Welcome to Tampa-St. Petersburg for the Seventh Annual Winter Meeting of the Society for Urodynamics and Female Urology. As in previous years, the meeting will be held in conjunction with the International Society of Pelvic Neuromodulation (ISPiN). Our scientific program remains very topic-oriented with emphasis on basic and translational science, urodynamics, urinary incontinence, pelvic organ prolapse, neuromodulation, neurourology, voiding dysfunction and pelvic reconstructive surgery. The meeting will run from Tuesday, February 23, to lunchtime Saturday, February 27.

My program co-chairs, Drs. Philippe Zimmern, Toby Chai (basic science), 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 kicks off with a program dedicated to basic science and translational research. This year we have added an additional half-day to the basic science program, for a total of 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. So much so that we wanted to devote the extra time for those who are interested. It is a unique opportunity for basic scientists and clinicians to interact in a wonderful academic and social environment. The tradition of daily breakout sessions in various areas continues. This allows us to increase the breadth of topics covered and also allows for more intimate discussion and sharing of ideas in a small group format. 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 from 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 Renaissance Vinoy Resort & Golf Club, is a great meeting venue, providing many amenities, restaurants and activities on site. It’s considered the showplace of the waterfront, as it is the only luxury St. Petersburg hotel on the west coast with the combination of a private marina, 18-hole golf course and 12-court tennis complex. 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.

Victor W. Nitti, MD
SUFU Program Chair
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  
Toby C. Chai, MD  
Christopher Chermansky, MD  
J. Quentin Clemens, MD  
Craig V. Comiter, MD  
Sophie Fletcher, MD  
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  
Kathleen C. Kobashi, MD  
Stephen R. Kraus, MD  
Deborah J. Lightner, MD  
Steven P. Petrou, MD  
Paul Pettit, MD  
Larissa V. Rodriguez, MD  
Nirit Rosenblum, MD  
Steven W. Siegel, MD  
John T. Stoffel, MD  
Suzette E. Sutherland, MD  
E. James Wright, MD

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

2010 SUFU Meeting Program Chairs  
Victor W. Nitti, MD  
Toby Chai, MD  
Steven W. Siegel, MD  
Philippe E. Zimmern, MD

We would also like to thank the 2010 SUFU Essay Competition Reviewers:

Gary Lemack, MD (Chair)  
Jason P. Gilleran, MD  
J. Christian Winters, MD
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<th>THURSDAY (February 25, 2010)</th>
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**SCHEDULE AT A GLANCE**

**TUESDAY**

- **February 23, 2010**
  - **General Session Location**: Vinoy Ballroom
  - **REGISTRATION OPEN**
    - Location: Vinoy Foyer and Palm Court Foyer
  - **EXHIBIT HALL OPEN**
    - Location: Royal Palm and Center Court
  - **VIDEO VIEWING**
    - In Speaker Ready Room
      - Location: Dann
  - **7:00 a.m.**
    - Residents and Fellows Breakfast
      - Location: Plaza ABC
  - **7:30 a.m.**
    - Breakfast with the Experts
      - Location: Plaza CD
  - **8:30 a.m.**
    - Welcome
  - **9:00 a.m.**
    - Biochemical Changes and Genetics of Stress Urinary Incontinence
  - **9:30 a.m.**
    - Q&A
  - **10:00 a.m.**
    - Break
  - **10:30 a.m.**
    - Translational Research in Nanotechnology Applied to Urology
  - **11:00 a.m.**
    - Translational Research in Nanotechnology Applied to Urology
  - **11:30 a.m.**
    - Industry Sponsored Lunch Symposium
      - Location: Vinoy Ballroom
  - **12:00 p.m.**
    - Industry Sponsored Lunch Symposium
      - Location: Vinoy Ballroom
  - **12:30 p.m.**
    - Bladder Signaling
  - **1:00 p.m.**
    - Translation Research in Neurorestoration
  - **1:30 p.m.**
    - ISPiN Poster Session
      - Location: Vinoy Ballroom
  - **2:00 p.m.**
    - Blavas Lectureship
  - **2:30 p.m.**
    - Break
  - **3:00 p.m.**
    - Break
  - **3:30 p.m.**
    - Lower Urinary Tract Biomechanics
  - **4:00 p.m.**
    - Translational Research in BPH
  - **4:30 p.m.**
    - Basic Science Poster Session II
  - **5:00 p.m.**
    - Female Urology, SUI and Prolapse Poster Session
      - Location: Vinoy Ballroom
  - **5:30 p.m.**
    - Welcome Reception with Industry Partners
      - Location: Center Court
  - **6:00 p.m.**
    - Basic Science Poster Session I
      - (with Wine & Cheese) Location: Vinoy Ballroom
  - **6:30 p.m.**
    - Basic Science Poster Session I
  - **7:00 p.m.**
    - Basic Science Poster Session I
  - **7:30 p.m.**
    - Basic Science Poster Session I
  - **8:00 p.m.**
    - Basic Science Poster Session I

**WEDNESDAY**

- **February 24, 2010**
  - **7:00 a.m.**
    - Transvaginal Mesh for POP Repair: Practical Guidelines for Use
      - Location: Dann
  - **7:30 a.m.**
    - Pelvic Organ Prolapse
  - **8:00 a.m.**
    - Biochemical Changes and Genetics of Stress Urinary Incontinence
  - **9:00 a.m.**
    - Q&A
  - **10:00 a.m.**
    - Break
  - **10:30 a.m.**
    - Translational Research in Nanotechnology Applied to Urology
  - **11:00 a.m.**
    - Translational Research in Nanotechnology Applied to Urology
  - **11:30 a.m.**
    - Industry Sponsored Lunch Symposium
      - Location: Vinoy Ballroom
  - **12:00 p.m.**
    - Industry Sponsored Lunch Symposium
      - Location: Vinoy Ballroom
  - **12:30 p.m.**
    - Bladder Signaling
  - **1:00 p.m.**
    - Translation Research in Neurorestoration
  - **1:30 p.m.**
    - ISPiN Poster Session
      - Location: Vinoy Ballroom
  - **2:00 p.m.**
    - Blavas Lectureship
  - **2:30 p.m.**
    - Break
  - **3:00 p.m.**
    - Break
  - **3:30 p.m.**
    - Lower Urinary Tract Biomechanics
  - **4:00 p.m.**
    - Translational Research in BPH
  - **4:30 p.m.**
    - Basic Science Poster Session II
  - **5:00 p.m.**
    - Female Urology, SUI and Prolapse Poster Session
      - Location: Vinoy Ballroom
  - **5:30 p.m.**
    - Welcome Reception with Industry Partners
      - Location: Center Court
  - **6:00 p.m.**
    - Basic Science Poster Session I
      - (with Wine & Cheese) Location: Vinoy Ballroom
  - **6:30 p.m.**
    - Basic Science Poster Session I
  - **7:00 p.m.**
    - Basic Science Poster Session I
  - **7:30 p.m.**
    - Basic Science Poster Session I
  - **8:00 p.m.**
    - Basic Science Poster Session I
## SCHEDULE AT A GLANCE

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<th>Date</th>
<th>FRIDAY February 26, 2010</th>
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<td><strong>EXHIBIT HALL OPEN</strong></td>
<td>9:00 a.m. – 4:00 p.m.</td>
<td>6:30 a.m. – 10:30 a.m.</td>
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<tr>
<td>Location: Royal Palm and Center Court</td>
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<td><strong>VIDEO VIEWING</strong></td>
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<tr>
<td>In Speaker Ready Room</td>
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<td><strong>Breakfast in Exhibit Hall</strong></td>
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<td><strong>Industry Sponsored Breakfast Symposium</strong></td>
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<td>Location: Plaza Ballroom</td>
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<tr>
<td><strong>Urodynamics Poster Session</strong></td>
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<tr>
<td>Location: Vinoy Ballroom</td>
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<tr>
<td><strong>Female Urology, SUI and Prolapse Podium Session</strong></td>
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<td>Location: Majestic 123AB</td>
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<tr>
<td><strong>Male Incontinence and Reconstruction Podium Session</strong></td>
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<td>Location: Majestic 123AB</td>
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<tr>
<td><strong>Lapides Award and Prize Essay Winner Presentations</strong></td>
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<td>Location: Majestic 123AB</td>
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<td><strong>Male and Female LUTS: BPH and OAB</strong></td>
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<td>Critical Evidence Based Evaluation of Laser Ablation Procedures for BPH/LUTS in Comparison to TURP</td>
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<tr>
<td><strong>SUFU Post Prostatectomy Incontinence Study</strong></td>
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<td>Location: Majestic 123AB</td>
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<td><strong>Neurourology: How Do We Promote Office-Based Care of the Neurological</strong></td>
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<td>Location: Majestic 123AB</td>
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<td><strong>Management of the Adult Spina Bifida Patient</strong></td>
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<td><strong>ISPiN Podium Session</strong></td>
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<tr>
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<td>(Break 2:50 p.m. – 3:00 p.m.)</td>
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<td><strong>Neuromodulation with Neurotoxins</strong></td>
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<td><strong>ISPiN Podium Session</strong></td>
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<td><strong>Programming and Unusual Case Forum</strong></td>
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<td>Location: Plaza AB</td>
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<td><strong>Overactive Bladder: Symptom &amp; Syndrome</strong></td>
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<td>Location: Plaza CD</td>
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<td><strong>Urinary Incontinence and Sexual Health in Older Adults</strong></td>
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<td>Location: Lassing/Miller</td>
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<td><strong>Case Presentations in Neurogenic Voiding Dysfunction</strong></td>
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<td>Location: Majestic 123AB</td>
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<tr>
<td><strong>Cocktail Reception and Award Presentations in Exhibit Hall</strong></td>
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OFFICERS

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Harriette M. Scarpero, MD
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Sandip P. Vasavada, MD

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Education Committee Chair
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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 urological subspecialty, which includes female and male pelvic medicine and reconstructive surgery, urodynamics, voiding dysfunction and neuromodulation, is a rapidly developing area. Attendees of the SUFU program need to be aware of the latest updates and controversies in topics related to female urology, pelvic floor prolapse, neuromodulation, BPH, genitourinary reconstructive surgery and pelvic neuromodulation. This meeting will provide active interactions between clinicians, investigators and basic scientists regarding diagnostic, therapeutics, and research topics related to urinary incontinence, pelvic organ prolapse, urodynamics, voiding dysfunction, and neuromodulation and robotic surgery. Attendees will benefit from the ongoing review of these topics, which will assist them in assessing patients and determining future research needs.

Objectives
At the conclusion of this program, participants should be able to:

1. Assess the role of the latest translational work in areas of bladder signaling, lower urinary tract biomechanics, biochemical changes and genetics of stress urinary incontinence neurorestoration and BPH
2. Identify the pros and cons of mesh and biomaterials in pelvic reconstruction
3. Describe latest evidence-based data and state-of-the-art care related to male and female incontinence, overactive bladder, pelvic prolapse and pelvic reconstructive surgery and neuromodulation
4. Describe the latest information on stem cell technology for the treatment of stress incontinence in women
5. Assess the role of office-based care of the neurological patient
6. Describe the current management of the adult spina bifida patient
7. Identify emerging technologies in neuromodulation and neurotoxins in lower urinary tract dysfunction
8. Describe the current critical evidence based evaluation of Laser Ablation Procedures for BPH/LUTS in comparison to TURP
9. Illustrate the value of pressure-flow urodynamic studies prior to outlet reduction surgery

CME ACCREDITATION

CME 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 of Urodynamics and Female Urology. 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 educational activity for a maximum of 27.75 AMA PRA Category 1 Credits™. Physicians should only claim credit commensurate with the extent of their participation in the activity.

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

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.

General Disclaimer of the Society for Urodynamics & Female Urology
The statements and opinions contained in this program are solely those of the individual authors and contributors and not of the Society for Urodynamics and Female Urology. 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 Society for Urodynamics and Female Urology disclaims responsibility for any injury to persons or property resulting from any ideas or products referred to in the abstracts or advertisements.
THANK YOU TO OUR 2010 INDUSTRY PARTNERS

Diamond

Emerald

Ruby

Topaz

THANK YOU TO OUR 2010 SPONSORS

THANK YOU TO OUR 2010 EDUCATIONAL GRANT SUPPORTER
THANK YOU TO OUR 2010 EXHIBITORS

Alphabetical as of 2/5/2010

Allergan
Allergan Medical Affairs
American Medical Systems, Inc.
Astellas Pharma US, Inc.
Bard Medical
Boehringer Ingelheim Pharmaceuticals, Inc.
Coloplast
Ethicon Women’s Health & Urology
Interstitial Cystitis Association
Intuitive Surgical, Inc.
Laborie Medical
MediWatch USA, Inc.
Medtronic Inc.
National Association for Continence
Neomedic International
Novartis Pharmaceuticals
Novasys Medical
Olympus/Gyrus ACMI
Pfizer, Inc.
Uroplasty, Inc.
Watson Pharmaceuticals
MAPS OF HOTEL

VINOY
GRAND BALLROOM

MEZZANINE NORTH
OPEN TO LOBBY

MEZZANINE SOUTH
MEZZANINE TERRACE

GUEST ROOMS
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GUEST ROOMS
255-263

MEZZANINE LEVEL

HOSPITALITY SUITE 253 & TERRACE

GUEST ROOMS
210-221

FOYER

HISTORY GALLERY

LOBBY

VERANDA

TERRACE ROOM

MARCHAND’S BAR

MARCHAND’S GRILL

LOBBY LEVEL
GENERAL INFORMATION

Registration / Information Desk
Location: Vinoy Foyer and Palm Court Foyer
Tuesday, February 23, 2010  12:30 p.m. – 6:00 p.m.
Wednesday, February 24, 2010  7:00 a.m. – 6:30 p.m.
Thursday, February 25, 2010  7:00 a.m. – 5:00 p.m.
Friday, February 26, 2010  7:00 a.m. – 5:00 p.m.
Saturday, February 27, 2010  6:30 a.m. – 12:00 p.m.

Exhibit Hall Hours
Location: Royal Palm and Center Court
Wednesday, February 24, 2010
    (Welcome Reception with Industry Sponsors)  7:00 p.m. – 8:30 p.m.
Thursday, February 25, 2010  9:00 a.m. – 4:00 p.m.
Friday, February 26, 2010  9:00 a.m. – 4:00 p.m.
    (Cocktail Reception and Award Presentations)  6:00 p.m. – 7:30 p.m.
Saturday, February 27, 2010  6:30 a.m. – 10:30 a.m.

