response) and ‘nonresponders.’ Sensory response was defined as perineal or bladder, or vaginal in women and scrotal in men. Outcome analysis included end points of stage 2 permanent generator implant (IPG), number of reprogrammings at 1 year, and reoperation for lead revision or explant for loss of efficacy. Pearson’s Chi-square test or Fisher’s Exact test were used for statistical analysis.

**Results:** A total of 101 patients with complete sensory data on all 4 leads who met inclusion criteria were identified, of whom 28 (28%) were ‘responders’. Of the 73 ‘nonresponders’, 48 (66%) had 0 active leads (motor only). There was no significant difference between the responders and non-responders in terms of age (57+/−15 vs 56+/− 17 years), gender (93% vs 90% female), or successful trial with IPG implant (86% vs 88%), respectively. Indications for SNS were similar in responders and nonresponders and included urgency (82 vs 81%), frequency (75 vs 77%), urge incontinence (68 vs 47%), pelvic pain (18 vs 17%), urinary retention (4 vs 11%), or other (18 vs 13%), respectively. Reprogramming rates at 12 months after implant were 1.4+/−1.4 and 1.7+/−2.5 (p=0.95) and reoperation rates at 12 months were 3.6 and 4.1% for responders and nonresponders.

**Conclusions:** Having sensory response on all 4 active leads is not necessary for successful stage 1 trial. Demonstrating a motor response only may be adequate for implantation and does not lead to higher risk of reoperation or increased need for reprogramming.

**Podium #32**

(ELEVATE ANTERIOR/APICAL: SAFETY AND EFFICACY IN SURGICAL TREATMENT OF PELVIC ORGAN PROLAPSE)

Edward Stanford, MD, MS¹, Robert Moore, DO², Jan Paul Roovers, MD³, James Lukban, DO⁴, Eduardo Bataller, MD⁵ and Suzette Sutherland, MD⁶

¹Memphis, TN; ²Alanta, GA; ³Netherlands; ⁴West Virginia, US; ⁵Spain; ⁶MN, USA

(Presented by: Edward Stanford)

**Objectives:** To assess the safety and efficacy of the Elevate® Anterior and Apical with IntePro® Lite™ support system (EAA) in the repair of pelvic organ prolapse (POP).

**Methods:** One hundred and forty-two women were enrolled at 16 centers (10 U.S., 6 E.U.) with 133 (93.7%) completing 6-months follow-up. The primary outcome studied was treatment failure defined as > Stage II POP-Q anytime during follow-up or surgical revision for recurrence. Secondary outcomes were quality of life (QOL) measures using Pelvic Organ Prolapse Urinary Incontinence Sexual Function Questionnaire (PISQ−12), Pelvic Floor Impact Questionnaire (PFQ), and Pelvic Floor Distress Inventory (PFDI) questionnaires. Surgical technique was standardized. Statistical analysis used paired t−tests and Wilcoxon signed rank tests. American Medical Systems (Minnesota, USA) provided research funding.
**Results:** Patient characteristics were: mean age 63.9±9.8 yrs; weight 72.4±14.6 kgs; BMI 27.3±5.3; parity 3±1; menopausal 127 (89%); and prior hysterectomy 62 (43.7%). Success rate for the anterior (86.3%, 95% CI 79.2%–91.6%) and apical compartments (98.8%, 95% CI 93.3%–100%) are shown in Tables 1 and 2. All failures were stage II at 6 months and two complained of bulge symptoms. Of the two, one had revision surgery. Forty-two patients had 60 device/procedure-related adverse events including urinary tract infection (8, 5.6%), mesh extrusion (6, 4.2%), transient buttock pain (5, 3.5%), hematoma (3, 2.1%), and dyspareunia (3, 2.1%). All QOL scores were significantly improved from baseline (<0.001). Satisfaction scores revealed that 126 (94.7%) felt that they were some or a lot improved; 124 (93.2%) were moderately, very, or extremely satisfied.

**Conclusions:** Initial short-term results show that the EAA system completed through a single vaginal incision and no external needle passes is effective in treating both anterior and apical prolapse concomitantly with few complications, low mesh extrusion rates, and high patient satisfaction. The EAA system appears to offer improvements over earlier generation mesh kits designed for anterior and apical vaginal prolapse treatment.

---

**Podium #33**

**UNREALISTIC EXPECTATIONS FOR PELVIC ORGAN PROLAPSE FOLLOW-UP BASED ON A REVIEW OF LEVEL-I/II EVIDENCE DATA IN CONTEMPORARY LITERATURE**

Rubiao Ou, MD¹, Xian-Jin Xie² and Philippe Zimmerm, MD²

¹Guangzhou, China; ²UT Southwestern Medical Center, Dallas, TX

(Presented by: Philippe Zimmerm)

**Purpose:** To study the lost to follow-up (LTF) rate in level I/II evidence-based studies related to the surgical management of pelvic organ prolapse (POP).

**Materials and Methods:** Randomized clinical trials (level I) or non-randomized but prospective studies (level II) related to the surgical treatment of POP from January 1995 to November 2010 were searched on PUBMED. Data reviewed included types of study, number of participating centers or hospitals, sample size calculation, surgical techniques, power calculation, estimated dropout rate, duration of follow-up, rate and reasons for LTF.

**Results:** 48 articles (4776 women) — 22 randomized clinical trials (RCT) and 26 non-randomized prospective studies — met the inclusion criteria. 21 articles gave details on sample size calculation, and only 5 explained their LTF rate after reaching LTF patients by mail or telephone. Percentages of LTF patients were 9.8% (255/2609) at ≤ 12 months in 26 articles, 15% (184/1232) at 24 months in 12 articles, 27% (114/420) at 36 months in 8 articles, 44% (272/615) at 60 months in 4 articles and 60% (273/456) at > 60 months in 3 articles. When only RCT (ie level I) studies were examined (N=22), the LTF rate trended up to 20% at 3 years, with no such studies extending out further. Among the more recent RCT studies (< 10 years) (N=18), the longest follow-up was ≤ 2 years with a low LTF rate (figure). Fifteen articles reported no missing data mostly because of small sample size or short follow-up. Only 3 articles defined LTF patients as treatment failure or successes and reported outcomes accordingly.

**Conclusions:** Based on this contemporary review of the literature on POP, we found an acceptable attrition rate (10–20%) in studies with 2–3 year follow-up time, but a much larger rate in studies extending 3–5 years out. Meaningful long-term follow-up reporting at 5 years, as usually recommended after POP repair, may be unrealistic.
Podium #34
PREDICTORS OF IMPROVEMENT IN LOWER URINARY TRACT SYMPTOMS AFTER SACROCOLPOPEXY
Leslie Rickey, MD¹ and James Minor, PhD²
¹University of Maryland, Baltimore, MD; ²Baltimore, MD
(Presented by: Leslie Rickey)

Introduction: The relationship between prolapse stage and OAB symptoms is not well understood. We sought to identify predictors of improvement of bothersome irritative urinary symptoms in women undergoing sacrocolpopexy for treatment of POP.

Methods: The Colpopexy and Urinary Reduction Efforts trial randomized 322 continent women with Stage II POP to undergo sacrocolpopexy with or without a Burch urethropexy. Women who reported at least 1 bothersome irritative urinary symptom at baseline were the subjects of this analysis. Demographic data and validated measures of symptom severity and quality of life were collected, including the Urogenital Distress Inventory (UDI), the Medical, Epidemiologic and Social Aspects of Aging questionnaire (MESA), the Hunskaar severity scale, and the Short Form Health Survey (SF−36). All participants underwent urodynamic testing (UDS) and anatomic assessment. Cluster analysis was performed to identify distinct categories of patients based on their UDI-I responses. Logistic regression models were fit to predict improvement in irritative urinary symptoms at the 12-month follow-up.

Results: Among subjects who reported bothersome irritative symptoms prior to surgery, 126 (74.6%) no longer reported bothersome symptoms 12 months after surgery. Urinary frequency improved in 87% of women, urgency improved in 89%, urge urinary incontinence improved in 94%, and nocturia improved in 70% of women. Baseline factors associated with lack of improvement included lower SF−36 physical component summary *OR (CI) = 0.92 (0.86, 0.98), p=.0043+, increased parity *OR 1.99 (1.35, 3.11), p=.0004+, leakage with cough during UDS (p=0.0391), and UDI−I cluster group (p=0.0028). Using the Hunskaar scale, patients with “very severe/severe”leakage had almost 3 times the chance of persistent irritative symptoms compared to the “none” or “slight/moderate”groups (p=.0029). Age, race, BMI, hormonal status, detrusor overactivity, POP-Q stage, and point Aa did not predict improvement in bothersome irritative symptoms.

Conclusions: Irritative urinary symptoms improve in a large percentage of women undergoing sacrocolpopexy for POP. Patients who report better physical health and fewer vaginal deliveries are more likely to report improvement of bothersome symptoms. UDI-I response patterns also predicted improvement in irritative LUTS. Cluster analysis may be a valuable tool for exposing distinct patient profiles that can affect treatment outcomes.

Podium #35
OUTCOMES OF OBSERVATION AS THERAPY FOR PELVIC ORGAN PROLAPSE: A STUDY IN NATURAL HISTORY OF PELVIC ORGAN PROLAPSE
Alienor Gilchrist, MD¹, Steven Swift, MD², William Campbell, MD², Margaret Steele, MD², Hema Brazell, MD² and Jonathon Foote, MD²
¹Department of Urology, Medical University of South Carolina, Charleston, SC; ²Department of Gynecology, Medical University of South Carolina, Charleston, SC
(Presented by: Alienor Gilchrist)

Objective: To determine the rate of progression or regression of pelvic organ prolapse in subjects who decline intervention (pessary or surgery) and elect observation.

Methods: This is an IRB approved retrospective review of 62 subjects collected over 5 years who chose observation as primary management of their pelvic organ prolapse. Subjects were identified using ICD 9 codes from all new patients seen at an outpatient Urogynecology clinic. The electronic medical records were reviewed and only subjects who elected observation and had at least 6 months of follow up exams were included. Subjects were followed with sequential pelvic organ prolapse quantification (POP−Q) exams performed by the same physician over an average of 24 months. A change in the leading edge value of greater than 1 cm was considered significant. Exam results and choice of therapy at last visit were recorded. Simple descriptive statistics were used to describe outcomes.

Results: The mean age was 65 ± 11 years, the median gravidity was 3 and the median parity was 3. The leading vaginal edge POPQ exam value at the time of initial exam ranged from −1.5cm to +7 cm with a mean of 1.6 cm. Distribution of patients by POPQ stages on initial exam were: stage I=1, stage II=28, stage III=32 and stage IV=1. In 81% (50/62) there was no change in their leading edge value. In 18% (11/62) there was greater than a 1 cm (mean 2.4cm, range 1.5−4 cm) increase in their leading edge value. In 1% (1/62) there was a decrease in their leading edge value of 2 cm. Subjects’ choice of management at their last recorded visit was as follows: 68% (42/62) desired continued observation, 16% (10/62) desired a pessary trial and 16% (10/62) desired surgical correction.

Conclusion: The natural history of pelvic organ prolapse is one of very minimal gradual change in subjects who decline intervention (pessary or surgery) and elect observation. There was no progression of disease as measured by the POP−Q exam in 81% over an average of 2 years. Only 32% eventually desired a therapeutic intervention. This demonstrates that observation is a viable choice in subjects with pelvic organ prolapse.
ANORECTAL AND BOWEL DYSFUNCTION ASSOCIATED WITH PELVIC ORGAN PROLAPSE (POP) IN EGYPTIAN WOMEN: PREVALENCE AND CORRELATION WITH MRI FINDINGS
Hala Imam, MD, PhD¹, Ahmed El-Azab, MD² and Hisham Imam, MD³
¹Gastroenterology Unit, Internal Medicine Department, Assiut University Hospital, Assiut, Egypt; ²Section of Female Urology and NeuroUrology Department, Assiut University Hospital, Assiut University, Assiut, Egypt; ³Diagnostic Radiology Department, Assiut University Hospital, Assiut, Egypt
(Presented by: Hala Imam)

Introduction and Aims: The aim is to estimate the prevalence of anorectal and bowel symptoms in women with POP and to determine the relationship between these symptoms and the type and degree of POP as detected by physical examination (PE) and pelvic MRI.

Materials and Methods: All consecutive women with POP were evaluated by Rome III constipation module questionnaire (Qr). Before starting the study, linguistic validation of the module was done to produce a translated version in the lay Egyptian language. The following criteria for constipation: straining during defecation, sensation of anal blockage, sensation of incomplete evacuation, manual maneuvers to facilitate defecation, hard stool and less than 3 bowel movement /week. For fecal incontinence, a structured Qr about the type of incontinent material (gas, liquid, or solid stool), the frequency and use of pads. In addition, Pelvic Floor Impact Qr (PFIQ) was administered to study subjects. Patients with neurological disorder were excluded. POP was graded clinically by the Halfway system. All patients then underwent pelvic MRI. Correlation coefficients were calculated.

Results: 69 women were included, mean age of 43.6 years (range; 26 – 65). By exam, 62 subjects (90%) have rectocele; 26% grade I, 47.8% grade II, 16% grade III and 4.3% grade VI. Cystocele of variable stages was found in all study subjects while enterocele in 12 cases (17%): grade I in 5 subjects (7%), grade II in 3 (4%), grade III in 4 (6%). Uterine descent was found in 42 cases (60%), while vaginal vault prolapse was found in 5 cases (7%). Constipation was found in 52% of rectocele cases, while fecal incontinence was found in 11% of cases. There was strong positive correlation between rectocele (diagnosed by PE and MRI) and severity of constipation; with the strongest correlation for straining followed by the incomplete bowel evacuation. There were no statistically significant correlations between rectal symptoms and enterocele or other compartment defects. There was statistically significant positive correlation between rectocele stage and the impaired Coloanal rectal impact domains (both total and individual item scores) of the PFIQ.

Conclusions: Bowel symptoms correlated with compartment-specific defect. A correlation between constipation and rectocele was found. There is weak correlation between constipation and anorectal descent by MRI. Worsening posterior compartment prolapse is not associated with worsening fecal incontinence (gas and fecal).

LEVATOR CONTRACTION STRENGTH AS RISK FACTOR FOR VOIDING DYSFUNCTION FOLLOWING SURGICAL CORRECTION OF STRESS URINARY INCONTINENCE AND PELVIC ORGAN PROLAPSE
Mohamed Ghafar, MD¹, Michelle Koski, MD², Thomas Nolan, MD¹, Ralph Chesson, MD¹ and J. Christian Winters, MD²
¹Department of Obstetrics and Gynecology, Louisiana State University, New Orleans, LA; ²Department of Urology, Louisiana State University, New Orleans, LA
(Presented by: Mohamed Ghafar)

Objectives: The objective of our study was to correlate levator ani contraction strength with early postoperative voiding dysfunction and to determine whether early postoperative voiding dysfunction can be predicted prior to anti-incontinence procedures and pelvic organ prolapse (POP) repair.