Speaker Ready Room Hours
Location: Dann
Thursday, February 25, 2010  7:00 a.m. – 6:00 p.m.
Friday, February 26, 2010  7:00 a.m. – 5:30 p.m.
Saturday, February 27, 2010  7:00 a.m. – 12:00 p.m.
PROGRAM SCHEDULE

2010 Winter Meeting
Society for Urodynamics and Female Urology
February 23 – 27, 2010
TUESDAY, FEBRUARY 23, 2010
All sessions located in the Vinoy Ballroom unless otherwise noted.

12:30 p.m. – 6:00 p.m.  Registration / Information Desk Open
Location: Vinoy Foyer

SUFU BASIC SCIENCE RESEARCH MEETING

1:30 p.m. – 3:00 p.m.  Bladder Signaling*
Moderators:  Matthew O. Fraser, PhD
              Gopal H. Badlani, MD
Panelists:
              Urothelium
              Lori A. Birder, PhD

             Interstitial Cells
              Adam P. Klausner, MD

             Smooth Muscle
              Rosalyn M. Adam, PhD

             Quantifying Afferent Signaling
              Karl B. Thor, PhD

3:00 p.m. – 3:30 p.m.  Break
Location: Vinoy Foyer

3:30 p.m. – 5:00 p.m.  Lower Urinary Tract Biomechanics
Moderators:  Margot S. Damaser, PhD
              Toby C. Chai, MD
Panelists:
              Overview of InVivo Biomechanics
              Matthew O. Fraser, PhD

             Biaxial Bladder Biomechanics
              Michael S. Sacks, PhD

             Pelvic Floor Biomechanics
              Margot S. Damaser, PhD

             Urethral Biomechanics
              Rachelle Prantil-Baun, PhD

6:30 p.m. – 8:30 p.m.  Basic Science Poster Session I (with Wine & Cheese)
Moderators:  Toby C. Chai, MD
              Alan J. Wein, MD, PhD (Hon)

Poster# BS1  EFFECTS OF IMPLANT GEOMETRY ON BLADDER PRESSURE
TRANSDUCTION IN THE SUBMUCOSA
Nicholas Szugye, Paul Fletter and Margot Damaser (Presented by: Paul Fletter)

Poster# BS2  WITHDRAWN

*Not CME Accredited
TUESDAY, FEBRUARY 23, 2010

All sessions located in the Vinoy Ballroom unless otherwise noted.

Poster# BS3  **CALCIUM SENSING RECEPTOR EXPRESSED IN INTERSTITIAL CELLS MODULATES BLADDER FUNCTION**
Vivian Cristofaro, PhD, Samar Lowalekar, MD, Subbarao V. Yalla, MD and Maryrose P. Sullivan, PhD (Presented by: Vivian Cristofaro)

Poster# BS4  **REGULATION OF TREK-1 CHANNEL BY ESTROGEN FOLLOWING ESTRUS STAGES**
Laura Dwyer, PhD, Salah Baker, PhD, Byoung Koh, BS, Lauren Peri, MS and Sang Don Koh, MD, PhD (Presented by: Sang Don Koh)

Poster# BS5  **A MOUSE MODEL OF CONDITIONAL SMOOTH MUSCLE-SPECIFIC DELETION OF THE MANGANESE SUPEROXIDE DISMUTASE GENE ALLOWS EXAMINATION ROLE OF OXIDATIVE STRESS IN DIABETIC BLADDER DYSFUNCTION**
Nan Xiao, MD, Guiming Liu, MD, PhD, Michael Kavran, MS and Firouz Daneshgari, MD (Presented by: Nan Xiao)

Poster# BS6  **PROSTAGLANDIN-E2 IS PRODUCED BY THE DETRUSOR LAYER AND MEDIATES SPONTANEOUS RHYTHMIC CONTRACTIONS IN THE URINARY BLADDER**
Adam Klausner, MD, Corey Johnson, MD, Aaron Stike, MD, Vikram Sabarwal, Amy Miner, BS, Harry Koo, MD and Paul Ratz, PhD (Presented by: Adam Klausner)

Poster# BS7  **OREXIN HAS A DIRECT EFFECT ON BLADDER FUNCTION**
Samar Lowalekar, MD, Vivian Cristofaro, PhD, Subbarao V. Yalla, MD and Maryrose P. Sullivan, PhD (Presented by: Samar Lowalekar)

Poster# BS8  **EXPRESSION OF TMEM16A AND PDGFR? IN MURINE BLADDER MYOFIBROBLAST**
Byoung Koh, William Hatton, PhD, Fiona Britton, PhD and Sang Don Koh, MD, PhD (Presented by: Sang Don Koh)

Poster# BS9  **DETRUSOR INJECTION OF AUTOLOGOUS ADIPOSE-DERIVED STEM CELLS IN CHITOSAN BASED GEL FOR TREATMENT OF THE EFFECTS OF BLADDER OUTLET OBSTRUCTION IN AN ANIMAL MODEL**
Ariana Smith, MD, Suny Harper, BS, Joanne Leung, BS, Rong Zhang, DDS, PhD, Chenlu Pan, BS, Benjamin Wu, DDS, PhD and Larissa Rodriguez, MD (Presented by: Ariana Smith)

Poster# BS10 **COMPARISON OF FESOTERODINE AND TOLTERODINE EXTENDED RELEASE FOR THE TREATMENT OF OVERACTIVE BLADDER: A HEAD-TO-HEAD PLACEBO-CONTROLLED TRIAL**
Sender Herschorn, MD, CM, Steven Swift, MD, Zhonghong Guan, MD, PhD, Martin Carlsson, MS, Jon D. Morrow, MD, CM, Marina Brodsky, PhD and Jason Gong, MD (Presented by: Sender Herschorn)
Poster# BS11  EARLY ONSET OF FESOTERODINE EFFICACY IN SUBJECTS WITH OVERACTIVE BLADDER
Howard B. Goldman, MD, FACS, Jon D. Morrow, MD, CM, Jason Gong, MD, Li-Jung Tseng, PhD and Tim Schneider, MD (Presented by: Howard B. Goldman)

Poster# BS12  IMMUNIZATION WITH SELF UROPLAKIN II CAUSES AUTOIMMUNE CYSTITIS; NOVEL MURINE EXPERIMENTAL AUTOIMMUNE CYSTITIS MODEL
Cengiz Z. Altuntas, PhD, Lauren N. Byrne, MD, Cagri Sakalar, PhD, M. Fatih Gulen, Esen Bakhaudtin, Jun Qin, PhD, Xiaoxia Li, PhD, Vincent K. Tuohy, PhD and Firouz Daneshgari, MD (Presented by: Lauren N. Byrne)

Poster# BS13  CATHETERIZING INTERSTITIAL CYSTITIS/PAINFUL BLADDER SYNDROME (IC/PBS) PATIENTS FOR INTRAVESICAL INSTILLATION: DOES CATHETER SIZE MATTER?
Marina Ruzimovsky, BSN, MSN, Soroush Rais-Bahrami, MD, Kathleen Donlon, RN and Robert Moldwin, MD (Presented by: Marina Ruzimovsky)

Poster# BS14  DO THE SURGICAL COMPONENTS OF SLING PROCEDURE CONTRIBUTE TO THE POST-SURGICAL BLADDER COMPLICATIONS?
Lauren N. Byrne, MD, Jonas Jricius, MD, Nan Xiao, MD, Michael Kavran, MS, Firouz Daneshgari, MD and Adonis Hijaz, MD (Presented by: Lauren N. Byrne)

Poster# BS15  GHRELIN- A PUTATIVE MECHANISTIC LINK BETWEEN OAB AND OBESITY
Pradeep Tyagi, PhD, Vikas Tyagi, MD, Kenneth Peters, MD, Erich Witteemer, Yao-Chi Chuang, MD, Hann-Chorng Kuo, MD, Naoki Yoshimura, MD, PhD and Michael Chancellor, MD (Presented by: Pradeep Tyagi)

Poster# BS16  URINARY NERVE GROWTH FACTOR IN OAB AND CYSTITIS
Hana Yoon, MD, PhD, Suk Seon Yoo, MD, Jae Yup Hong, MD, PhD and Ju Tae Seo, MD, PhD (Presented by: Hana Yoon)

Poster# BS17  EFFECTS OF OBESITY AND TYPE 2 DIABETES ON RECOVERY FROM PUDENDARAL NERVE INJURY IN FEMALE ZUCKER RATS
Hai-Hong Jiang, MD, PhD, Bradley C. Gill, BSE, Dan Li Lin, MD, Jonathan B. Glaab, BS, Bruce I. Kinley, BS and Margot S. Damaser, PhD (Presented by: Bradley C. Gill)

Poster# BS18  DIABETIC BLADDER DYSFUNCTION IN TYPE 2 MOUSE MODELS MAY DIFFER FROM THAT REPORTED FOR TYPE 1 DIABETES
Guiming Liu, PhD, Nan Xiao, MD, PhD, Michael Kavran, MS, Nicholas Boncher, MD and Firouz Daneshgari, MD (Presented by: Nicholas Boncher)
12:00 p.m. – 4:00 p.m. Executive Committee Meeting  
Location: Plaza AB

7:00 a.m. – 6:30 p.m. Registration / Information Desk Open  
Location: Vinoy Foyer and Palm Court Foyer

**SUFU BASIC SCIENCE RESEARCH MEETING**

7:30 a.m. – 8:30 a.m. Breakfast with the Experts  
Location: Plaza CD  
Table Leaders: Gopal H. Badlani, MD; Lori A. Birder, PhD  
Toby C. Chai, MD; Margot S. Damaser, PhD  
Firouz Daneshgari, MD; Matthew O. Fraser, PhD  
Peggy Norton, MD; Karl B. Thor, PhD

8:30 a.m. – 8:40 a.m. Welcome  
Victor W. Nitti, MD, Program Organizer  
E. Ann Gormley, MD, SUFU President  
Toby C. Chai, MD, Basic Science Committee Co-Chair  
Philippe Zimmern, MD, Basic Science Committee Co-Chair

8:40 a.m. – 10:00 a.m. Biochemical Changes and Genetics of Stress Urinary Incontinence  
Moderators: Adonis K. Hijaz, MD  
Peggy Norton, MD  
Panelists: TIMP  
Bertha Chen, MD  
MMP1  
Gopal H. Badlani, MD  
LOX-1  
Larissa V. Rodriguez, MD  
Twin and Linkage Studies  
Peggy Norton, MD

10:00 a.m. – 10:30 a.m. Break  
Location: Vinoy Foyer

10:30 a.m. – 11:30 a.m. Translational Research in Nanotechnology Applied to Urology  
Moderator: Earl Y. Cheng, MD  
Panelists: Review on Nanomaterials in Urology  
Thomas Webster, PhD  
Current Applications of Nanoscale Materials to Bladder Tissue Engineering  
Earl Y. Cheng, MD  
Lab-on-a-Chip for Rapid Diagnosis of Urinary Tract Infections  
Joseph C. Liao, MD
WEDNESDAY, FEBRUARY 24, 2010
All sessions located in the Vinoy Ballroom unless otherwise noted.

11:45 a.m. – 12:45 p.m.  Industry Sponsored Lunch Symposium
Location Vinoy Ballroom

“Results From Two Head-to-Head Trials Comparing Two OAB Agents”
Peter K. Sand, MD
Northshore University Health System
University of Chicago, Pritzker School of Medicine
Evanston, IL
Sponsored by Pfizer, Inc.

1:00 p.m. – 2:00 p.m.  State-of-the-Art Presentation
Moderator:  Toby C. Chai, MD
Presenter:  Host Factors Involved in Bacterial Cystitis Pathogenesis
Soman N. Abraham, PhD

2:00 p.m. – 3:30 p.m.  Translation Research in Neurorestoration
Moderator:  Kenneth M. Peters, MD
Panelists:  Neuroembryology
John S. Wiener, MD
Neuroplasticity After Spinal Cord Injury
Changfeng Tai, PhD
Challenges in Nerve Re-Routing
Kenneth M. Peters, MD

3:30 p.m. – 4:00 p.m.  Break
Location: Vinoy Foyer

4:00 p.m. – 5:00 p.m.  Translational Research in BPH
Moderator:  Robert H. Getzenberg, PhD
Panelists:  Definition of BPH/LUTS, an Epidemiologic Perspective
Elizabeth A. Platz, ScD, MPH
CT Antigens as Potential Therapeutic Target for BPH/LUTS
Robert H. Getzenberg, PhD
The Role of Inflammation in the Pathology of BPH/LUTS
M. Scott Lucia, MD
5:00 p.m. – 6:30 p.m.  Basic Science Poster Session II*
Moderators: Karl B. Thor, PhD
            Firouz Daneshgari, MD

Poster# BS19  LIPOSOMES FACILITATE EFFICIENT BLADDER UPTAKE OF ANTISENSE OLIGONUCLEOTIDES
Vikas Tyagi, MD, Yoshio Sugino, MD, Naoki Yoshimura, MD, PhD, Jonathan Kaufman, PhD, Yao-Chi Chuang, MD, Hann-Chorng Kuo, MD, Michael Chancellor, MD and Pradeep Tyagi, PhD (Presented by: Vikas Tyagi)

Poster# BS20  INJECTION OF BOTULINUM TOXIN TYPE A AS A THERAPEUTIC OPTION FOR BLADDER PRESERVATION IN PATIENTS WITH SEVERE NEUROGENIC DETRUSOR OVERACTIVITY
Taisha Williams, MD, M.E. Beck, PA-C, T.J. Lehrfeld, MD, J. Serio, RN, T. Nguyen, MD and D.A. Gordon, MD (Presented by: Taisha Williams)

Poster# BS21  ELECTRICAL STIMULATION OF THE URETHRA EVOKES BLADDER CONTRACTION AND EMPTYING IN MEN WITH SPINAL CORD INJURY
Michael Kennelly, MD, Kimberly Arena, PA-C, Nell Shaffer, RN, Maria Bennett, MS, Warren Grill, PhD and Joseph Boggs, PhD (Presented by: Joseph Boggs)

Poster# BS22  COLLAGEN INGROWTH ASSESSMENT: SYNTHETIC AND ALLOGRAFT/XENOGRAFT IN A TWO-SITE ANIMAL MODEL
Dobie Giles, MD, Mohamed Akl, MD, Wesley Hilger, MD, Qingshan Chen, Qing Wu, Leslie Kevin, MD and Cornella Jeffrey, MD (Presented by: Dobie Giles)