Material and Methods: Retrospective chart review of 205 patients after surgery for POP and or stress urinary incontinence was conducted. Prolapse was staged using the Pelvic Organ Prolapse Quantification (POP-Q). Levator contraction strength was recorded using the oxford 0–5 classification scale. Patients were stratified into groups based on levator contraction strength. Voiding dysfunction was defined as residual of > 100 ml that required discharge home with intermittent catheter or further period of catheterization. Potential predictors of voiding dysfunction stratified by pelvic strength (PS) were assessed with Chi-square test. Univariate and multivariate logistic regression analysis to assess association with voiding dysfunction was performed.
Results: Descriptive statistics on the whole sample and then broken down by categories of pelvic strength showed that mean/median age, PVR, and length of hospital stay varies significantly with pelvic strength. \((P<0.0001)\), \((P=0.04)\), and \((0.07)\). Univariate logistic regression analysis showed there is a significant association between pelvic strength and stage of prolapse or voiding mechanism (normal vs. abdominal straining) evaluated by urodynamics \((P=0.001)\) and \((P=0.03)\). Also patients with pelvic strength score of 0 compared to score of 1 were 3.8 times as likely to have dysfunction, and when compared to those with score 2, patients with pelvic strength score of 0 were 16.3 times as likely as to have dysfunction \((P<0.0001)\). Patient with high PVR>100ml and stage 4 prolapse vs stage 3 were 3.68 times \((P=0.001)\) and 2.45 times \((P=0.05)\) as likely to have voiding dysfunction. Multivariate logistic regression analysis showed that elevated estimated blood loss was a significant predictor of voiding dysfunction \((P=0.007)\).

Conclusion: Diminished levator ani contraction strength, mechanism of voiding, age, and EBL correlated with increased early postoperative voiding dysfunction. The most consistent factors associated with early voiding dysfunction were levator contraction strength and PVR. These tools are useful for assessing and counseling patients prior to surgery.

Podium #38

5-YEAR COST ANALYSIS OF INTRA-DETRUSOR INJECTION OF BOTULINUM TOXIN TYPE A AND AUGMENTATION CYSTOPLASTY FOR REFRACTORY NEUROGENIC DETRUSOR OVERACTIVITY

Priya Padmanabhan, MD, MPH¹, Harriette Scarpero, MD², Doug Milam, MD², Roger Dmochowski, MD² and David Penson, MD²
¹University of Kansas Medical Center, Kansas City, KS; ²Nashville, TN
(Presented by: Priya Padmanabhan)

Introduction and Objectives: The treatment options for oral antimuscarinic refractory patients with neurogenic (NGB) detrusor overactivity (DO) are intradetrusor injections of Botulinum Toxin Type A (BoNTA) and augmentation cystoplasty (AC). Repeat BoNTA injections have been found to be safe, effective and durable for depressed bladder compliance to achieve a low pressure capacity. The price of the toxin and inherent repetitive administration of BoNTA may have formidable cost implications. We estimated the average initial treatment costs and cumulative 5 year costs of BoNTA injections and AC for antimuscarinic refractory patients.

Methods: A complete survey of peer reviewed literature provided the percentages of outcomes and complications. Procedure and surgical costs were derived from the Medipac database of the hospital billing system using Current Procedural Terminology (CPT) codes. Hospital center costs were determined from Diagnosis Related Group (DRG) reimbursement files. Drug costs were calculated using Center for Medicare and Medicaid Services (CMS) Average Selling Price. All costs were reported in 2008−2009 US dollars. Model building and one-way sensitivity analysis was performed to evaluate assumptions and uncertainties using the Treeage Pro 2009 software based on variations in parameter estimates.

Results Obtained: The initial treatment costs were $25042 and $2,947 for AC and BoNTA, respectively. Long-term costs were calculated based on success, failure, and complications of BoNTA and AC. The average cumulative 5 year cost by intervention was $33,272 and $28,065 for AC and BoNTA (bi-annual injections), respectively. One way sensitivity analysis revealed that BoNTA injections persisted as the less costly treatment option. If the durability of BoNTA injections is less than a mean of 5.1, the model favors AC. The model is sensitive to facility and surgeons costs of BoNTA injections and facility cost of AC. If the complication rate for AC drops below 14%, AC is favored.

Conclusions: This is the first cost comparison of surgical treatment options for refractory NGB DO. Management has important long-term quality of life and clinical ramifications. AC has been used for decades as an effective surgical option for NGB patients who cannot be managed conservatively. BoNTA is now used due to its safety, reproducibility and ease of administration. We show BoNTA as the less costly choice over a five-year period in the treatment of NGB patients.

Podium #39

OPEN RECONSTRUCTION OF VESICOURETHRAL ANASTAMOTIC STRICTURE FOLLOWING OPEN, LAPAROSCOPIC, AND ROBOTIC-ASSISTED RADICAL PROSTATECTOMY

David Hadley, MD and Brian Flynn, MD
University of Colorado Division of Urology, Aurora, CO
(Presented by: David Hadley)

Introduction and Objectives: Wide implementation of prostate cancer screening, and improvements in minimally invasive surgery, have led to an increasing number of men undergoing radical prostatectomy (RP). Consequently, the prevalence of the vesicourethral (VU) anastomotic stricture has increased. We present and discuss the one of the largest series of post-prostatectomy outlet reconstruction described in the United States.
Methods: A prospectively maintained database of all cases of VU strictures that underwent open reconstruction performed by a single surgeon was analyzed. From 2004−2010, (10) men were treated at a mean age of 67 years and with a mean Body Mass Index of 28 kg/m2. Open RP had been performed in (5), robotic RP (3) and laparoscopic RP converted to an open RP in (2). Two patients had additional radiation therapy.

Results: A mean of 2.3 operative endoscopic urethral procedures were performed prior to repair. The mean length of defect was 2.5 cm (range 1–4 cm). Open reconstruction using an abdominal approach occurred in (5), perineal approach in (1), and combined approach in (4). Bladder neck tapering was performed in all cases, pubectomy in (7), and corporal splitting in (1). Two repairs utilized peritoneal flaps and (1) case required a gracilis flap. The mean operative time was 347 minutes (range 123–543), and median blood loss was 450 mL (range 50–6000 mL). A blood transfusion was required in (3) cases. At a mean follow-up of 35 months (range 2–70), only one patient developed a recurrent stricture. Three patients were continent post-operatively and did not require subsequent surgery while (7) had severe incontinence. Of the (7) with incontinence (4) were successfully treated with an AUS, (1) was treated with an AUS that was subsequently removed due to erosion and (2) patients remain incontinent at this time.

Conclusions: Open reconstruction of VU anastomotic strictures after RP results in long-term restoration of urethral patency. While postoperative urinary incontinence is generally the rule, subsequent AUS placement is feasible. Each repair must be individualized, and a strong familiarity with ancillary maneuvers, such as pubectomy and corporal splitting, is critical.

Podium #40

PATTERNS OF MANAGEMENT OF URETHRAL STRICTURE DISEASES IN THE VA SYSTEM
Claudia Sevilla¹, Victoria Scott¹, Mingming Wang, MPH², Elizabeth Yano, PhD, MSPH² and Jennifer Anger, MD, MPH³
¹UCLA Dept of Urology, Los Angeles, CA; ²VA Greater Los Angeles Healthcare System, Los Angeles, CA; ³Cedars-Sinai Medical Center and UCLA Department of Urology, Los Angeles, CA
(Presented by: Claudia Sevilla)

Objectives: To date, few health services research studies have evaluated patterns of care for urethral stricture disease using national datasets. We sought to describe the number of urethral dilations, urethrotomies, and urethroplasties performed on men with a diagnosis of urethral stricture disease seeking care in the Veterans Affairs (VA) health care system in Southern California and Nevada over a 5-year period.

Methods: We analyzed stricture treatment for male veterans with an ICD-9 diagnosis code for urethral stricture in the National Patient Care Database (NPCD). Encounters for urethral stricture procedures performed in these men were identified on the basis of the presence of Physicians Current Procedural Terminology Coding System (4th edition, CPT-4) codes for treatments performed during the fiscal years 2002–2006.

Results: A total of 1,457 men carried a diagnosis of urethral stricture disease during the index time period. Of these, 333 men (23%) underwent 431 procedures. Of the 216 men who underwent urethral dilations, 170 (79%) underwent only 1 procedure and 26 (12%) underwent 2 procedures. Of the 79 men who underwent urethrotomy, 76 (96%) underwent only one procedure. Sixteen men (5%) underwent a urethroplasty, eight of whom underwent a perineal urethrostomy (Table 1).

Conclusions: Although it is known that cure rates of DVIU/dilation are extremely low, we found that the vast majority of men treated for stricture disease did not undergo definitive urethroplasty. This may represent poor care for men with stricture disease. However, most men only underwent only one DVIU/dilation over a 5-year time period, suggesting that urethral dilation/urethrotomy may temporize a subset of patients for a significant period of time. A short recurrence-free time period after a dilation/urethrotomy may predict the need for early urethroplasty.

Funding: by the Greater Los Angeles VA.

<table>
<thead>
<tr>
<th>Table 1. Table received by outpatient and inpatient male VA patients with a diagnosis of urethral stricture over 5 years.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Urethral dilation</td>
</tr>
<tr>
<td>Urethroplasty/DVIU</td>
</tr>
<tr>
<td>Other (sten/sten)</td>
</tr>
<tr>
<td>Urethroplasty</td>
</tr>
<tr>
<td>All stages</td>
</tr>
<tr>
<td>Perineal Urethrostomy</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

*Data on seven patients was missing from the data set.
ACUTE ADMINISTRATION OF AMPA/KINATE BLOCKER COMBINED WITH DELAYED TRANSPLANTATION OF NEURONAL AND GLIAL
RESTRICTED PRECURSORS IMPROVES LOWER URINARY TRACT FUNCTION IN SPINAL INJURED RATS
Takahiko Mitsui1,2, Birgit Neuhuber1, Itzhak Fischer1
1Department of Neurobiology and Anatomy, Drexel University College of Medicine, Philadelphia, PA; 2Department of Urology, Hokkaido University, Graduate School of Medicine, Sapporo, Japan
(Presented by: Takahiko Mitsui)

Objectives: We tested the effects of acutely administering NBQX, an AMPA/kinate receptor antagonist shown to reduce glutamate excitotoxicity, combined with delayed transplantation of NRP/GRP.

Methods: Female rats received a moderate contusion injury at T8/9. NBQX was directly administered into the lesion site immediately after injury. Nine days post-injury, NRP/GRP were delivered into the lesion site. OP-Controls received neither NBQX nor NRP/GRP after spinal cord injury.

Results: Immunohistochemical evaluation revealed that transplanted cells survived, filled the lesion site, migrated rostrally and caudally, and differentiated into neurons, astrocytes, and oligodendrocytes. The combined treatment reduced the size of the lesion to a greater extent than NRP/GRP alone or OP-Controls. NRP/GRP transplantation with and without NBQX produced significant recovery of hindlimb and bladder function compared to the injury alone. The combined treatment of NBQX and NRP/GRP resulted in a voided volume/micturition that was closer to normal animals and cystometry showed greater improvement of urodynamic parameters, compared to NRP/GRP alone or OP-Controls. Combination of NRP/GRP with NBQX can induce more spouting, regeneration or sparing of descending projections to lumbosacral cord. Meanwhile, the density of primary afferent projections at the lumbosacral spinal cord in rats with combined treatments was similar to the results of NRP/GRP alone with decreased sprouting of primary afferents in lumbosacral cord, compared to OP-Control rats.

Conclusions: Transplants of NRP/GRP combined with NBQX further promote recovery of micturition function following spinal cord injury, through increased protection of the spinal cord.
Podium #41
FUNCTIONAL BRAIN ACTIVITY UNDERLYING IMPAIRED CONTINENCE CONTROL IN OLDER WOMEN WITH OAB
Stasa Tadic, MD, MS, Derek Griffiths, PhD, Werner Schaefer, DI, Andrew Murrin, BA, Becky Clarckson, PhD and Neil Resnick, MD
University of Pittsburgh, Division of Geriatric Medicine and Gerontology
(Presented by: Stasa Tadic)

Introduction and Objectives: Patients with overactive bladder (OAB) and urgency incontinence (UI) who exhibit detrusor overactivity (DO) on urodynamic exam may have more advanced functional impairment of continence control. Nevertheless, the underlying mechanism of such easier elicitable DO remains unknown since information about brain activity involved in such control is lacking. We have developed method that applies urodynamic monitoring to functional brain imaging which could answer this question. Objective of this study is to present subjects with OAB/UI who underwent functional brain imaging and developed DO during bladder filling in the scanner. Specifically, we aimed to compare their brain activity during period of urgency (that preceded DO) with subjects that remained continent in the scanner. Based on our previous findings we a priore postulated that group with elicitable DO in scanner will have diminished activity in key brain areas involved in continence control.

Methods: We used Statistical Parametric Mapping Program to compare and map differences in brain activity during bladder filling and reported urgency between groups with and without elicitable DO.

Results: As postulated, during bladder filling and reported urgency, subjects with elicitable DO showed a lack of activity in key regions of executive cortex and paralimbic areas (e.g. medial prefrontal cortex and parahippocampus) believed to be involved in suppression of urgency and maintaining continence. Clinically, they were older, had more age-related structural damage of the brain (e.g. white matter) and less tolerance of bladder filling on standard urodynamics.

Conclusions: Despite clinically similar presentations in OAB patients there is a spectrum of functional impairment of continence control. Subjects with more easily elicitable DO have more advanced impairment which, in part, may relate to inefficient brain activity during storage phase in key areas involved in voiding and continence control. Functional brain imaging combined with urodynamics is a useful tool to differentiate functional phenotypes underlying OAB and may provide new information to help improve management and treatment.

Funding: NIH/K23AG031916−01 and 2R01AG020629−06.

Podium #42
LIPOSOMES ASSISTED BLADDER UPTAKE OF ANTISENSE OLIGONUCLEOTIDES AMELIORATE SYMPTOMS OF DETRUSOR OVERACTIVITY IN RAT MODEL
Vikas Tyagi, MD¹, Yoshio Sugino, MD², Naoki Yoshimura, MD, PhD², Michael Chancellor, MD¹ and Pradeep Tyagi, PhD¹
¹William Beaumont Hospital, Royal Oak, MI; ²University of Pittsburgh, Pittsburgh, PA
(Presented by: Vikas Tyagi)

Purpose: Sequence-specific gene-silencing mechanism is a promising approach to develop a new therapeutics. However, inefficient intracellular uptake of the oligonucleotides ODN is a major impediment. The aim of the study was to examine the feasibility of liposomes to improve bladder uptake of phosphorothioate ODN.

Method: Female Sprague-dawley rats anaesthetized with isoflurane were instilled 0.5mL of either saline or liposomal fluorescent ODN (6i• -M) for 30min. Bladders were harvested at 8 and 24h after instillation to visualize bladder uptake by fluorescence confocal microscopy. The efficacy of antisense treatments was assessed by cystometry and NGF immunohistochemistry.

Results: The bright red fluorescence of TYE 563 attached to the instilled ODN revealed maximum bladder accumulation of ODN at 24 h. Baseline CMG under saline infusion 24h after instillation was indistinct with mean intercontraction interval (ICI) of 18.44±2.52min and 18.29±1.62 min in the vehicle and antisense treated groups, respectively. Rats instilled with saline or aqueous ODN without liposomes demonstrated AA induced bladder overactivity with ICI reduction of 49.71± 9.68% from baseline values compared to 14.17±3.71% after instillation of liposomal ODN. Increased density of NGF immunostaining in urothelium of AA treated bladder sections was comparatively reduced in rats instilled with liposomal ODN.
Conclusions: Intravesical route can allow selective exposure of high concentration of antisense ODN to the NGF producing cells in urothelium and avoid potential systemic side effects from genetic manipulation of NGF expression and the possible safety concerns noted with systemic administration of monoclonal human NGF antibodies such as paresthesia, hypoesthesia and arthralgia.
Video #1  PURE TRANSVAGINAL EXCISION OF MESH EROSION INVOLVING THE BLADDER
Farzeen Firoozi, MD¹ and Howard B. Goldman, MD²
¹NSLIJ, New Hyde Park, NY; ²Cleveland Clinic, Cleveland, Ohio
(Presented by: Farzeen Firoozi)

Video #2  SUTURELESS SACROCOLPOPEXY
Serge Marinkovic, MD
Decatur, IL
(Presented by: Serge Marinkovic)