Poster# BS23  STEM CELL HOMING CYTOKINE UPREGULATION IN LYSYL OXIDASE LIKE 1 (LOXL1) KNOCKOUT MICE AFTER VAGINAL DISTENSION
Una Lee, MD, A. Marcus Gustilo-Ashby, MD, Mei Kuang, Dan Li Lin, MD and Margot Damaser, MD (Presented by: Una Lee)

Poster# BS24  THE EFFECT OF AGING, PARITY, AND HORMONE REPLACEMENT STATUS ON THE BIOMECHANICAL PROPERTIES OF VAGINAL TISSUE IN WOMEN WITH PELVIC ORGAN PROLAPSE
Una Lee, MD, Ja-Hong Kim, MD, Christian Twiss, MD, Valerie Arboleda, Shlomo Raz, MD, Eric Vilain, JN, Ben Wu, MD and Larissa Rodriguez, MD (Presented by: Una Lee)

Poster# BS25  EFFECTS OF ELECTRICAL STIMULATION OF THE PUDENDAL NERVE ON EXPRESSION OF NEUROTROPHINS IN ONUF’S NUCLEUS FOLLOWING SIMULATED CHILDBIRTH INJURY
Hai-Hong Jiang, MD, PhD, Bradley Gill, BS, Levilester Salcedo, MD, Paul Zaszczyrnski, BS, Brian Balog, BS, Dan Li Lin, MD and Margot Damaser, PhD (Presented by: Hai-Hong Jiang)

*Not CME Accredited
poster# bs26  effects of neurotrophin supplementation on functional recovery of the pudendal nerve following simulated childbirth injury: preliminary results
bradley c. gill, bse, hai-hong jiang, md, phd, brian m. balog, bs, amy s. nowacki, phd and margot s. damaser, phd (presented by: bradley c. gill)

poster# bs27  mmp-1 promoter variant is associated with stress urinary incontinence and pelvic organ prolapse
patrick mckenzie, md, jan rohozinski, phd, sonia vishwajit, karl-erik andersson, md, phd and gopal badlani, md (presented by: patrick mckenzie)

poster# bs28  impact of aging on degree of injury and recovery to bladder function, and expression of stem cell homing chemokine in rat model of simulated birth trauma
nicholas boncher, md, mingfang tao, md, michael kavran, ms, nan xiao, md, greg spana, md, firouz daneshgari, md and adonis hijaz, md (presented by: nicholas boncher)

poster# bs29  opposite effects of type 1 diabetes mellitus on bladder and urethral smooth muscle strips
liansheng chang, md, zhongguang yang, md, phd, paul c. dolber, phd and matthew o. fraser, phd (presented by: matthew o. fraser)

poster# bs30  expression of monocyte chemotactic protein-3 following simulated birth trauma in mouse model of obesity
nicholas boncher, md, gino vricella, md, mingfang tao, md, guiming liu, phd, michael kavran, ms, firouz daneshgari, md and adonis hijaz, md (presented by: gino vricella)

poster# bs31  differential response of stem cell homing chemokine among models of stress urinary incontinence in mice
adonis hijaz, md, jack cheng-tsung hou, md, mingfang tao, md, lauren n. byrne, md, guiming liu, md, phd, yi-hao lin, md, michael kavran, ms and firouz daneshgari, md (presented by: lauren n. byrne)

poster# bs32  long term durability of polydimethylsiloxane injectable bulkling agent (macrolastique®) in urethral tissues: animal study histopathology
william wustenberg, dvm (presented by: william wustenberg)

poster# bs33  external urethral sphincter electromyography after simulated childbirth injury with recovered leak point pressure
hai-hong jiang, md, phd, jessica clemons, brian balog, bs, and margot damaser, phd (presented by: hai-hong jiang)
**Poster# BS34**  CAN MODELIZED ANALYSIS OF PRESSURE-FLOW STUDIES IMPROVE THE KNOWLEDGE OF THE NERVOUS CONTROL OF BOTH BLADDER AND URETHRA?
Françoise Valentini, MD, PhD and Pierre Nelson, PhD (Presented by: Françoise Valentini)

**Poster# BS35**  URINE STORAGE IN THE RAT IS AN ACTIVE RATHER THAN PASSIVE PROCESS
Matthew O. Fraser, PhD and Paul C. Dolber, PhD (Presented by: Matthew O. Fraser)

### 4:00 p.m. – 6:30 p.m.
**Fellows Forum (for participating fellows only)**
*Location: Plaza CD*
**Moderators:** Eric S. Rovner, MD  
Gary E. Lemack, MD  
Harriette M. Scarpero, MD

### 7:00 p.m. – 8:30 p.m.
**SUFU Welcome Reception with Our Industry Partners**
*Location: Center Court*
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<th>Time</th>
<th>Event</th>
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| 7:00 a.m. – 5:00 p.m. | Registration / Information Desk Open  
|               | Location: Palm Court Foyer                                           |                                 |
| 7:00 a.m. – 8:00 a.m. | Residents and Fellows Breakfast  
|               | Location: Plaza ABC  
|               | Moderators: Eric S. Rovner, MD  
|               | Gary E. Lemack, MD  
|               | Harriette M. Scarpero, MD                                              |                                 |
| 8:00 a.m. – 5:00 p.m. | Video Viewing in Speaker Ready Room  
|               | Location: Dann                                                       |                                 |
| Video# 1      | NOVEL SINGLE INCISION SLING TECHNIQUE USING THE SOLYX SIS SYSTEM    |                                  |
|               | Scott Serels, MD (Presented by: Scott Serels)                        |                                 |
| Video# 2      | PLACEMENT OF A TINED ELECTRODE AT THE PUDENDAL NERVE                 |                                  |
|               | Kenneth Peters, MD, Kim Killinger, RN and Brain Boguslawski, BS (Presented by: Kenneth Peters) |                                 |
| Video# 3      | THE RACKLEY CONTINENT NEO-URACHUS FOR URINARY DIVERSION              |                                  |
|               | Michael Ingber, MD, Farzeen Firoozi, MD, Courtenay Moore, MD, Sandip Vasavada, MD and Raymond Rackley, MD (Presented by: Michael Ingber) |                                 |
| Video# 4      | TRANSVAGINAL COMBINED SACROSPINOUS RECTOPEXY AND VAGINAL VAULT SUSPENSION |                                  |
|               | Farzeen Firoozi, MD, Kelly A. Garrett, MD, Brooke Gurland, MD, Michael Ingber MD, Howard B. Goldman, MD (Presented by: Farzeen Firoozi) |                                 |
| Video# 5      | PERCUTANEOUS TIBIAL NERVE STIMULATION                                |                                  |
|               | Michael Ingber, MD, Farzeen Firoozi, MD, Courtenay Moore, MD, Raymond Rackley, MD, Sandip Vasavada, MD (Presented by: Michael Ingber) |                                 |
| Video# 6      | ROBOTIC-ASSISTED LAPAROSCOPIC SACROCOLOPOPEXY                        |                                  |
|               | Jennifer Anger, MD, MPH, Ja-Hong Kim, MD, and Peter Schulam, MD, PhD (Presented by: Jennifer Anger) |                                 |
| Video# 7      | CONSTRUCTION OF FEMALE NEourethra USING BUCCAL MUCOSA                |                                  |
|               | Gamal Ghoniem, MD, FACS (Presented by: Gamal Ghoniem)                |                                 |
| 9:00 a.m. – 4:00 p.m. | Exhibit Hall Open  
|               | Location: Royal Palm and Center Court                                 |                                 |
THURSDAY, FEBRUARY 25, 2010
All sessions located in the Majestic 123AB unless otherwise noted.

GENERAL SESSION

7:55 a.m. – 8:00 a.m.  Introduction
Victor W. Nitti, MD

SUFU – Pelvic Organ Prolapse
Moderator: Sandip P. Vasavada, MD

8:00 a.m. – 8:20 a.m.  Pelvic Organ Prolapse: Essentials of Evaluation for the Clinician and Clinical Researcher
Kimberly Kenton, MD, MS

8:20 a.m. – 9:35 a.m.  Transvaginal Mesh for POP Repair: Practical Guidelines for Use
Is There an “Ideal” Patient for Transvaginal Mesh Placement?
J. Christian Winters, MD

Who Should Not Have Transvaginal Mesh?
Mickey M. Karram, MD

Mesh Kits: Why They are Good and When They are Not So Good
Vincent Lucente, MD

Short and Intermediate Term Outcomes of Transvaginal Mesh
Howard B. Goldman, MD

Managing Complications of Transvaginal Mesh
Kathleen C. Kobashi, MD

9:35 a.m. – 10:00 a.m.  Q & A

10:00 a.m. – 10:30 a.m.  Break – Visit Exhibits
Location: Royal Palm and Center Court

10:30 a.m. – 11:00 a.m.  Debate: Robotics for POP Repair, State-of-the-Art or Gimmick?
Moderator: Nirit Rosenblum, MD

State-of-the-Art
Jeffrey L. Cornella, MD

Gimmick
Eric S. Rovner, MD

11:00 a.m. – 11:30 a.m.  Debate on Stem Cells for Female SUI – “The Optimal Stem Cell”
Moderator: Christopher K. Payne, MD

Adipose Derived Stem Cells
Larissa V. Rodriguez, MD

Muscle Derived Stem Cells
Michael Chancellor, MD
THURSDAY, FEBRUARY 25, 2010
All sessions located in the Majestic 123AB unless otherwise noted.

11:45 a.m. – 12:45 p.m. Industry Sponsored Lunch Symposium
Location: Plaza Ballroom
“Breaking Through the Barriers: Understanding and Diagnosing Female Sexual Dysfunction”
Speaker: Ridwan Shabsigh, MD, FACS
Maimonides Medical Center, Brooklyn, NY
Columbia University College of Physicians and Surgeons, New York, NY
Sponsored by Boehringer Ingelheim Pharmaceuticals

11:45 a.m. – 12:45 p.m. Industry Sponsored Lunch Symposium
Location: Vinoy Ballroom
“The SKINside Story on OAB Treatment”
Highlights of Recent Advances in the Treatment of OAB
Faculty:
Gary G. Kay, PhD
Georgetown University, Washington, DC
Michael J. Kennelly, MD, FACS
Charlotte Continence Center
Carolinas Rehabilitation Hospital
UNC – Chapel Hill, NC
Scott A. MacDiarmid, MD
Alliance Urology Specialists
Bladder Control and Pelvic Pain Center, Greensboro, NC
Sponsored by Watson Pharma, Inc.

1:00 p.m. – 2:30 p.m. Concurrent Poster/Podium Sessions
Prolapse and SUI Podium Session
Moderators: Harriette M. Scarpero, MD
Peter K. Sand, MD

Podium #1 PELVIC FLOOR DISORDER SELF-REPORTED HEALTH-RELATED QUALITY OF LIFE QUESTIONNAIRES: AN ASSESSMENT OF READABILITY
Shelby Morrisroe, MD, Jonathan Bergman, MD, Rezoana Rashid, Rebecca Rogers, MD and Jennifer Anger, MD (Presented by: Shelby Morrisroe)

Podium #2 GENETIC DETERMINANTS OF STRESS URINARY INCONTINENCE IN WOMEN
Peggy Norton, MD, Kristina Allen-Brady, PhD and Lisa Cannon-Albright, PhD (Presented by: Peggy Norton)

Podium #3 AUTOLOGOUS MUSCLE-DERIVED CELLS AS THERAPY FOR STRESS URINARY INCONTINENCE: A RANDOMIZED, BLINDED TRIAL
Sender Herschorn, MDCM, FRCSC, Lesley Carr, MD, Colin Birch, MBBS, Magnus Murphy, FRCSC, Magali Robert, MD, Ronald Jankowski, PhD, Ryan Pruchnic, MS, MBA, David Wagner, MS and Michael Chancellor, MD (Presented by: Sender Herschorn)
THURSDAY, FEBRUARY 25, 2010

All sessions located in the Majestic 123AB unless otherwise noted.

Podium #4  MEASUREMENT OF TRANSURETHRAL BLADDER NECK DISTRACTION DURING TENSION-FREE VAGINAL TAPE (TVT) PROCEDURE
Shameem Abbasy, MD, MPH, Megan Tarr, MD, Thythy Pham, MD, MS, Kimberly Kenton, MD, MS, Linda Brubaker, MD, MS and Elizabeth Mueller, MD, MS (Presented by: Shameem Abbasy)

Podium #5  INCONTINENCE AND PELVIC RECONSTRUCTIVE SURGERY: DOES ABU CERTIFICATION LOG DATA DEMONSTRATE DIFFERENCES IN PRACTICE PATTERNS BY GENERATION OF TRAINING?
Priya Padmanabhan, MD, MPH, Melissa Kaufman, MD, PhD, Roger Dmochowski, MD and Harriette Scarpero, MD (Presented by: Priya Padmanabhan)

Podium #6  OUTCOMES OF PREGNANCY FOLLOWING SURGERY FOR STRESS URINARY INCONTINENCE: A SYSTEMATIC REVIEW
Shelby Morrisroe, MD, Matthew Pollard, MD, Matthew Mossanen, MD, Paul Shekelle, MD and Jennifer Anger, MD (Presented by: Shelby Morrisroe)

Podium #7  HEALTH LITERACY AND DISEASE UNDERSTANDING AMONG AGING WOMEN WITH PELVIC FLOOR DISORDERS
Una Lee, MD, Matthew Mossanen, Brita Mittal, Matthew Pollard, Sally Maliski, RN, PhD, Christopher Tarney, MD, Mark Litwin, MD, MPH, Rebecca Rogers, MD and Jennifer Anger, MD, MPH (Presented by: Una Lee)

Podium #8  ADJUSTABLE CONTINENCE THERAPY (ACT®) FOR SEVERE ISD AND RECURRENT FEMALE STRESS URINARY INCONTINENCE – LONG TERM EXPERIENCE
Ervin Kocjancic, MD, Crievellaro Simone, MD and BrunoCrivellaro Frea, MD (Presented by: Ervin Kocjancic)

Podium #9  LONG-TERM FOLLOW UP OF VOIDING PARAMETERS AND SURGICAL RECURRENCE AFTER URETHRAL DIVERTICULECTOMY
Michael Ingber, MD, Farzeen Firoozi, MD, Kamran Sajadi, MD, Christina Ching, MD, Howard (Presented by: Michael Ingber)

1:00 p.m. – 2:30 p.m.  ISPiN Moderated/Non-Moderated Poster Session
Location: Vinoy Ballroom
Moderators:  Raul C. Ordorica, MD
            Tracy Small Wilson, MD

MODERATED

Poster# 1  THE IMPACT OF CHRONIC NEUROMODULATION ON CO-MORBID BOWEL SYMPTOMS IN PATIENTS WITH VOIDING DYSFUNCTION
Kenneth M. Peters, MD, Kim A. Killinger, MSN, Jeffrey R. Kangas, BS and Judith A. Boura (Presented by: Kenneth M. Peters)
THURSDAY, FEBRUARY 25, 2010
All sessions located in the Majestic 123AB unless otherwise noted.