Video #3  UTERINE PRESERVATION: BILATERAL SACROSPINOUS SUSPENSION USING UPHOLD MESK KIT
Gamal Ghoniem, MD, FACS¹, Melanie Crites, DO² and Bader Almosaieed, MD²
¹Cleveland Clinic Florida, Weston, FL; ²Cleveland Clinic Florida
(Presented by: Gamal Ghoniem)

Video #4  LAPAROSCOPIC RETROPUBIC URETHROLYSIS
Hung-Jui Tan, MD, Alon Z. Weizer, MD and Humphrey O. Atiemo, MD
University of Michigan, Ann Arbor, MI
(Presented by: Hung-Jui Tan)

Video #5  TROUBLESHOOTING NEUROMODULATION — THE BASICS
Bradley Gill, BSE, Courtney Lee, MD, William Roth, BS and Sandip Vasavada, MD
Cleveland Clinic, Cleveland, OH
(Presented by: Bradley Gill)

Video #6  ROBOTIC-ASSISTED LAPAROSCOPIC VESICOVAGINAL FISTULA REPAIR: THE EXTRAVESICLE TECHNIQUE
Alexandra Rogers, MD¹, David Thiel, MD², Steven Petrou, MD² and Theodore Brisson, MD³
¹Jacksonville, FL; ²Mayo Clinic Florida; ³Trident Health Systems, Charleston, SC
(Presented by: Alexandra Rogers)

Video #7  ROBOTIC HYSTERECTOMY WITH SACROCOLPOPEXY
Ryan Pickens, MD¹ and Wesley White, MD²
¹UTMCK; ²UTMCK, Knoxville, TN
(Presented by: Ryan Pickens)

Video #8  ROBOT-ASSISTED LAPAROSCOPIC BLADDER DIVERTICULECTOMY
Courtney Lee, MD, Michael White, MD, Rackley Raymond, MD and Jihad Kauok, MD
Glickman Urological and Kidney Institute, Cleveland Clinic Foundation, Cleveland, OH
(Presented by: Courtney Lee)

Video #9  AJUST, THE SINGLE INCISION TRANSOBTURATOR SLING FOR WOMEN WITH STRESS URINARY INCONTINENCE
Vincent Lucente, MD, MBA
Institute for Female Pelvic Medicine, Allentown, PA
(Presented by: Vincent Lucente)
Video #10  URETHROPLASTY WITH VESTIBULAR FLAP
Christopher Yang, MD¹, Don Arnold, II, MD¹, Bruno Frea, MD² and Ervin Kocjancic, MD¹
¹University of Illinois at Chicago, Chicago, IL; ²University of Udine, Udine, Italy
(Presented by: Christopher Yang)

Video #11  TRANSVAGINAL COLPOCLEISIS IN THE TREATMENT OF VAGINAL VAULT PROLAPSE IN THE ELDERLY FEMALE: SURGICAL TECHNIQUE
Denise Chow, MD¹, Michelle Koski, MD¹, Joanna Togami, MD¹, Ralph Chesson, MD³, Ahmet Bedestani, MD², and Jack Winters, MD¹
¹Louisiana State University/Ochsner Clinic Foundation, Departments of Urology, New Orleans, LA; ²Louisiana State University/Ochsner Clinic Foundation, New Orleans, LA; ³Louisiana State University, Department of Obstetrics and Gynecology, New Orleans, LA
(Presented by: Denise Chow)

Video #12  MODIFIED LATZKO PROCEDURE (PARTIAL COLPOCLEISIS) FOR VESICOVAGINAL FISTULA REPAIR: TECHNIQUE AND OUTCOMES
Denise Chow, MD¹, Ahmet Bedestani, MD², Ralph Chesson, MD² and Jack Winters, MD¹
¹Louisiana State University/Ochsner Clinic Foundation, Departments of Urology, New Orleans, LA; ²Louisiana State University, Department of Obstetrics and Gynecology, New Orleans, LA
(Presented by: Denise Chow)

Video #13  ROBOTIC-ASSISTED ABDOMINAL SACRAL COLPOPEXY AND RECTOPEXY FOR THE TREATMENT OF COMPLEX VAGINAL VAULT AND RECTAL PROLAPSE
Michelle Koski, MD, Denise Chow, MD, Richard Vanlangendonck, MD and J. Christian Winters, MD
Louisiana State University/Ochsner Clinic Foundation Departments of Urology, New Orleans, LA
(Presented by: Michelle Koski)

Video #14  ROBOTIC-ASSISTED LAPAROSCOPIC AUGMENTATION CYSTOPLASTY
Jason Kim, MD, Stephen Lukasewycz, MD, Alvaro Lucioni, MD, Paul Kozlowski, MD and Kathleen Kobashi, MD
Virginia Mason Medical Center, Seattle, WA
(Presented by: Jason Kim)

Video #15  ELEVATE ANTERIOR REPAIR
Alienor Gilchrist, MD and Eric Rovner, MD
Medical University of South Carolina, Department of Urology
(Presented by: Alienor Gilchrist)

Video #16  ROBOTIC-ASSISTED VESICOVAGINAL FISTULA REPAIR
Aqsa Khan, MD¹, Claudia Sevilla² and Jennifer Anger, MD, MPH¹
¹Department of Urology, University of California - Los Angeles, Los Angeles, CA; ²David Geffen School of Medicine, University of California Los Angeles, Los Angeles, CA
(Presented by: Aqsa Khan)

Video #17  THE ELEVATE SYSTEM FOR REPAIR OF FEMALE PELVIC PROLAPSE
Larry T. Sirls, MD and Dmitriy Nikolavsky, MD
William Beaumont Hospital, Royal Oak, MI
(Presented by: Larry T. Sirls)
APPLICATION FOR MEMBERSHIP

- **FULL MEMBER**
  An individual (MD, PhD, DO) with a strong interest in the field, who has been in practice for at least one year. The individual must submit two letters of recommendation from Full Members. Full Members have voting rights.

- **AFFILIATE MEMBER**
  An individual with an interest in the field who does not satisfy the criteria as a Full Member, including individuals working in training (resident, fellow, post-doc), allied health professional (nurse, NP, PA) or individuals in industry-related positions. Letters of recommendation are not needed. Affiliate Members have NO voting rights.

Name ___________________________________________________________ Gender  M  or  F

Degree(s) ___________________________________________ Preferred Mailing Address □ Office □ Home

**Office Address**
_____________________________________________________________

City __________________________ State/Province __________ Zip/Postal Code _______

Country ________________ Telephone __________________________ Fax ________________

**Home Address**
_____________________________________________________________

City __________________________ State/Province __________ Zip/Postal Code _______

Country ________________ Telephone __________________________ Fax ________________

Email __________________________________________________________ Date of Birth __________________________

Residency _______________________________________________________

Fellowship _______________________________________________________

Current Position _________________________________________________

Number of Refereed Publications _________________________________

List two FULL members of the society who will forward reference letters on your behalf:

1) ________________________________________________________________ 2) ________________________________________________________________

Please send this application along with your CV to:
Society for Urodynamics & Female Urology
Two Woodfield Lake
1100 East Woodfield Road, Suite 520
Schaumburg, IL 60173
Phone: (847) 517-7225
Fax: (847) 517-7229
Email: info@sufuorg.com

Signature of Applicant ___________________________________________ Date __________________________
## Alphabetical Index of Presenters

**Author/Presenter, Date, Time, and Abstract Placement**

Due to time limitations, authors who do not have a time and date listed will not be presenting their abstracts at this meeting. See Abstracts section for complete text.

<table>
<thead>
<tr>
<th>Author/Presenter</th>
<th>Date</th>
<th>Time</th>
<th>Placement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen-Brady, Kristina</td>
<td>3/2/11</td>
<td>5:00 p.m.</td>
<td>Poster #BS27</td>
</tr>
<tr>
<td>Al-Shaiji, Tariq F.</td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #NM11</td>
</tr>
<tr>
<td>Anthony, Michele</td>
<td>3/1/11</td>
<td>5:30 p.m.</td>
<td>Poster #BS4</td>
</tr>
<tr>
<td>Benderev, Theodore V.</td>
<td>3/4/11</td>
<td>4:30 p.m.</td>
<td>Podium #29</td>
</tr>
<tr>
<td>Blaivas, Jerry G.</td>
<td>3/4/11</td>
<td>9:10 a.m.</td>
<td>Podium #22</td>
</tr>
<tr>
<td>Boncher, Nicholas A.</td>
<td>3/2/11</td>
<td>5:00 p.m.</td>
<td>Poster #BS48</td>
</tr>
<tr>
<td>Brink, Thaddeus</td>
<td>3/1/11</td>
<td>5:30 p.m.</td>
<td>Poster #BS7</td>
</tr>
<tr>
<td>Brucker, Benjamin M.</td>
<td>3/3/11</td>
<td>5:45 p.m.</td>
<td>Podium #10</td>
</tr>
<tr>
<td></td>
<td>3/3/11</td>
<td>6:35 p.m.</td>
<td>Podium #15</td>
</tr>
<tr>
<td></td>
<td>3/5/11</td>
<td>8:00 a.m.</td>
<td>Poster #M26</td>
</tr>
<tr>
<td>Burgess, Kimberly</td>
<td>3/4/11</td>
<td>8:30 a.m.</td>
<td>Poster #M18</td>
</tr>
<tr>
<td>Byrne, Lauren N.</td>
<td>3/2/11</td>
<td>5:00 p.m.</td>
<td>Poster #BS31</td>
</tr>
<tr>
<td>Campeau, Lysanne</td>
<td>3/2/11</td>
<td>5:00 p.m.</td>
<td>Poster #BS41</td>
</tr>
<tr>
<td>Casanova, Nina</td>
<td>3/4/11</td>
<td>8:30 a.m.</td>
<td>Poster #NM41</td>
</tr>
<tr>
<td>Chakrabarty, Amit</td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #NM17</td>
</tr>
<tr>
<td>Chen, Bertha</td>
<td>3/2/11</td>
<td>5:00 p.m.</td>
<td>Poster #BS39</td>
</tr>
<tr>
<td>Chen, Heidi</td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #M8</td>
</tr>
<tr>
<td>Chermansky, Christopher</td>
<td>3/2/11</td>
<td>5:00 p.m.</td>
<td>Poster #BS25</td>
</tr>
<tr>
<td>Choo, Myung-Soo</td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #NM6</td>
</tr>
<tr>
<td>Chow, Denise</td>
<td>3/3/11</td>
<td>8:00 a.m.</td>
<td>Video #11</td>
</tr>
<tr>
<td></td>
<td>3/3/11</td>
<td>8:00 a.m.</td>
<td>Video #12</td>
</tr>
<tr>
<td>Clarkson, Becky</td>
<td>3/2/11</td>
<td>5:00 p.m.</td>
<td>Poster #BS26</td>
</tr>
<tr>
<td>Clemens, J. Quentin</td>
<td>3/3/11</td>
<td>1:10 p.m.</td>
<td>Podium #2</td>
</tr>
<tr>
<td>Colhoun, Andrew</td>
<td>3/5/11</td>
<td>8:00 a.m.</td>
<td>Poster #NM45</td>
</tr>
<tr>
<td>Comiter, Craig V.</td>
<td>3/1/11</td>
<td>5:30 p.m.</td>
<td>Poster #BS1</td>
</tr>
<tr>
<td></td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Podium #9</td>
</tr>
<tr>
<td></td>
<td>3/5/11</td>
<td>8:00 a.m.</td>
<td>Poster #NM54</td>
</tr>
<tr>
<td>Crane, Andrea</td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #M7</td>
</tr>
<tr>
<td>Crawford, Bruce</td>
<td>3/4/11</td>
<td>9:40 a.m.</td>
<td>Podium #25</td>
</tr>
<tr>
<td>Crisp, Catrina</td>
<td>3/5/11</td>
<td>8:00 a.m.</td>
<td>Poster #M24</td>
</tr>
<tr>
<td>Cristofaro, Vivian</td>
<td>3/2/11</td>
<td>5:00 p.m.</td>
<td>Poster #BS32</td>
</tr>
</tbody>
</table>
Crites, Melanie
3/5/11  8:00 a.m.  Poster #NM52

Dillon, Benjamin E.
3/5/11  8:00 a.m.  Poster #NM44

Dissaranan, Charuspong
3/2/11  5:00 p.m.  Poster #BS29

Enemchukwu, Ekene A.
3/5/11  8:00 a.m.  Poster #M30

Firoozi, Farzeen
3/3/11  8:00 a.m.  Video #1

Fletter, Paul
3/2/11  5:00 p.m.  Poster #BS42

Fok, Cynthia See-Ming
3/4/11  8:30 a.m.  Poster #NM35

Fraser, Matthew O.
3/2/11  5:00 p.m.  Poster #BS46
3/2/11  5:00 p.m.  Poster #BS47

Gaynor-Krupnick, Darlene
3/4/11  9:30 a.m.  Podium #24

Ghafar, Mohamed A.
3/5/11  8:50 a.m.  Podium #37

Ghanaat, Mazyar
3/3/11  5:35 p.m.  Poster #NM16

Ghoniem, Gamal M.
3/3/11  8:00 a.m.  Video #3

Gilchrist, Alienor S.
3/3/11  8:00 a.m.  Video #15
3/3/11  5:35 p.m.  Poster #NM3
3/5/11  8:30 a.m.  Podium #35