Poster# 2   PERCUTANEOUS TIBIAL NERVE STIMULATION DOUBLE-BLINDED, RANDOMIZED, SHAM-CONTROLLED TRIAL FOR OVERACTIVE BLADDER: EFFECT ON FECAL
Kenneth M. Peters, MD, Donna J. Carrico, NP, MS, Ramon Perez-Marrero, MD, Ansar U. Khan, MD, Leslie S. Wooldridge, MSN, RNCS, GNP, Gregory L. Davis, MD and Scott A. MacDiarmid, MD (Presented by: Kenneth M. Peters)

Poster# 3   BILATERAL TINED LEAD PLACEMENT DURING STAGE I SACRAL NERVE ROOT TESTING IMPROVES CLINICAL OUTCOMES WITH SACRAL NEUROMODULATION
Taisha Williams, MD, M.E. Beck, PA-C, Aretha Makia, MD and D.A. Gordon, MD, FACS (Presented by: Taisha Williams)

Poster# 4   INDICATIONS, OUTCOMES, AND COMPLICATIONS OF SACRAL NERVE STIMULATION FOR THE TREATMENT OF MALE VOIDING DYSFUNCTION
Joe Mobley, MD, MPH, Ryan Pickens, MD, Wes White, MD, Regula Doggweiler, MD, and Frederick Klein, MD (Presented by: Joe Mobley)

Poster# 5   SACRAL NEUROMODULATION DEVICE INFECTION: ANALYSIS OF RISK FACTORS
Bader Almosaieed, MD, and Gamal Ghoniem, MD, FACS (Presented by: Bader Almosaieed)

Poster# 6   COMPARATIVE EFFECTIVENESS: PERCUTANEOUS TIBIAL NERVE STIMULATION (PTNS) AND SACRAL NERVE STIMULATION (SNS) FOR OVERACTIVE BLADDER (OAB) TREATMENT
Scott MacDiarmid, MD, and Melissa Martinson, PhD (Presented by: Scott MacDiarmid)

Poster# 7   DOES BOWEL FUNCTION CHANGE IN IRRITABLE BOWEL SYNDROME PATIENTS UNDERGOING NEUROMODULATION FOR VOIDING DYSFUNCTION?
Kenneth M. Peters, MD, Kim A. Killinger, MSN, Jeffrey R. Kangas, BS, and Judith A. Boura (Presented by: Kenneth M. Peters)

Poster# 8   NATIONAL TRENDS IN THE USAGE AND SUCCESS OF SACRAL NEUROMODULATION IN THE MEDICARE POPULATION
Anne P. Cameron, MD, Jennifer T. Anger, MD, MPH, Rodger Madison, Christopher S. Saigal, MD, MPH, and J. Quentin Clemens, MD, MSCI (Presented by: Anne P. Cameron)

Poster# 9   RISK FACTORS FOR THE DELAYED LEAD MIGRATION AFTER PLACEMENT OF SACRAL NEUROMODULATORS – DO OUTCOMES PARALLEL THE EXTENT OF LEAD MOVEMENT?
Rashel Haverkorn, MD, Alienor Gilchrist, MD, Daniel Decker, MD, Sunshine Murray, MD, Sophie Fletcher, MD, and Gary Lemack, MD (Presented by: Rashel Haverkorn)
NON-MODERATED*

**Poster# 10** SUCCESS OF SACRAL NEUROMODULATION IN A PRIVATELY INSURED POPULATION
Anne P. Cameron, MD, Jennifer T Anger, MD, MPH, Rodger Madison, Christopher S. Saigal, MD, MPH, and J. Quentin Clemens, MD, MSCI (Presented by: Anne P. Cameron)

**Poster# 11** SACRAL NEUROMODULATION AND PATIENT PREPAREDNESS: DOES THIS IMPROVE PERCEPTION OF SURGICAL OUTCOME?
Farzeen Firoozi, MD, Michael S. Ingber, MD, Courtenay Moore, MD, Howard B. Goldman, MD, Raymond Rackley, MD, and Sandip Vasavada, MD (Presented by: Farzeen Firoozi)

**Poster# 12** BATTERY LONGEVITY AFTER SACRAL NEUROMODULATION
Anne P. Cameron, MD, Jennifer T. Anger, MD, MPH, Rodger Madison, Christopher S. Saigal, MD, MPH and J. Quentin Clemens, MD, MSCI (Presented by: Anne P. Cameron)

**Poster# 13** THE ROLE OF PROVIDER VARIABLES ON OUTCOMES OF SACRAL NEUROMODULATION
Jennifer Anger, MD, MPH, Anne Cameron, MD, Roger Madison, PhD, Christopher Saigal, MD, MPH, J. Quentin Clemens, MD, and The Urologic Diseases in America Project (Presented by: Jennifer Anger)

**Poster# 14** PERCUTANEOUS TIBIAL NERVE STIMULATION FOR THE TREATMENT OF OVERACTIVE BLADDER: TREATMENT INTERVAL FREQUENCY
Scott MacDiarmid, MD, Kenneth Peters, MD, and Leslie Wooldridge, GNP (Presented by: Scott MacDiarmid)

**Poster# 15** A SHORT-TERM ANALYSIS OF PARAMETERS AFFECTING THE OUTCOME OF SACRAL NEUROMODULATION
Hana Yoon, MD, PhD (Presented by: Hana Yoon)

**Poster# 16** THE EFFECT OF SACRAL NEUROMODULATION ON ANTICHOLINERGIC EXPENDITURES IN A PRIVATELY INSURED POPULATION
Jennifer Anger, MD, MPH, Anne Cameron, MD, Roger Madison, PhD, Christopher Saigal, MD, MPH, J. Quentin Clemens, MD, and Urologic Diseases in America Project (Presented by: Jennifer Anger)

**Poster# 17** USE OF COMBINED ANTICHOLINERGIC MEDICATION AND SACRAL NEUROMODULATION IN THE TREATMENT OF REFRACTORY OVERACTIVE BLADDER
Ene George, MD, Felicia Lane, MD and Karen Noblett, MD (Presented by: Ene George)

*Not CME Accredited*
THURSDAY, FEBRUARY 25, 2010

All sessions located in the Majestic 123AB unless otherwise noted.

Poster# 18  WITHDRAWN

Poster# 19  SACRAL NERVE ROOT NEUROMODULATION FOR THE TREATMENT OF INTRACTABLE PAINFUL BLADDER SYNDROME/INTERSTITIAL CYSTITIS (PBS/IC): 14 YEARS EXPERIENCE OF ONE CENTER

Poster# 20  EFFICACY OF NEUROMODULATION FOR REFRACTORY INTERSTITIAL CYSTITIS/PAINFUL BLADDER SYNDROME
Sara Lenherr, MD, Gjanje Smith, MD, John Bresette, MD, and John Stoffel, MD (Presented by: Sara Lenherr)

2:30 p.m. – 3:00 p.m.  Blaivas Lectureship: What Have We Learned About Using Bowel in Urologic Reconstruction in the Past 30 Years?
Sender Herschorn, MD

3:00 p.m. – 3:30 p.m.  Break – Visit Exhibits
Location: Royal Palm and Center Court

3:30 pm. – 4:30 p.m.  Panel Discussion: Nocturia
Moderator: Jeffrey P. Weiss, MD

Defining the Problem
Jeffrey P. Weiss, MD

Effect on QoL
Mary Pat FitzGerald, MD

Impact on Elderly
Catherine DuBeau, MD

Treatment Options: Today and Tomorrow
Jeffrey P. Weiss, MD
4:30 p.m. – 5:30 p.m.  BREAKOUT SESSIONS

1. Treatment of Complex Post Prostatectomy Voiding Dysfunction: Strictures and Incontinence
   Location: Lassing/Miller Room
   Brian J. Flynn, MD (Director)
   Sean P. Elliott, MD
   Christopher M. Gonzalez, MD, MBA
   Karl J. Kreder, Jr., MD

2. Imaging
   Location: Plaza AB
   Sender Herschorn, MD (Director)
   MRI Imaging of the Pelvic Floor
   Lennox Hoyte, MD
   Fast Pelvic Floor Ultrasound Imaging
   Chris Constantinou, PhD

3. Interesting Urodynamics Case Presentations
   Location: Majestic 123AB
   Craig V. Comiter, MD (Director)
   Stephen R. Kraus, MD
   Sandip P. Vasavada, MD

5:30 p.m. – 7:00 p.m. Concurrent Poster/Podium Sessions

Female Urology, SUI and Prolapse Moderated/Non-Moderated Poster Session
Location: Vinoy Ballroom
Moderators: Ajay K. Singla, MD
           John J. Smith III, MD

MODERATED

Poster# 21  FORCE OF STREAM AFTER SLING THERAPY (FAST): MIDTERM ANALYSIS OF SAFETY AND EFFICACY OF RAPID DISCHARGE BASED ON SUBJECTIVE REPORT
Michael Ingber, MD, Farzeen Firoozi, MD, Courtenay Moore, MD, Raymond Rackley, MD, Sandip Vasavada, MD, and Howard B. Goldman, MD (Presented by: Michael Ingber)

Poster# 22  LONG-TERM OUTCOMES AND COMPLICATIONS OF THE TRANSOBTURATOR MIDURETHRAL SLING
Paul W. Walker, MD, Joshua Holstead, MS, B. Jill Williams, PhD, and Alex Gomelsky, MD (Presented by: Paul W. Walker)

Poster# 23  MANAGEMENT OF SHORT TERM COMPLICATIONS OF SYNTHETIC MIDURETHRAL SLINGS
George R. Schade, MD, Edward J. McGuire, MD, and Ann P. Cameron, MD (Presented by: George R. Schade)
THURSDAY, FEBRUARY 25, 2010

All sessions located in the Majestic 123AB unless otherwise noted.

Poster# 24  URETHRAL DISTORTION AFTER PLACEMENT OF SYNTHETIC MID URETHRAL SLING
Sunshine Murray, MD, Rashel Haverkorn, MD, Yvonne Koch, MD, Gary Lemack, MD, and Philippe Zimmern, MD (Presented by: Sunshine Murray)

Poster# 25  OPTIMIZING MIDURETHRAL SLING OUTCOMES AND MINIMIZING COMPLICATIONS: CHOOSING APPROACH BASED ON RISK FACTOR ANALYSIS
Alex Gomelsky, MD, Mirian Boci, MD, and B. Jill Williams, PhD (Presented by: Alex Gomelsky)

Poster# 26  WITHDRAWN

Poster# 27  SINGLE CENTER INITIAL EXPERIENCE WITH NOVEL THERAPY FOR STRESS URINARY INCONTINENCE THAT REDUCES SUDDEN CHANGES IN INTRAVESICAL PRESSURE – THE FIRST THREE YEARS
Leslie Crescimano, MD (Presented by: Leslie Crescimano)

Poster# 28  REVIEW OF COMPLICATIONS OF SUBURETHRAL MESH SLINGS REFERRED FOR UROLOGIC INTERVENTION
Kevin Carlson, MD, FRCSC, and Richard Baverstock, MD, FRCSC (Presented by: Kevin Carlson)

Poster# 29  ONE YEAR CLINICAL OUTCOMES FOLLOWING USE OF A SINGLE-INCISION SLING IN WOMEN WITH STRESS URINARY INCONTINENCE (SUI)
Douglas Grier, MD, Vincent Lucente, MD, Douglas Tincello, MD, Salil Khandwala, MD, Richard Kalbfleisch, MD, Paul Riss, MD, Malcolm Frazer, MD, K. Lee, MD, Theunis Botha, MD, William Han, MD, and Aaron Kirkemo, MD (Presented by: Douglas Grier)

Poster# 30  PREVALENCE OF CARDIOVASCULAR RISK FACTORS AND COMORBIDITY IN OVERACTIVE BLADDER
Michelle E. Koski, MD, Gregory J. Broughton, MD, Ekene A. Enemchukwu, MD, Emily Kurtz, MD, Douglas F. Milam, MD, Harriette M. Scarpero, MD, Roger R. Dmochowski, MD, and Melissa R. Kaufman, MD, PhD (Presented by: Michelle E. Koski)
NON-MODERATED*

Poster# 31  
1, 2 AND 3 YEAR RESULTS OF THE ADJUSTABLE CONTINENCE THERAPY (ACT®)  
Suzette E. Sutherland, MD, S.R. Aboseif, MD, S.D. Nash, MD, N.H. Baum, MD, L.M. Tu, MD, P.J. Pommerville, MD, J.N. Slutsy, MD, N.T. Galloway, MD, and J.F. Bresette, MD (Presented by: Suzette E. Sutherland)

Poster# 32  
SAFETY AND EFFICACY OF SLING AFTER BULKING INJECTION FOR PERSISTENT STRESS URINARY INCONTINENCE (SUI)  
Michelle Koski, MD, Priya Padmanabhan, MPH, MD, Melissa Kaufman, MD, PhD, Harriette Scarpero, MD, and Roger Dmochowski, MD (Presented by: Michelle Koski)

Poster# 33  
SUCCESS OF BULKING INJECTIONS FOR PATIENTS WITH SUBOPTIMAL RESPONSE TO SURGERY FOR STRESS URINARY INCONTINENCE (SUI)  
Priya Padmanabhan MD, MPH, Harriette Scarpero, MD, and Roger Dmochowski, MD (Presented by: Priya Padmanabhan)

Poster# 34  
THE DARK SIDE OF PROPHYLACTIC SUBURETHRAL TAPE PLACEMENT  
Rachel Jerome, Sunshine Murray, MD, and Zimmern Philippe, MD (Presented by: Sunshine Murray)

Poster# 35  
EFFICACY AND SAFETY OF TRANSOBTURATOR ADJUSTABLE TAPE (TOA) FOR THE TREATMENT OF FEMALE STRESS URINARY INCONTINENCE  
Kyu-Sung Lee, MD, Young-Suk Lee, MD, Ha Na Lee, MD, Myung-Soo Choo, MD, Jeong Gu Lee, MD, Hyeong Gon Kim, MD, and Woo Jin Ko, MD (Presented by: Kyu-Sung Lee)

Poster# 36  
CLINICAL OUTCOMES IN PATIENTS UNDERGOING TVT-SECURTM FOR STRESS URINARY INCONTINENCE: AN UPDATE  
Ekene Enemchukwu, MD, MPH, Priya Padmanabhan, MD, MPH, Benjamin Whittam, MD, and Roger Dmochowski, MD (Presented by: Ekene Enemchukwu)

Poster# 37  
DURABILITY OF MACROPLASTIQUE® INJECTION FOR FEMALE STRESS URINARY INCONTINENCE: TWO YEARS EXPERIENCE  
Jacques Corcos, MD, Gamal Ghoniem, MD, Craig Comiter, MD, O. Lenaine Westney, MD, and Sender Herschorn, MD (Presented by: Jacques Corcos)

Poster# 38  
IMPACT OF TRANSLABIAL ULTRASOUND ON DIAGNOSIS AND TREATMENT OF MESH RELATED COMPLICATIONS  
Andrea Staack, MD, PhD, Z. Chad Baxter, MD, Una Lee, MD, Shelby Morrisroe, MD, Ja-Hong Kim, MD, Larissa V. Rodriguez, MD, and Shlomo Raz, MD (Presented by: Andrea Staack)

*Not CME Accredited
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<td>SYMPTOMATIC IMPROVEMENT AND URODYNAMIC CHANGES ARE NOTED AFTER MID-URETHRAL SLING TAKEDOWN, BUT RETREATMENT RATES REMAIN HIGH</td>
<td>Sunshine Murray, MD, Rashel Haverkorn, MD, Philippe Zimmern, MD, and Gary Lemack, MD (Presented by: Sunshine Murray)</td>
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<td>SECONDARY AUTOLOGOUS FASCIA SLINGS FARE MORE POORLY THAN PRIMARY SLINGS</td>
<td>Bruce Schlomer, MD, Rachel Jerome, Sunshine Murray, MD, Rashel Haverkorn, MD, and Philippe Zimmern, MD (Presented by: Sunshine Murray)</td>
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<td>Jason Kim, MD, Alvaro Lucioni, MD, Fred Govier, MD, and Kathleen Kobashi, MD (Presented by: Jason Kim)</td>
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<td>Kevin Carlson, MD, FRCSC, and Troy Schultz, MD (Presented by: Kevin Carlson)</td>
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<td>URETHRAL EROSION OF SYNTHETIC MID URETHRAL SLINGS: REPAIR AND OUTCOMES</td>
<td>Sophie Fletcher, MD, Gary Lemack, MD, and Philippe Zimmern, MD (Presented by: Philippe Zimmern)</td>
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<td>URETHRAL BULKING AGENTS USED IN THE UNITED STATES: HOW ARE THEY ANALYZED?</td>
<td>Gamal Ghoniem, MD, FACS, and Roger Dmochowski, MD (Presented by: Gamal Ghoniem)</td>
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<td>MODIFIED LATZKO PROCEDURE (PARTIAL COLPOCESIS) FOR VESICOVAGINAL FISTULA: TECHNIQUE AND OUTCOMES</td>
<td>Denise Chow, MD, Ahmet Bedestani, MD, Ralph Chesson, MD, and J. Christian Winters, MD (Presented by: Denise Chow)</td>
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<td>OUTCOMES IN VAGINAL PROLAPSE SURGERY USING SURGEON CONSTRUCTED MESH FOR REPAIR AUGMENTATION</td>
<td>Rashel Haverkorn, MD, Alienor Gilchrist, MD, Sunshine Murray, MD, and Gary Lemack, MD (Presented by: Rashel Haverkorn)</td>
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THURSDAY, FEBRUARY 25, 2010
All sessions located in the Majestic 123AB unless otherwise noted.

Poster# 48  PATIENT-PERCEIVED OUTCOMES AND SEXUAL FUNCTION AFTER URETHRAL DIVERTICULUM REPAIR
Farzeen Firoozi, MD, Michael S. Ingber, MD, Courtney L. Lee, MD, Christina B. Ching, MD, Courtenay Moore, MD, Howard B. Goldman, MD, Sandip Vasavada, MD, and Raymond Rackley, MD (Presented by: Farzeen Firoozi)

5:30 p.m. – 7:00 p.m.  Neurogenic Bladder Podium Session
Moderators:  Gregory T. Bales, MD
John P. Lavelle, MB, BCh, BSc, FRCS

Podium #10  PATIENT-CENTERED GOALS FOR EVALUATION OF FEMALE SEXUAL DYSFUNCTION IN MULTIPLE SCLEROSIS
Alienor Gilchrist, MD, Rashel Havorkorn, MD, Sunshine Murray, MD, Gina Remington, RN, Sophie Fletcher, MD, Elliot M. Frohman, MD, PhD and Gary Lemack, MD (Presented by: Alienor Gilchrist)

Podium #11  THE PREVALENCE OF OVERACTIVE BLADDER SYMPTOMS IN PATIENTS WITH MULTIPLE SCLEROSIS: CORRELATIONS WITH INCREASED DISABILITY AS WELL AS REDUCED QUALITY OF LIFE
Sangeeta Mahajan, MD, Pragna Patel, MD and Ruth Ann Marrie, MD (Presented by: Sangeeta Mahajan)

Podium #12  THE PREVALENCE OF CATHETER UTILIZATION IN PATIENTS WITH MULTIPLE SCLEROSIS AND THE IMPACT ON QUALITY OF LIFE
Sangeeta Mahajan, MD, Pragna Patel, MD and Ruth Ann Marrie, MD (Presented by: Sangeeta Mahajan)

Podium #13  SUPINE AND UPRIGHT URODYNAMIC EVALUATION OF INCONTINENT ILEOVESICOSTOMY IN WHEELCHAIR-BOUND ADULTS WITH NEUROGENIC BLADDER
Polina Reyblat, MD, Priyanka Kadam, Wesley Kong, MD and David Ginsberg, MD (Presented by: Polina Reyblat)

Podium #14  BLADDER MANAGEMENT METHODS AFTER TRAUMATIC SPINAL CORD INJURY IN THE UNITED STATES
Anne P. Cameron, MD, Lauren P. Wallner, MPH, Aruna V. Sarma, PhD, Denise G. Tate, PhD, Gianna M. Rodriguez, MD and J. Quentin Clemens, MD, MSCI (Presented by: Anne P. Cameron)

Podium #15  MEDICAL COMPLICATIONS ASSOCIATED WITH CHOICE OF BLADDER MANAGEMENT AFTER TRAUMATIC SPINAL CORD INJURY
Anne P. Cameron, MD, Lauren P. Wallner, MPH, Martin Forchheimer, MPP, Rodney Dunn, Gianna Rodriguez, MD, David Chen, MD, Susane Groah, MD, MPH, John A. Horton, III, MD, Denise G. Tate, PhD and J. Quentin Clemens, MD, MSCI (Presented by: Anne P. Cameron)
Podium #16  UROLOGIC MANAGEMENT OF ADULT PATIENTS WITH NEUROGENIC BLADDER AND MYELOMENINGOCELE
Polina Reyblat, MD, Donald Hannoun, MD and David Ginsberg, MD (Presented by: Polina Reyblat)

Podium #17  PREDICTING RESPONSE TO DOXAZOSIN IN PATIENTS WITH VOIDING DYSFUNCTION AND PARKINSON DISEASE: IMPACT OF THE NEUROLOGICAL IMPAIRMENT
Cristiano Gomes, MD, Zein Sammour, MD, Bessa Jr. Jose, MD, Barbosa Egberto, MD, Lopes Roberto, MD, Sallem Flavio, MD, Trigo-Rocha Flavio, MD, Pinheiro Marcelo, MD, Bruschini Homero, MD and Srougi Miguel, MD (Presented by: Cristiano Gomes)
FRIDAY, FEBRUARY 26, 2010
All sessions located in the Majestic 123AB unless otherwise noted.

6:45 a.m. – 7:45 a.m.  | Industry Sponsored Breakfast Symposium
                      | Location: Plaza Ballroom
                      | “Stimulation Breakfast: Caffeine, Carbs and InterStim Therapy”
                      | Faculty:
                      | Suzette E. Sutherland, MD
                      | Craig Comiter, MD
                      | Chip Butrick, MD
                      | Karen Noblett, MD
                      | Sponsored by Medtronic

7:00 a.m. – 5:00 p.m. | Registration
                      | Location: Palm Court Foyer

9:00 a.m. – 4:00 p.m. | Exhibit Hall Open
                      | Location: Royal Palm and Center Court

8:00 a.m. – 5:00 p.m. | Video Viewing in Speaker Ready Room
                      | Location: Dann

8:00 a.m. – 9:30 a.m. | Concurrent Poster/Podium Sessions
                      | Urodynamics Moderated/Non-Moderated Poster Session
                      | Location: Vinoy Ballroom
                      | Moderators: Stephen R. Kraus, MD
                      | Katie N. Ballert, MD

Poster# 49  | THE CORRELATION OF VOIDING VARIABLES BETWEEN NON-INSTRUMENTED UROFLOWMETRY AND PRESSURE-FLOW STUDIES IN WOMEN WITH STRESS INCONTINENCE
           | Elizabeth Mueller, MD, MSME, Philippe Zimmern, MD, Yan Xu, Sirls Larry, MD, Albo Mike, MD, Rickey Leslie, MD, Wilson Tracy, MD, Moallli Pamela, MD and Norton Peggy, MD (Presented by: Elizabeth Mueller)

Poster# 50  | STANDARDIZED URETHRAL PRESSURE PROFILOMETRY IN WOMEN: REPRODUCIBILITY OF MAXIMUM URETHRAL CLOSURE PRESSURE
           | Françoise Valentini, MD, PhD and Gilberte Robain, MD, PhD (Presented by: Françoise Valentini)

Poster# 51  | NEAR INFRARED SPECTROSCOPY IN PATIENTS WITH OVERACTIVE BLADDER*
           | Tara Frenkl, Railkar Radha, PhD, Shore Neal, MD, Balien James, MD, Sutherlans Suzette, MD, Burke Joanne, Beals Chan, MD, Ruddy Marcella, MD, Andrew Macnab, MD and Stothers Lynn, MD (Presented by: Tara Frenkl)

*Not CME Accredited
FRIDAY, FEBRUARY 26, 2010

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Poster# 52  URODYNAMIC “AREA UNDER THE CURVE” AS A POTENTIAL PROGNOSTIC FACTOR IN NEUROGENIC BLADDER DYSFUNCTION
Colin Goudelocke, MD and Eric Rovner, MD (Presented by: Colin Goudelocke)

Poster# 53  UTILITY OF FLUOROSCOPY DURING URODYNAMICS IN THE EVALUATION OF BLADDER OUTLET OBSTRUCTION IN WOMEN
Sagar Shah, MD, Sarah Mitcell, Eva Fong, MD, Nirit Rosenblum, MD, Christopher Kelly, MD and Victor Nitti, MD (Presented by: Sagar Shah)

Poster# 54  RISK FACTORS FOR LOW BLADDER COMPLIANCE IN END STAGE RENAL DISEASE PATIENTS
John Stoffel, MD, Genevieve Kruger, MD, Hocine Tighiouart, MS, James Pomposelli, MD, PhD, Rodney Taylor, MD and Andrea Sorcini, MD (Presented by: John Stoffel)

Poster# 55  COMBINATION OF TWO NON-INVASIVE EVALUATION OF BLADDER OUTLET OBSTRUCTION (BOO) CAN RUB OUT SOURCES OF VARIABILITY USING PENILE CUFF TEST (PCT).
François Valentini, MD, PhD, Pierre Nelson, PhD and Derek Turner, MD (Presented by: François Valentini)

Poster# 56  FUNCTIONAL VS. ANATOMIC FEMALE BLADDER OUTLET OBSTRUCTION: ARE THEY DIFFERENT?
Sagar Shah, MD, Sarah Mitchell, Eva Fong, MD, Nirit Rosenblum, MD, Christopher Kelly, MD and Victor Nitti, MD (Presented by: Sagar Shah)

Poster# 57  CONCORDANCE OF NEAR INFRARED SPECTROSCOPY (NIRS) DATA WITH PRESSURE FLOW STUDIES IN MEN WITH LUTS
Doreen E. Chung, MD, Richard K. Lee, MD, Steven A. Kaplan, MD and Alexis E. Te, MD (Presented by: Doreen E. Chung)

NON-MODERATED*

Poster# 58  IS THERE A RELATIONSHIP BETWEEN VOIDED VOLUME AND THE URGE TO VOID?
Jeffrey P. Weiss, MD, Michael Amirian, BS, Jeffrey P. Weiss, MD, Georgia Panagopoulos, PhD, Lorraine Liang, BS and Stanislav Belotserkovskiy (Presented by: Jeffrey P. Weiss)

Poster# 59  DYSFUNCTIONAL VOIDING VS. DETRUSOR EXTERNAL SPHINCTER DYSSYNERGIA IN WOMEN: DO THEY DIFFER?
Sagar Shah, MD, Sarah Mitchell, Eva Fong, MD, Nirit Rosenblum, MD, Christopher Kelly, MD and Victor Nitti, MD (Presented by: Sagar Shah)

*Not CME Accredited
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Poster# 60  CLINICAL EVALUATION OF MALES WITH LOWER URINARY TRACT SYMPTOMS (LUTS): CORRELATION OF FLOW RATE WITH VOIDED VOLUME AND BLADDER VOLUME
Matthew Rutman, MD, Ava-Dawn Gabbidon, BA, Hirsoshi Katsumi, MD, Georgia Panagopoulos, PhD, Jeffrey Weiss, MD and Jerry Blaivas, MD (Presented by: Matthew Rutman)

Poster# 61  THE FREQUENCY AND INDICATIONS FOR URODYNAMICS STUDIES PERFORMED IN THE UNITED STATES BY UROLOGISTS DURING THE PERIOD OF 2003–2007
Elizabeth Mueller, MD, MSME and Kimberly Kenton, MD, MS (Presented by: Elizabeth Mueller)

Poster# 62  THE EFFECT OF TRANSURETHRAL CATHETERIZATION ON UROFLOW PARAMENTERS
Anne Suskind, MD and Phillip Smith, MD (Presented by: Anne Suskind)

Poster# 63  IS THERE VALUE IN OBTAINING A URINALYSIS PRIOR TO URODYNAMICS TESTING?
Denise Elser, MD and Michele McAuliffe, RN (Presented by: Denise Elser)