Gill, Bradley
3/3/11  8:00 a.m.  Video #5
3/3/11  6:15 p.m.  Podium #13

Gilleran, Jason P.
3/3/11  1:30 p.m.  Podium #4
3/4/11  4:50 p.m.  Podium #31

Gomelsky, Alexander
3/3/11  5:35 p.m.  Poster #NM21

Gomes, Cristiano
3/5/11  8:00 a.m.  Poster #M23

Gomez, Christopher S.
3/3/11  6:55 p.m.  Podium #17

Gorbachinsky, Ilya
3/2/11  5:00 p.m.  Poster #BS40

Grigoriev, Victor E.
3/4/11  8:30 a.m.  Poster #NM39

Grimsby, Gwen M.
3/4/11  8:30 a.m.  Poster #M14

Gruber, Daniel
3/1/11  5:30 p.m.  Poster #BS3

Hadley, David A.
3/5/11  8:00 a.m.  Poster #NM56
3/5/11  9:10 a.m.  Podium #39

Henderson, Mary F.
3/5/11  8:00 a.m.  Poster #NM53

Holstead, Joshua
3/4/11  8:30 a.m.  Poster #M17

Horowitz, Andrew
3/1/11  5:30 p.m.  Poster #BS23
3/1/11  5:30 p.m.  Poster #BS24

Hsu, Yuchao
3/2/11  5:00 p.m.  Poster #BS43

Imam, Hala
3/3/11  5:35 p.m.  Poster #NM25
3/4/11  8:30 a.m.  Poster #NM40
3/5/11  8:40 a.m.  Podium #36
<table>
<thead>
<tr>
<th>Name</th>
<th>Date</th>
<th>Time</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingimarsson, Johann</td>
<td>3/3/11</td>
<td>1:40 p.m.</td>
<td>Podium #5</td>
</tr>
<tr>
<td>Isariyawongse, Justin P.</td>
<td>3/2/11</td>
<td>5:00 p.m.</td>
<td>Poster #BS35</td>
</tr>
<tr>
<td>Jeong, Seong J.</td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #M1</td>
</tr>
<tr>
<td>Jiang, HaiHong</td>
<td>3/1/11</td>
<td>5:30 p.m.</td>
<td>Poster #BS19</td>
</tr>
<tr>
<td>Johnson, Corey M.</td>
<td>3/4/11</td>
<td>8:30 a.m.</td>
<td>Poster #NM29</td>
</tr>
<tr>
<td>Johnson, Kelly C.</td>
<td>3/5/11</td>
<td>8:00 a.m.</td>
<td>Poster #NM43</td>
</tr>
<tr>
<td></td>
<td>3/5/11</td>
<td>8:00 a.m.</td>
<td>Poster #NM47</td>
</tr>
<tr>
<td></td>
<td>3/5/11</td>
<td>8:00 a.m.</td>
<td>Poster #NM49</td>
</tr>
<tr>
<td></td>
<td>3/5/11</td>
<td>8:00 a.m.</td>
<td>Poster #NM57</td>
</tr>
<tr>
<td>Jura, Ying</td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #NM20</td>
</tr>
<tr>
<td></td>
<td>3/4/11</td>
<td>8:40 a.m.</td>
<td>Podium #19</td>
</tr>
<tr>
<td>Kershen, Richard T.</td>
<td>3/2/11</td>
<td>5:00 p.m.</td>
<td>Poster #BS28</td>
</tr>
<tr>
<td>Khan, Aqsa A.</td>
<td>3/3/11</td>
<td>8:00 a.m.</td>
<td>Video #16</td>
</tr>
<tr>
<td></td>
<td>3/4/11</td>
<td>8:30 a.m.</td>
<td>Poster #M11</td>
</tr>
<tr>
<td></td>
<td>3/4/11</td>
<td>8:30 a.m.</td>
<td>Poster #M12</td>
</tr>
<tr>
<td></td>
<td>3/4/11</td>
<td>8:50 a.m.</td>
<td>Podium #20</td>
</tr>
<tr>
<td>Kim, Jason</td>
<td>3/2/11</td>
<td>5:00 p.m.</td>
<td>Poster #BS37</td>
</tr>
<tr>
<td></td>
<td>3/3/11</td>
<td>8:00 a.m.</td>
<td>Video #14</td>
</tr>
<tr>
<td></td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #M2</td>
</tr>
<tr>
<td></td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #M3</td>
</tr>
<tr>
<td></td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #NM27</td>
</tr>
<tr>
<td>Kit, Laura C.</td>
<td>3/4/11</td>
<td>9:50 a.m.</td>
<td>Podium #26</td>
</tr>
<tr>
<td>Kitney, Darryl</td>
<td>3/2/11</td>
<td>5:00 p.m.</td>
<td>Poster #BS34</td>
</tr>
<tr>
<td>Klausner, Adam P.</td>
<td>3/1/11</td>
<td>5:30 p.m.</td>
<td>Poster #BS22</td>
</tr>
<tr>
<td></td>
<td>3/5/11</td>
<td>8:00 a.m.</td>
<td>Poster #NM48</td>
</tr>
<tr>
<td>Koh, Sang D.</td>
<td>3/1/11</td>
<td>5:30 p.m.</td>
<td>Poster #BS20</td>
</tr>
<tr>
<td>Koski, Michelle E.</td>
<td>3/3/11</td>
<td>8:00 a.m.</td>
<td>Video #13</td>
</tr>
<tr>
<td></td>
<td>3/4/11</td>
<td>8:30 a.m.</td>
<td>Poster #NM33</td>
</tr>
<tr>
<td>Kraus, Stephen R.</td>
<td>3/3/11</td>
<td>6:25 p.m.</td>
<td>Podium #14</td>
</tr>
<tr>
<td>Kullmann, F. Aura</td>
<td>3/2/11</td>
<td>5:00 p.m.</td>
<td>Poster #BS33</td>
</tr>
<tr>
<td>Lai, H. Henry</td>
<td>3/1/11</td>
<td>5:30 p.m.</td>
<td>Poster #BS15</td>
</tr>
<tr>
<td>Le, Ngoc-Bich P.</td>
<td>3/4/11</td>
<td>8:30 a.m.</td>
<td>Poster #NM31</td>
</tr>
<tr>
<td>Lee, Courtney</td>
<td>3/3/11</td>
<td>8:00 a.m.</td>
<td>Video #8</td>
</tr>
<tr>
<td></td>
<td>3/5/11</td>
<td>8:00 a.m.</td>
<td>Poster #M22</td>
</tr>
<tr>
<td>Lee, Dominic</td>
<td>3/5/11</td>
<td>8:00 a.m.</td>
<td>Poster #NM51</td>
</tr>
<tr>
<td>Lee, Ha N.</td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #NM7</td>
</tr>
<tr>
<td>Lee, Una J.</td>
<td>3/1/11</td>
<td>5:30 p.m.</td>
<td>Poster #BS9</td>
</tr>
<tr>
<td></td>
<td>3/3/11</td>
<td>2:10 p.m.</td>
<td>Podium #8</td>
</tr>
<tr>
<td>Lenherr, Sara M.</td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #NM12</td>
</tr>
<tr>
<td>Levey, Helen R.</td>
<td>3/3/11</td>
<td>1:00 p.m.</td>
<td>Podium #1</td>
</tr>
<tr>
<td>Loutochin, Oleg</td>
<td>3/2/11</td>
<td>5:00 p.m.</td>
<td>Poster #BS38</td>
</tr>
<tr>
<td>Lowalekar, Samar</td>
<td>3/2/11</td>
<td>5:00 p.m.</td>
<td>Poster #BS44</td>
</tr>
<tr>
<td>Name</td>
<td>Date</td>
<td>Time</td>
<td>Type</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------</td>
<td>----------</td>
<td>------------</td>
</tr>
<tr>
<td>Lucente, Vincent</td>
<td>3/3/11</td>
<td>8:00 a.m.</td>
<td>Video #9</td>
</tr>
<tr>
<td>Mahdy, Ayman</td>
<td>3/4/11</td>
<td>8:30 a.m.</td>
<td>Poster #15</td>
</tr>
<tr>
<td>Mahfouz, Wally</td>
<td>3/1/11</td>
<td>5:30 p.m.</td>
<td>Poster #21</td>
</tr>
<tr>
<td></td>
<td>3/2/11</td>
<td>5:00 p.m.</td>
<td>Poster #45</td>
</tr>
<tr>
<td>Marinkovic, Serge P.</td>
<td>3/3/11</td>
<td>8:00 a.m.</td>
<td>Video #2</td>
</tr>
<tr>
<td>Markle, Danielle</td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #5</td>
</tr>
<tr>
<td>McAdams, Paul</td>
<td>3/5/11</td>
<td>8:00 a.m.</td>
<td>Poster #28</td>
</tr>
<tr>
<td>McIntyre, Matthew G.</td>
<td>3/3/11</td>
<td>1:50 p.m.</td>
<td>Podium #6</td>
</tr>
<tr>
<td>Mitsui, Takahiko</td>
<td>3/5/11</td>
<td>9:30 a.m.</td>
<td>Lapides Podium</td>
</tr>
<tr>
<td>Mobley, II, Joe</td>
<td>3/4/11</td>
<td>8:30 a.m.</td>
<td>Poster #16</td>
</tr>
<tr>
<td>Monga, Ash</td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #10</td>