Poster# 64  ROLE OF URETHRAL ULTRASOUND IN THE EVALUATION OF ANTERIOR URETHRAL STRICTURES
Ahmed Safwat, MD, Mohammed Elgammal, MD, Ayman Mahdy, MD, Medhat Abdalla, MD and Nabil Bissada, MD (Presented by: Ayman Mahdy)

Poster# 65  DECELLULARIZED PORCINE-DERIVED BLOOD VESSEL MATRIX GRAFT FOR URETHRAL REPLACEMENT IN A RABBIT MODEL
Sam Kuykendall, MD, Erin Bird, MD and Gilad Amiel, MD (Presented by: Sam Kuykendall)

Poster# 66  TRANS-VAGINAL BLADDER NECK CLOSURE WITH POSTERIOR URETHRAL FLAP
Colin Goudelocke, MD, Brett Lebed, MD, Nathaniel Hamilton, MD and Eric Rovner, MD (Presented by: Colin Goudelocke)

Poster# 67  ANTERIOR ANAL SPHINCTEROPLASTY: AN ANALYSIS OF RESULTS, COMPLICATIONS, AND OUTCOMES
Shelby Morrisroe, MD, Una Lee, MD, Chad Baxter, MD, Andrea Staack, MD, Ja-Hong Kim, MD, Larissa Rodriguez, MD and Shlomo Raz, MD (Presented by: Shelby Morrisroe)

Poster# 68  THE URACHAL-PERIVESICAL PERITONEAL FLAP: A PREVIOUSLY UNREPORTED TISSUE FLAP IN VESICOVAGINAL FISTULA REPAIR
Britton E. Tisdale, MD, Mary Henderson, Timothy O. Davies, MD and Kurt A. McCammon, MD (Presented by: Mary Henderson)
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<td>Ryan Krlin, MD, Robyn Crowell and Jack Winters, MD</td>
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<td>Elizabeth Williams, MD and Steven Siegel, MD</td>
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<td>CLINICAL EVALUATION OF FEMALES WITH LOWER URINARY TRACT SYMPTOMS (LUTS): CORRELATION OF FLOW RATE WITH VOIDED VOLUMES: IS 150 ML VOIDED VOLUME NECESSARY?</td>
<td>Matthew Rutman, MD, Ava-Dawn Gabbidon, BA, Hiroshi Katsumi, MD, Georgia Panagopoulos, PhD, Jeffrey Weiss, MD and Jerry Blaivas, MD</td>
<td>Matthew Rutman</td>
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FRIDAY, FEBRUARY 26, 2010
All sessions located in the Majestic 123AB unless otherwise noted.

8:00 a.m. – 9:30 a.m.  Female Urology, SUI and Prolapse Podium Session
Moderators:  Jennifer Anger, MD
            Jason P. Gilleran, MD

Podium #18  PRESENTATION AND MANAGEMENT OF IATROGENIC FOREIGN BODIES OF THE LOWER URINARY TRACT FOLLOWING PELVIC SURGERY
Priya Padmanabhan, MD, MPH, Ryan Hutchinson, BS, W. Stuart Reynolds, MD, Shady Salen, MD, Harriette Scarpero, MD and Roger Dmochowski, MD
(Presented by: Priya Padmanabhan)

Podium #19  FEMALE PELVIC ANATOMY TRAINING MODULE FOR UROLOGY RESIDENTS
Benjamin Brucker, MD, William Jaffe, MD and Ariana Smith, MD
(Presented by: Benjamin Brucker)

Podium #20  PREOPERATIVE SYMPTOM OF HESITATING URINARY STREAM IS ASSOCIATED WITH SURGICAL FAILURE AND POSTOPERATIVE VOIDING DYSFUNCTION FOLLOWING BURCH COLPOSUSPENSION OR PUVOVAGINAL RECTUS FASCIAL SLING SURGERY
Tatiana Sanses, MD, Linda Brubaker, MD, Stephen Kraus, MD, Jerry Lowder, MD, Gary Lemack, MD, Peggy Norton, MD, Sharon Tennstedt, PhD, Yan Xu, PhD and Toby Chai, MD
(Presented by: Toby Chai)

Podium #21  IN VIVO MEASUREMENT OF THE ANTERIOR VAGINAL WALL BIOMECHANICAL PROPERTIES IN PROLAPSE PATIENTS UNDERGOING SURGICAL REPAIR
Elizabeth Mosier, Rachel Jerome, Charlie Chuong, PhD, Robert Eberhart, PhD and Philippe Zimmern, MD
(Presented by: Philippe Zimmern)

Podium #22  URETHRAL FUNCTION OF WOMEN WITH DETRUSOR OVERACTIVITY IS INTERMEDIATE THAT OF CONTINENT AND STRESS INCONTINENT WOMEN
Kimberly Kenton, MD, MS, Elizabeth Mueller, MD, MS, Lior Lowenstein, MD and Linda Brubaker, MD, MS
(Presented by: Kimberly Kenton)

Podium #23  SALVAGE SPIRAL SLING TECHNIQUES: ALTERNATIVES FOR THE MANAGEMENT OF DISABLING RECURRENT URINARY INCONTINENCE IN FEMALES
Alejandro Rodriguez, MD, Raul Ordoñica, MD, Mitchell Hoffman, MD and Jorge Lockhart, MD
(Presented by: Raul Ordoñica)

Podium #24  WORSE SURGICAL OUTCOMES FOR PATIENTS OVER 70 UNDERGOING A RETROPUBIC MID-URETHRAL POLYPROPYLENE SLING
Jason Kim, MD, Alvaro Lucioni, MD, Fred Govier, MD and Kathleen Kobashi, MD
(Presented by: Jason Kim)
Podium #25  MANAGEMENT OF POLYPROPYLENE MESH COMPLICATIONS (VAGINAL WALL EXTRUSION AND URINARY TRACT EROSION) AFTER SURGERY FOR STRESS URINARY INCONTINENCE AND PELVIC ORGAN PROLAPSE
Joseph Dall'Era, MD, Ryan Terlecki, MD and Brian Flynn, MD (Presented by: Joseph Dall'Era)

Podium #26  ONE YEAR FOLLOW-UP DATA ON THE MINIARC™ SINGLE INCISION SLING SYSTEM FOR THE TREATMENT OF STRESS URINARY INCONTINENCE
Ryan Pickens, MD, Frederick Klein, MD, Joe Mobley, III, MD, MPH and Wesley White, MD (Presented by: Ryan Pickens)

9:30 a.m. – 10:00 a.m.  Break – Visit Exhibits

GENERAL SESSION

10:00 a.m. – 10:10 a.m.  Announcements
Victor W. Nitti, MD

10:10 a.m. – 10:25 a.m.  President’s Address
E. Ann Gormley, MD

10:25 a.m. – 10:40 a.m.  SUFU Post Prostatectomy Incontinence Study
Victor W. Nitti, MD

10:40 a.m. – 11:00 a.m.  Neurourology: How Do We Promote Office-Based Care of the Neurological Patient?
Michael J. Kennelly, MD

11:00 a.m. – 11:30 a.m.  Management of the Adult Spina Bifida Patient
David A. Ginsberg, MD

11:45 a.m. – 12:45 p.m.  Industry Sponsored Lunch Symposium
Location: Plaza Ballroom

“Anticholinergic Pharmacotherapy & CNS: A Current Understanding”
Faculty:  Gary G. Kay, PhD
Georgetown University, Washington, DC
Martin Michel, MD, Professor
Academic Medical Center University of Amsterdam
Amsterdam, Netherlands
Cara Tannenbaum, M.D., M. Sc.
Université of Montreal
Insitut universitaire de gériatrie de Montréal
McGill University Health Center
Montreal, Quebec, Canada
Sponsored by Allergan
FRIDAY, FEBRUARY 26, 2010
All sessions located in the Majestic 123AB unless otherwise noted.

11:45 a.m. – 12:45 p.m. Industry Sponsored Lunch Symposium
Location: Vinoy Ballroom
“Incontinence Therapy 2010 - Foundation for the Future”
Faculty:
Michael Kennelly, MD
John J. Smith, MD
Arthur P. Mourtzinos, MD
Sponsored by Coloplast

ISPIN SESSION

1:00 p.m. – 2:50 p.m. Emerging Technologies
Moderator: Steven W. Siegel, MD
Nerve Transfer/Re-Routing
Kenneth M. Peters, MD
Somatic Modulation of Bladder Function
Changfeng Tai, PhD
Pudendal Neuromodulation for Neurogenic Patients
Michele Spinelli, MD
Intraspinal Stimulation for Intractable Pelvic Pain
Giancarlo Barolat, MD

2:50 p.m. – 3:00 p.m. Break

3:00 p.m. – 4:00 p.m. Neuromodulation with Neurotoxins
Moderator: Charles W. Butrick, MD
Update on Neurotoxin Translational Research
Christopher P. Smith, MD
Clinical Trial Updates for OAB Conditions
Michael E. Albo, MD
Translational Observations from Neurotoxin Clinical Trials
Gary E. Lemack, MD
Neurotoxin Applications for Pelvic Floor Muscle Dysfunction
Courtenay K. Moore, MD
4:00 p.m. – 4:50 p.m.  

**ISPiN Podium Session**

Moderators:  
*Angelo E. Gousse, MD*  
*J. Quentin Clemens, MD*

**Podium #27**  
NEW EFFICACY DATA ON PERCUTANEOUS TIBIAL NERVE STIMULATION: A MULTI-CENTER, RANDOMIZED, SHAM-CONTROLLED TRIAL FOR OVERACTIVE BLADDER SYNDROME  
Kenneth M. Peters, MD, Donna J. Carrico, NP, MS, Ramon Perez-Marrero, MD, Ansar U. Khan, MD, Leslie S. Wooldridge, MSN, RNCS, GNP, Gregory L. Davis, MD and Scott A. MacDiarmid, MD (Presented by: Kenneth M. Peters)

**Podium #28**  
PERCUTANEOUS TIBIAL NERVE STIMULATION (PTNS), PELVIC FLOOR REHABILITATION (PFR) AND ELECTRICAL STIMULATION (ES) IN THE TREATMENT OF URINARY INCONTINENCE  
Earl Surwit, MD and Rosa Garcia, BSN, NP (Presented by: Earl Surwit)

**Podium #29**  
SURGICAL INTERVENTION FOLLOWING INTERSTIM® SACRAL NEUROMODULATION IMPLANT FOR THE MANAGEMENT OF LOWER URINARY TRACT SYMPTOMS -14 YEARS EXPERIENCE OF ONE CENTER  

**Podium #30**  
SACRAL NEUROMODULATION FOR REFRACTORY OVERACTIVE BLADDER: INITIAL INSIGHT INTO EFFECTS ON FEMALE SEXUAL FUNCTION  
Bradley C. Gill, BSE, Mia Swartz, MD, MS, Courtenay Moore, MD, Howard Goldman, MD, Raymond Rackley, MD and Sandip Vasavada, MD (Presented by: Bradley C. Gill)

**Podium #31**  
ULTRASOUND TECHNIQUE FOR LOCATING SACRAL FORAMINA AND PLACING AN INTERSTIM PNE LEAD*  
Phillip Falkner, DVM and Eric Bonde, BME, MBA (Presented by: Phillip Falkner)

*Not CME Accredited*
5:00 p.m. – 6:00 p.m.  BREAKOUT SESSIONS

1. Programming and Unusual Case Forum
   Location: Plaza AB
   Magdy M. Hassouna, MD, PhD (Director)
   Steven W. Siegel, MD
   Paul D. Pettit, MD
   Norbert Kaula, PhD

2. Overactive Bladder: Symptom & Syndrome
   Location: Plaza CD
   Alan J. Wein, MD, PhD (Hon) (Director)
   Symptom
   Jerry G. Blaivas, MD
   Syndrome
   Eric S. Rovner, MD

3. Urinary Incontinence and Sexual Health in Older Adults
   Location: Lassing/Miller Room
   Tomas L. Griebling, MD, MPH (Director)
   Gregory T. Bales, MD
   Suzette E. Sutherland, MD
   Allen D. Seftel, MD

4. Case Presentations in Neurogenic Voiding Dysfunction
   Location: Majestic 123AB
   John C. Hairston, MD (Director)
   Jacques Corcos, MD
   Sender Herschorn, MD

6:00 p.m. – 7:30 p.m.  Cocktail Reception and Award Presentations in Exhibit Hall
   Location: Royal Palm and Center Court
SATURDAY, FEBRUARY 27, 2010
All sessions located in the Majestic 123AB unless otherwise noted.

6:30 a.m. – 12:00 p.m.  Registration / Information Desk Open
Location: Palm Court Foyer

6:30 a.m. – 10:30 a.m.  Exhibit Hall Open
Location: Royal Palm and Center Court

6:30 a.m. – 8:00 a.m.  Breakfast in Exhibit Hall
Location: Royal Palm and Center Court

8:00 a.m. – 12:00 p.m.  Video Viewing in Speaker Ready Room
Location: Dann

7:30 a.m. – 8:00 a.m.  SUFU Annual Business Meeting

8:00 a.m. – 9:30 a.m.  OAB, IC and Pelvic Pain, Prolapse Moderated/Non-Moderated Poster Session
Location: Vinoy Ballroom
Moderators: Deborah R. Erickson, MD
Kenneth M. Peters, MD

Poster# 77  EFFICACY OF A SUPERSATURATED CALCIUM PHOSPHATE ORAL RINSE (CAPHOSOL) IN THE TREATMENT OF XEROSTOMIA SECONDARY TO ANTIMUSCARINIC TREATMENT FOR THE BLADDER
Katherine Klos, MD and Tiffany Sotelo, MD (Presented by: Katherine Klos)

Poster# 78  BASELINE PREDICTORS OF PATIENT REPORTED LACK OF EFFICACY (LOE) TO ANTIMUSCARINICS IN OVERACTIVE BLADDER SYNDROME (OAB): A MULTIVARIATE ANALYSIS
David Staskin, MD, Michael Oefelein, MD, FACS and Ray Rackley, MD
(Presented by: David Staskin)

Poster# 79  MENTAL DISTRESS PREDICTS PAIN SEVERITY, PHYSICAL IMPAIRMENT IN INTERSTITIAL CYSTITIS AND CHRONIC PELVIC PAIN
Chad Baxter, MD, Roger Bolus, PhD, Una Lee, MD, Emeran Mayer, Deborah Ackerman, PhD, and Larissa Rodriguez, MD (Presented by: Chad Baxter)

Poster# 80  THE OVERACTIVE BLADDER SYNDROME (OAB) AND OBESITY: EVIDENCE OF ANTIMUSCARINIC EFFICACY REGARDLESS OF BODY MASS INDEX AT BASELINE
Michael Chancellor, MD, Michael Oefelein, MD, FACS and Sandip Vasavada, MD (Presented by: Michael Chancellor)

Poster# 81  PATIENTS’ EXPERIENCE WITH DARIFENACIN: RESULTS OF A COMMUNITY-BASED SURVEY IN OVERACTIVE BLADDER PATIENTS
Diane Newman and L. Green² (Presented by: Diane Newman)
SATURDAY, FEBRUARY 27, 2010
All sessions located in the Majestic 123AB unless otherwise noted.

Poster# 82  A RANDOMIZED, PLACEBO CONTROLLED, CROSSOVER STUDY TO EVALUATE THE EFFECTS OF TOLTERODINE ON URODYNAMIC PARAMETERS IN PATIENTS WITH OVERACTIVE BLADDER*
Tara Frenkl, Radha A. Railkar, Neal Shore, James Bailen, Suzette E. Sutherland, Joanne Burke, Boyd B. Scott, Marcella Ruddy and Chan Beals (Presented by: Tara Frenkl)

Poster# 83  CHRONIC PELVIC PAIN PATIENTS WITH NEUROPATHIC SYMPTOMS DEMONSTRATE POORER MENTAL HEALTH STATUS
Sandeep S. Saluja, BS, Arvin George, MD, Mostafa Sadek, MD, Jennifer Fariello, MSN, CRNP, Kristene Whitmore, MD, Salim Wehbe, MD and Robert Moldwin, MD (Presented by: Sandeep S. Saluja)

Poster# 84  LONG-TERM TOLERABILITY AND EFFICACY OF PENTOSAN POLYSULPHATE SODIUM IN THE TREATMENT OF PAINFUL BLADDER SYNDROME/ INTERSTITIAL CYSTITIS (PBS/IC)

Poster# 85  EFFECTS OF OXYBUTYNIN TOPICAL GEL ON GASTRIC EMPTYING*
Naomi Dahl, PharmD, Marilyn McIlwain, BS and Weining Volinn, MS (Presented by: Naomi Dahl)

Poster# 86  EARLY LIFETIME TRAUMA IMPACTS SYMPTOM SEVERITY OF INTERSTITIAL CYSTITIS AND CHRONIC PELVIC PAIN
Chad Baxter, MD, Roger Bolus, PhD, Deborah Ackerman, PhD Emeran Mayer, and Larissa Rodriguez, MD (Presented by: Chad Baxter)

Poster# 87  A ONCE DAILY (QD) EXTENDED RELEASE (ER) ANTIMUSCARINIC REDUCES NOCTURNAL AS WELL AS DAYTIME TOILET VOIDS IN OVERACTIVE BLADDER SYNDROME (OAB)
David Ginsberg, MD and Michael Oefelein, MD, FACS (Presented by: David Ginsberg)

Poster# 88  EFFECT OF OXYBUTYNIN CHLORIDE TOPICAL GEL ON QUALITY OF LIFE IN WOMEN WITH OVERACTIVE BLADDER

Poster# 89  LINEAR CORRELATION AND REGRESSION BETWEEN SEVERITY OF URGE SENSATION AND VOIDED VOLUME IN PATIENTS WITH OAB: A DIFFERENT APPROACH TO UNDERSTAND URGENCY
Zhonghong Guan, MD, PhD, Miriam Harel, MD, Jeffrey P. Weiss, MD, Joseph Wang, MS and Jerry G. Blaivas, MD (Presented by: Miriam Harel)

*Not CME Accredited
Poster# 90  DO PATIENTS UNDERSTAND LOWER URINARY TRACT SYMPTOM TERMINOLOGY?
Nadya Cinman, MD, Amin Herati, MS and Robert Moldwin MD (Presented by: Nadya Cinman)

Poster# 91  INTRAVESICAL BUPIVACAINE FOR LIDOCAINE-REFRACTORY PATIENTS WITH PAINFUL BLADDER SYNDROME/INTERSTITIAL CYSTITIS
Renee Quillin, MD, Gwen Hooper, ARNP and Deborah Erickson, MD (Presented by: Renee Quillin)

Poster# 92  THE EFFICACY OF VAGINAL DIAZEPAM USE FOR PELVIC FLOOR DYSFUNCTION PAIN, INTERSTITIAL CYSTITIS, AND/OR VULVAR PAIN: PRELIMINARY DATA
Donna J. Carrico, NP, MS, Frank Burks, MD and Kenneth M. Peters, MD (Presented by: Donna J. Carrico)

Poster# 93  SLEEP DISRUPTION IN WOMEN WITH OVERACTIVE BLADDER (OAB): CHARACTERISTICS AND IMPACT
Diane Newman and Patricia Koochaki (Presented by: Diane Newman)

Poster# 94  MINIMUM IMPORTANT DIFFERENCE FOR VALIDATED INSTRUMENTS IN WOMEN WITH URGE INCONTINENCE
Keisha Dyer, MD, MPH, Linda Brubaker, MD, MS, Toby Chai, MD, Emily Lukacz, MD, MAS, Alayne Markland, DO, MSc, Ingrid Nygaard, MD, David Rahn, MD, Anne Stoddard, ScD and Yan Xu, MS (Presented by: Keisha Dyer)

Poster# 95  RELIABILITY AND VALIDITY OF THE OVERACTIVE BLADDER SYMPTOM SCORE IN SPANISH (OABSS-S)
Aaron Weinberg, BS, Gabriel Brandeis, MD, Jeffery Weiss, MD, John Bruyere, BS, Matthew Rutman, MD and Jerry Blaivas, MD (Presented by: Aaron Weinberg)

Poster# 96  THE SAFETY OF ONCE-DAILY EXTENDED RELEASE ANTIMUSCARINIC THERAPY IN MEN WITH OVERACTIVE BLADDER SYNDROME
Scott Macdiarmid, MD, FRCPSC, David Sussman, MD and Michael Oefelein, MD (Presented by: Scott Macdiarmid)

Poster# 97  FUNCTIONAL BLADDER CAPACITY AS AN OBJECTIVE MEASURE OF RESPONSE TO INTRAVESICAL DIMETHYL SULFOXIDE FOR THE TREATMENT OF NEWLY DIAGNOSED INTERSTITIAL CYSTITIS
Adam Gafni-Kane, MD, Hongyan Du, MS, Aimee Nguyen, MD, Manhan Vu, DO, Roger P. Goldberg, MD, Peter K. Sand, MD and Sylvia Botros, MD (Presented by: Adam Gafni-Kane)
SATURDAY, FEBRUARY 27, 2010
All sessions located in the Majestic 123AB unless otherwise noted.

Poster# 98  NOCTURIA: WHY DO PEOPLE VOID AT NIGHT?
Jerry G. Blaivas, MD, Michael Amirian, BS, Jeffrey P. Weiss, MD, Georgia Panagopoulos, PhD, Lorraine Liang, BS and Stanislav Belotserkovskiy (Presented by: Jeffrey P. Weiss)

Poster# 99  EFFECT OF FLEXIBLE DOSE ESCALATION IN A PLACEBO-CONTROLLED CLINICAL TRIAL OF FESOTERODINE
David R. Staskin, MD, Jon D. Morrow, MD, CM, Vik Khullar, MD, Zhonghong Guan, MD, PhD and Roger Dmochowski, MD (Presented by: David R. Staskin)

Poster# 100  FAVORABLE ROLE OF TRIGONE FULGURATION IN THE MANAGEMENT OF RECURRENT URINARY TRACT INFECTIONS
Mierzwiak Jesse, MD, Sunshine Murray, MD and Philippe Zimmern, MD (Presented by: Mierzwiak Jesse)

Poster# 101  TRENDS IN FEMALE PELVIC MEDICINE AND RECONSTRUCTIVE SURGERY EXPOSURE DURING UROLOGY RESIDENCY
Farzeen Firoozi, MD, Howard B. Goldman, MD, Courtenay Moore, MD, Raymond Rackley, MD and Sandip Vasavada, MD (Presented by: Farzeen Firoozi)

Poster# 102  PURELY TRANSVAGINAL TECHNIQUE AND MANAGEMENT OF ALL FORMS OF MESH-RELATED COMPLICATIONS FROM COMMERCIAL PROPLAPSE KITS
Farzeen Firoozi, MD, Michael S. Ingber, MD, Charuspong Dissaranan, MD, Courtenay Moore, MD, Raymond Rackley, MD, Sandip Vasavada, MD and Howard B. Goldman, MD (Presented by: Farzeen Firoozi)

Poster# 103  WITHDRAWN

Poster# 104  SHORT TERM SAFETY OUTCOMES OF CYSTOCELE REPAIR USING THE PERIGEE® POLYPROPYLENE MESH KIT
Matthew McIntyre, MD, Bret Lebed, MD, Walker Nichols, BS and Eric Rovner, MD (Presented by: Matthew McIntyre)

8:00 a.m. – 9:30 a.m.  Male Incontinence and Reconstruction Podium Session
Moderators:  O. Lenaine Westney, MD
Ervin Kocjancic, MD

Podium #32  LONG TERM OUTCOMES OF ARTIFICIAL URINARY SPHINCTER IN PATIENTS WITH HISTORY OF RADIATION THERAPY OR PREVIOUS URETHRAL SURGERY
Alvaro Lucioni, MD, David Rapp, MD, Jason Kim, MD and Fred Govier, MD (Presented by: Alvaro Lucioni)
Podium #33  EXCISION AND REPLACEMENT OF THE FAILED ADVANCE MALE URETHRAL SLING FOR TREATMENT OF POST-PROSTATECTOMY INCONTINENCE
Britton E. Tisdale, MD, Jeremy B. Tonkin, MD and Kurt A. McCammon, MD
(Presented by: Jeremy B. Tonkin)

Podium #34  TIME FROM PROSTATECTOMY TO ARTIFICIAL URINARY SPHINCTER: DOES IT AFFECT OUTCOMES?
Benjamin Whittam, W. Stuart Reynolds, MD, Ian Thompson, MD, Todd Doran, PA, Melissa Kaufman, MD, PhD and Doug Milam, MD (Presented by: Benjamin Whittam)

Podium #35  LONG TERM RESULTS AND COMPLICATIONS OF THE UROLUME SPHINCTER PROSTHESIS
Patrick Shenot, MD and Akhil Das, MD (Presented by: Patrick Shenot)

Podium #36  CREATION OF A CONTINENT URINARY CHANNEL IN ADULTS WITH NEUROGENIC BLADDER USING A SINGLE PIECE OF BOWEL: LONG-TERM RESULTS WITH THE MONTI AND CASALE (SPIRAL MONTI) PROCEDURES
Christopher Knopick, MD and Brian Flynn, MD (Presented by: Christopher Knopick)

Podium #37  TRANSVAGINAL VERSUS TRANSABDOMINAL REPAIR OF VESICO-VAGINAL FISTULAS: EVOLVING EXPERIENCE AT OUR INSTITUTION
Kevin Carlson, MD, FRCSC and Laura Chang-Kit, MD (Presented by: Kevin Carlson)

Podium #38  OUTCOME AND COST COMPARISON BETWEEN OPEN AND ROBOTIC ILEOVESICOSTOMY FOR THE NEUROGENIC BLADDER PATIENT
Alex Vanni, MD, Kevin Bennett, Linda Ng, MD and John Stoffel, MD (Presented by: John Stoffel)

Podium #39  LONG TERM FOLLOW UP OF ILEOVESICOSTOMY AND COLOVESICOSTOMY IN PATIENTS WITH NEUROGENIC BLADDER DYSFUNCTION
Akhil Das, MD, Nathan Roberts, MD and Patrick Shenot, MD (Presented by: Akhil Das)
GENERAL SESSION

9:30 a.m. – 9:40 a.m. Lapides Award Presentation
Moderator: Kenneth M. Peters, MD

GHRELIN: A PUTATIVE MECHANISTIC LINK BETWEEN OAB AND OBESITY
Pradeep Tyagi, Vikas Tyagi, Erich Witteemer, Naoki Yoshimura, Kenneth M. Peters, Michael B. Chancellor (Presented by: Pradeep Tyagi)

9:40 a.m. – 10:00 a.m. Prize Essay Winner Presentations
Moderator: Gary E. Lemack, MD

Podium #40 THE EFFECTS OF ACUTE AND CHRONIC STRESS ON BLADDER STRUCTURE AND FUNCTION
Ariana Smith, MD, Joanne Leung, BS, Suny Harper, BS, Rong Zang, DDS, PhD, Shlomo Raz, MD, Emeran Mayer, MD and Larissa Rodriguez, MD (Presented by: Ariana Smith)

Podium #41 WHAT IS THE PREDICTIVE VALUE OF URODYNAMICS WHEN COMPARED TO CLINICAL HISTORY AND VALIDATED INSTRUMENTS?
Daniel Caruso, MD, MBA, Prashanth Kanagarajah, MD, Ross Krasnow, MD, Brian Cohen, MD and Angelo Gousse, MD (Presented by: Prashanth Kanagarajah)

MALE and FEMALE LUTS: BPH and OAB
Moderator: William I. Jaffe, MD

10:00 a.m. – 10:30 a.m. Critical Evidence Based Evaluation of Laser Ablation Procedures for BPH/LUTS in Comparison to TURP
John T. Wei, MD, MS

10:30 a.m. – 11:00 a.m. The Value of Pressure-Flow Urodynamic Studies Prior to Outlet Reduction Surgery for BPH/LUTS
Moderator: William I. Jaffe, MD

Pro
Alex E. Te, MD

Con
Michael P. O’Leary, MD, MPH
SATURDAY, FEBRUARY 27, 2010
All sessions located in the Majestic 123AB unless otherwise noted.