</tr>
<tr>
<td>Mourtzinos, Arthur P.</td>
<td>3/5/11</td>
<td>8:00 a.m.</td>
<td>Poster #29</td>
</tr>
<tr>
<td></td>
<td>3/5/11</td>
<td>8:00 a.m.</td>
<td>Poster #58</td>
</tr>
<tr>
<td>Munoz, Alvaro</td>
<td>3/1/11</td>
<td>5:30 p.m.</td>
<td>Poster #10</td>
</tr>
<tr>
<td></td>
<td>3/1/11</td>
<td>5:30 p.m.</td>
<td>Poster #14</td>
</tr>
<tr>
<td>Murray, Cynelle</td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #19</td>
</tr>
<tr>
<td>Murray, Sunshine</td>
<td>3/5/11</td>
<td>8:00 a.m.</td>
<td>Poster #42</td>
</tr>
<tr>
<td>Nikolavsky, Dmitriy</td>
<td>3/4/11</td>
<td>8:30 a.m.</td>
<td>Poster #30</td>
</tr>
<tr>
<td>O’Connor, R. Corey</td>
<td>3/5/11</td>
<td>8:00 a.m.</td>
<td>Poster #27</td>
</tr>
<tr>
<td>Oh, Seung-June</td>
<td>3/3/11</td>
<td>6:45 p.m.</td>
<td>Podium #16</td>
</tr>
<tr>
<td>Outcault, Sarah</td>
<td>3/3/11</td>
<td>1:20 p.m.</td>
<td>Podium #3</td>
</tr>
<tr>
<td>Padmanabhan, Priya</td>
<td>3/5/11</td>
<td>9:00 a.m.</td>
<td>Podium #38</td>
</tr>
<tr>
<td>Pelletier Cameron, Anne</td>
<td>3/5/11</td>
<td>8:00 a.m.</td>
<td>Poster #46</td>
</tr>
<tr>
<td>Pickens, Ryan B.</td>
<td>3/3/11</td>
<td>8:00 a.m.</td>
<td>Video #7</td>
</tr>
<tr>
<td></td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #13</td>
</tr>
<tr>
<td></td>
<td>3/4/11</td>
<td>8:30 a.m.</td>
<td>Poster #32</td>
</tr>
<tr>
<td>Powell, II, Charles R.</td>
<td>3/4/11</td>
<td>4:10 p.m.</td>
<td>Podium #27</td>
</tr>
<tr>
<td>Purohit, Rajveer S.</td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #11</td>
</tr>
<tr>
<td>Ramm, Olga</td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #5</td>
</tr>
<tr>
<td>Reynolds, William S.</td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #4</td>
</tr>
<tr>
<td></td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #6</td>
</tr>
<tr>
<td></td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #18</td>
</tr>
<tr>
<td></td>
<td>3/4/11</td>
<td>8:30 a.m.</td>
<td>Poster #19</td>
</tr>
<tr>
<td>Rickey, Leslie M.</td>
<td>3/5/11</td>
<td>8:20 a.m.</td>
<td>Podium #34</td>
</tr>
<tr>
<td>Robinson, Barbara</td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #4</td>
</tr>
<tr>
<td>Rogers, Alexandra E.</td>
<td>3/3/11</td>
<td>8:00 a.m.</td>
<td>Video #6</td>
</tr>
<tr>
<td>Rogo-Gupta, Lisa</td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster #14</td>
</tr>
<tr>
<td></td>
<td>3/4/11</td>
<td>8:30 a.m.</td>
<td>Poster #20</td>
</tr>
<tr>
<td>Name</td>
<td>Date</td>
<td>Time</td>
<td>Type</td>
</tr>
<tr>
<td>--------------------</td>
<td>--------</td>
<td>--------</td>
<td>------------</td>
</tr>
<tr>
<td>Rowley, Michael</td>
<td>3/4/11</td>
<td>8:30 a.m.</td>
<td>Poster</td>
</tr>
<tr>
<td>Sajadi, Kamran</td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster</td>
</tr>
<tr>
<td>Schaefer, Werner</td>
<td>3/3/11</td>
<td>2:00 p.m.</td>
<td>Podium</td>
</tr>
<tr>
<td></td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster</td>
</tr>
<tr>
<td>Sevilla, Claudia</td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster</td>
</tr>
<tr>
<td></td>
<td>3/5/11</td>
<td>9:20 a.m.</td>
<td>Podium</td>
</tr>
<tr>
<td>Sirls, II, Larry T.</td>
<td>3/3/11</td>
<td>8:00 a.m.</td>
<td>Video</td>
</tr>
<tr>
<td>Smith, Ariana L.</td>
<td>3/4/11</td>
<td>9:00 a.m.</td>
<td>Podium</td>
</tr>
<tr>
<td>Smith, Phillip</td>
<td>3/1/11</td>
<td>5:30 p.m.</td>
<td>Poster</td>
</tr>
<tr>
<td></td>
<td>3/1/11</td>
<td>5:30 p.m.</td>
<td>Poster</td>
</tr>
<tr>
<td>Speich, John</td>
<td>3/1/11</td>
<td>5:30 p.m.</td>
<td>Poster</td>
</tr>
<tr>
<td>Staack, Andrea</td>
<td>3/1/11</td>
<td>5:30 p.m.</td>
<td>Poster</td>
</tr>
<tr>
<td>Stanford, Edward</td>
<td>3/5/11</td>
<td>8:00 a.m.</td>
<td>Podium</td>
</tr>
<tr>
<td>Taskin, David R.</td>
<td>3/1/11</td>
<td>5:30 p.m.</td>
<td>Poster</td>
</tr>
<tr>
<td>Stout, Shannon</td>
<td>3/4/11</td>
<td>8:30 a.m.</td>
<td>Poster</td>
</tr>
<tr>
<td>Suadicani, Sylvia</td>
<td>3/2/11</td>
<td>5:00 p.m.</td>
<td>Poster</td>
</tr>
<tr>
<td>Tadic, Stasa</td>
<td>3/5/11</td>
<td>9:40 a.m.</td>
<td>Podium</td>
</tr>
<tr>
<td>Tan, Hung-Jui</td>
<td>3/3/11</td>
<td>8:00 a.m.</td>
<td>Video</td>
</tr>
<tr>
<td>Tarr, Megan</td>
<td>3/4/11</td>
<td>8:30 a.m.</td>
<td>Poster</td>
</tr>
<tr>
<td>Thorner, Daniel</td>
<td>3/5/11</td>
<td>8:00 a.m.</td>
<td>Poster</td>
</tr>
<tr>
<td>Tincello, Douglas</td>
<td>3/4/11</td>
<td>8:30 a.m.</td>
<td>Podium</td>
</tr>
<tr>
<td>Tran, Viet Q.</td>
<td>3/4/11</td>
<td>8:30 a.m.</td>
<td>Poster</td>
</tr>
<tr>
<td></td>
<td>3/4/11</td>
<td>8:30 a.m.</td>
<td>Poster</td>
</tr>
<tr>
<td>Tyagi, Pradeep</td>
<td>3/1/11</td>
<td>5:30 p.m.</td>
<td>Poster</td>
</tr>
<tr>
<td>Tyagi, Vikas</td>
<td>3/1/11</td>
<td>5:30 p.m.</td>
<td>Poster</td>
</tr>
<tr>
<td></td>
<td>3/5/11</td>
<td>9:50 a.m.</td>
<td>Podium</td>
</tr>
<tr>
<td>Vaish, Sneha S.</td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster</td>
</tr>
<tr>
<td></td>
<td>3/3/11</td>
<td>5:35 p.m.</td>
<td>Poster</td>
</tr>
<tr>
<td>Valentini, Francoise A.</td>
<td>3/1/11</td>
<td>5:30 p.m.</td>
<td>Poster</td>
</tr>
<tr>
<td></td>
<td>3/5/11</td>
<td>8:00 a.m.</td>
<td>Poster</td>
</tr>
<tr>
<td>Vuturo, Maggie</td>
<td>3/4/11</td>
<td>8:30 a.m.</td>
<td>Poster</td>
</tr>
<tr>
<td></td>
<td>3/4/11</td>
<td>4:20 p.m.</td>
<td>Podium</td>
</tr>
<tr>
<td>Wang, Jicheng</td>
<td>3/4/11</td>
<td>4:40 p.m.</td>
<td>Podium</td>
</tr>
<tr>
<td>Yang, Christopher</td>
<td>3/3/11</td>
<td>8:00 a.m.</td>
<td>Video</td>
</tr>
<tr>
<td>Yoon, Hana</td>
<td>3/2/11</td>
<td>5:00 p.m.</td>
<td>Poster</td>
</tr>
<tr>
<td>Zimmern, Philippe E.</td>
<td>3/1/11</td>
<td>5:30 p.m.</td>
<td>Poster</td>
</tr>
<tr>
<td></td>
<td>3/5/11</td>
<td>8:10 a.m.</td>
<td>Podium</td>
</tr>
<tr>
<td>Zuckerman, Jack</td>
<td>3/5/11</td>
<td>8:00 a.m.</td>
<td>Poster</td>
</tr>
</tbody>
</table>