11:00 a.m. – 12:00 p.m. Podium Session
Moderators: William I. Jaffe, MD
Alex Te, MD

Podium #42 THE SUCCESS AND LONG-TERM DURABILITY OF SINGLE-INCISION TRANSURETHRAL INCISION OF THE BLADDER NECK (TUIBN) FOR FUNCTIONAL BLADDER NECK OBSTRUCTION
Priya Padmanabhan, MD, MPH, Roger Dmochowski, MD and Douglas Milam, MD (Presented by: Priya Padmanabhan)

Podium #43 A SINGLE CENTER, PROSPECTIVE, RANDOMIZED STUDY TO EVALUATE THE EFFECT OF REPEAT INTRA-DETRUSOR INJECTIONS OF BOTULINUM TOXIN-A FOR REFRACTORY IDIOPATHIC OVERACTIVE BLADDER PATIENTS.
Angelo Gousse, MD, Prashanth Kanagarajah, MD, Rajinikanth Ayyathurai, MD and Daniel Caruso, MD (Presented by: Prashanth Kanagarajah)

Podium #44 OVERACTIVE BLADDER SYMPTOM SEVERITY IS NOT RELATED TO CYSTOMETRIC BLADDER CAPACITY
Jerry Blaivas, MD, Lorraine Liang, BS, Jeffrey P. Weiss, MD, Michael Amirian, BS and Chandra Samaroo (Presented by: Jerry Blaivas)

Podium #45 OUTCOMES OF INTRAVESICAL BOTULINUM TOXIN FOR IDIOPATHIC OVERACTIVE BLADDER SYMPTOMS: A SYSTEMATIC REVIEW OF THE LITERATURE
Jennifer Anger, MD, MPH, Aviva Weinberg, MD, PhD, Marika Suttorp, MA, Mark Litwin, MD, MPH and Paul Shekelle, MD, PhD (Presented by: Jennifer Anger)

Podium #46 TEST-RETEST RELIABILITY OF THE URGENCY, SEVERITY AND IMPACT QUESTIONNAIRE (USIQ) FOR PATIENTS WITH OVERACTIVE BLADDER
Lior Lowenstein, MD, MS, Kimberly Kenton, MD, MS, Mary Pat FitzGerald, MD, MS, Linda Brubaker, MD, MS, Mary Tulke, BSN, Joye Fordham, MD and Elizabeth R. Mueller, MD, MSME (Presented by: Elizabeth R. Mueller)

THANK YOU
SUFU Foundation Resident Surgical Lab Sponsors:
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ANNUAL BUSINESS MEETING AGENDA

Society for Urodynamics and Female Urology
Saturday, February 27, 2010
7:30 a.m. – 8:00 a.m.
Location: Majestic 123AB

1. Call to Order – President, E. Ann Gormley, MD
2. Approval of 2009 minutes and thank you to program chairs – Victor W. Nitti, MD
3. Treasurer’s Report – J. Christian Winters, MD
5. Awards Committee Report – Philippe Zimmern, MD
6. Membership Committee Report – Alan J. Wein, MD, PhD
7. Nominating Committee Report – Victor W. Nitti, MD
8. Old Business
   (a) Fellowship Update / Match – J. Christian Winters, MD
9. New Business
   (a) Announcement of 2011 meeting
   (b) Other
10. Adjourn
EVENING EVENTS

Wednesday, February 24, 2010
Welcome Reception
7:00 p.m. – 8:30 p.m.
Location: Center Court
Enjoy cocktails and light hors d’oeuvres as you meet with Industry Partners in the exhibit hall.
Dress: Business Casual

Friday, February 26, 2010
Cocktail Reception and Awards Presentation
6:00 p.m. – 7:30 p.m.
Location: Royal Palm and Center Court
Finish off the annual meeting with an evening of cocktails, mingling and award presentations in the exhibit hall.
Dress: Business Casual

SPOUSE AND GUEST ACTIVITIES

GOLF AT THE VINOY GOLF CLUB
A day spent at Renaissance Vinoy Golf Club is a harkening back to the golden age of Florida golf clubs and resorts. Originally designed in the 1920s, the course was restored under the direction of renowned golf architect Ron Garl. Today, Renaissance Vinoy Golf Club features an 18-hole, par 72 championship course with pine valleys, nine lakes, narrow fairways and a signature island green. It is a challenging course for the serious golfer, yet provides many enjoyable options for the casual player. The golf club is located just a few minutes from Renaissance Vinoy Resort and Golf Club, which is situated on a 14-acre site overlooking the beautiful Tampa Bay. First-class amenities surround you in this meticulously restored resort that has earned a National Register of Historic Places designation. (727) 896-8000

THE CITY’S LANDMARK
Attracting two millions visitors per year, Peer Over the Pier is an inverted pyramid that juts a half mile into Tampa Bay from downtown’s shores. It is a five-story marketplace with shops and restaurants, the Pier Aquarium, an observation deck, a bait shop and more. (727) 821-6443

MUSEUMS
St. Petersburg is the birthplace of scheduled aviation. In 1914, Pilot Tony Jannus flew the Benoist Airboat from St. Petersburg to Tampa on the world’s first scheduled airline flight, transporting St. Petersburg Mayor Abe Pheil and a bag of mail. View a full-scale, operational replica of the historic airboat at the St. Petersburg Museum of History’s Flight #1 Pavilion. (727) 894-1052

The world’s most comprehensive collection of Salvador Dali’s surrealistic art works is housed at St. Petersburg’s world-class Salvador Dali Museum, downtown on Bayboro Harbor. (727) 823-3767

Everything is in bloom at Sunken Gardens, an exotic collection of more than 50,000 tropical plants and flowers. The four-acre botanical attraction features a butterfly garden, wedding lawn, a walk-through aviary with exotic species of birds, and an orchid arbor. This garden is open seven days a week. (727) 551-3100

St. Petersburg’s newest museum leaves a most memorable impression. The fourth largest Holocaust museum in the country, the Florida Holocaust Museum is housed in downtown St. Petersburg. The centerpiece of the museum is a Polish Boxcar used to transport victims to the death camps during World War II. (727) 820-0100

From September to May, special presentations and viewings are held at the St. Petersburg College Planetarium, a sky theater under a 7.3-meter domed ceiling projection screen. (727) 341-4320
ARTS, EVENTS & CULTURE
The Festival of States is St. Petersburg’s premier festival, celebrating for more than 80 years of springtime events, parades, music, art, food and entertainment. All year long, St. Petersburg hosts 1,000 events in its downtown facilities and waterfront parks, ranging from food fests to jazz concerts and sports events to Shakespeare festivals. (727) 893-7039

St. Petersburg’s downtown streets are lined with hexagon block sidewalks, some of Florida’s best Mediterranean-Revival style architecture, and two dozen properties located on the National Historic Register. Pick up a list of historic sites from the city’s Planning Department (One Fourth Street N.), or a historic walking tour brochure from the St. Petersburg Museum of History (335 Second Avenue NE). Guided walking tours are offered by St. Petersburg Preservation. (727) 824-7802

A thriving antique district lines both sides of Central Avenue in downtown St. Petersburg. Collectors will find more than a hundred antique shops in the city — and many within this eclectic five-block stretch of Central between Sixth and Eighth Streets.

From sports bars by Tropicana Field, jazz bars on Central Avenue and nonstop entertainment at BayWalk, St. Petersburg comes alive after dark. Enjoy dinner in one of many fine downtown restaurants, followed by live music and entertainment at a number of venues. The newest entertainment spot, BayWalk/ Muvico 20, offers a 20-screen cinema with stadium seating, designer retail shops and theme dining establishments, along with martini and daiquiri bars. Baywalk, (727) 895-9277 or Muvico, (727) 502-9573

Outstanding educational institutions in St. Petersburg offer enriching lecture series all year long, including the University of South Florida St. Petersburg, Eckerd College, St. Petersburg College, and the Poynter Institute for Media Studies. (727) 821-9494

BEACHES & BOATING
Three of the top 20 beaches in the United States are in Pinellas County. From St. Petersburg, the closest and most pristine is Fort DeSoto, a 900-acre county preserve consisting of five islands, seven miles of undeveloped beaches, a camp ground, boat ramps, fishing piers, paved fitness trails and a historic fort. The sugary-white sands of St. Petersburg’s 500-foot Gulf-front municipal beach on Treasure Island is certified annually by the National Clean Beaches Council as an outstanding environmentally-friendly “Blue Wave” beach.

No better place for recreational boating than St. Petersburg. More recreational boaters call Tampa Bay home than any other port in Florida. Within an easy stroll of downtown museums, shops and restaurants is St. Petersburg’s Municipal Marina — the largest in Florida — with 610 boat slips and dockage for visiting vessels. Downtown, there are 22 boater-based businesses and a total of 1,500 dockages, and daily rentals of everything from a pontoon boat to a luxury yacht with crew. There are also sightseeing excursions along the St. Petersburg coast. (727) 821-6443
INVITED SPEAKERS’ LECTURE SUMMARIES
The Urothelium
Evolution’s finest barrier
Vesicular traffic and barrier function
Modification of barrier in health and disease
Recovery of barrier function following pathology
Urothelial-cell interactions
LUT formation
Embryogenesis
Autocrine and paracrine signaling
Immune interactions

Visceral Sensation – from the bottom up
Evidence for urothelial participation in physical and chemical stimulus transduction
Physical Evidence
Proximity of bladder nerves to urothelium
Expression of receptors/ion channels
TRP channels; P2X/P2Y; neurotrophins; bradykinin; CRF; adrenergic; muscarinic; peptidergic;
BK channels; ENaC; ASIC; 5HT; estrogen.
Functional Evidence
Receptors/ion channels (examples of endpoints):
Secretion of transmitters/mediators (capable of altering sensory function)
Measurement of intracellular calcium (fura/rhod); currents (patch clamp)
Trafficking (membrane impermeant dyes)
Apical membrane “capacitance” changes (correlates with trafficking)

Pathophysiological Responses
Physiology
Hormones
Urine composition
Pathology
Ischemia
Infection
Functional pain syndromes

Conclusions
Urothelium has multiple roles
Barrier function
Sensory function
First component of the LUT “Sensory Web”
Interstitial Cells of Cajal (ICC) were first described as primitive nerve cells overlying the myenteric plexus of rabbit intestine by Cajal in 1911. Research on these cells as potential mediators of neural signal transduction accelerated after Thurneberg (1982) hypothesized that ICCs might act as gut “pacemakers.” The cells have typical dendritic-type processes and stain for cKit which is a tyrosine kinase membrane-based receptor. ICCs were initially felt to be specific to the gut and important only in gut motility. However, ICCs or ICC-like cells have now been identified in multiple organ systems outside the gut including the lymphatics, uterus, and in multiple genitor-urinary organs. The first report suggesting the presence of ICCs in the urinary bladder was published by Smet et al in 1996. Since this time, a flurry of research has been performed to further characterize ICCs in the urinary bladder in order to explore the possibility that these cells might be important in bladder signaling and in the pathophysiology of overactive bladder.

Based on detailed confocal immunohistochemical studies by McLuskey’s group, three different types of ICCs have now been identified in the bladder according to morphologic characteristics, cell-to-cell networking, and location within the bladder wall. In general, all ICCs in the bladder are characterized by positive staining with cKit and Vimentin (which helps distinguish them from smooth muscle cells), by the presence of branched cytoplasmic processes, and by close proximity or direct contact with surrounding nerve fibers. ICCs in the suburothelial layer or lamina propria (ICC-LP) are stellate in appearance and networked to each other. ICCs surrounding and parallel to muscle bundles (ICC-IM) are elongated or linear in appearance and are NOT networked to each other. ICCs within and between muscle fibers (ICC-IB) are stellate in appearance and are networked to each other.

Bladder ICC function has been studied by the use of several techniques including immunohistochemical studies to identify expression of receptors and other markers important in bladder signaling, patch-clamp studies to discover specific ion channels and their pharmacologic properties, and Ca²⁺ fluorescence imaging in which calcium fluorescence serves as a surrogate for cellular activity or signaling. These studies highlight the fact the different ICC types within the bladder likely function in unique ways. The ICC-LPs respond to ATP and may be important as amplifiers of purinergic signals derived from the urothelium. Thus, these specific cells are likely important in afferent and sensory perception of bladder filling and possibly the perception of urinary “urgency.” On the other hand, ICCs in the muscle layers (ICC-IM and ICC-IB) respond mainly to cholinergic stimulation. Therefore, it is speculated that these cells are more likely involved as mediators of spontaneous rhythmic activity that occurs during bladder filling.

Species differences in ICC location and function must also be considered, as animals like the mouse do not appear to have ICCs in the lamina propria as compared to larger populations of these cells identified in guinea pigs and human bladder, prompting speculation that larger bladder wall thickness may necessitate greater need for cells such as ICCs that help in the amplification of luminaly or superficially-derived signals. In addition, growing evidence that ICCs may release prostaglandins as signals to nearby detrusor smooth muscle cells or nerves implicates this paracrine signaling method in disorders of overactive bladder. Many of the roles ascribed to ICCs are currently highly speculative, and a great deal of further research is required to determine how ICC signaling is involved in bladder physiology and in disorders of overactive bladder.
Mechanical stimuli as a trigger for pathologic tissue remodeling in hollow organs
  Bladder, heart, airways, gut,

Target cell type          – smooth muscle  
– concept of phenotypic modulation in smooth muscle remodeling

How to model mechanical stimulation experimentally 
  In vitro – FlexCell-based cyclic stretch-relaxation 
  Ex vivo – stretch injury model

Endpoint measurements  
  Biochemical pathway activation  
  Transcription factor DNA-binding activity & gene expression changes  
  Phenotypic changes – growth, de-differentiation, migration

Findings  
  Mechanical stimulation activates several parallel kinase cascades – PI3K/Akt, p38MAPK  
  Mechanical stimulation elicits highly selective changes in gene expression  
  *In silico* analysis identified AP-1 as a potential mediator of stretch-induced gene expression changes  
  Overlap in mechanical and growth factor-mediated signaling  
    Cyclic stretch and PDGF elicit overlapping signaling and transcriptional changes in SMC  
    PDGFR activated in tissue by stretch injury  
  Differential AP-1 activation by discrete stimuli  
    Fra1, specific to PDGFR activation  
    FosB, specific to stretch stimulation  
  Verified AP-1 targets in vitro and in intact tissue  
    Thrombomodulin - Akt- and Fra1-dependent  
    Novel mediator of SMC migration  
    Induced in detrusor in response to mechanical bladder injury  
  
    Tenascin C - FosB-regulated  
    Induced in response to in vitro stretch

How do alterations in SMC phenotype affect other cell types in the bladder?  
  Potential effects on afferent activity?  
  Effects on organ function?
This presentation will focus on the bladder primary afferent neurons beginning with initiation of action potentials in bladder afferent fibers through to measurement of secondary responses following stimulation of bladder afferent fibers.

Afferent terminals are present on the serosal surface of the bladder, in the detrusor smooth muscle, in the suburothelial layer, and within the urothelial layers. The larger, low threshold, myelinated, A fiber terminals that are most important for normal urine storage reflexes and voiding reflexes are located in the smooth muscle layer and are activated by stretch which opens Na\(^+\) channels. The fibers are in series with the muscle cells and thus are stretched when the smooth muscles contract or when the bladder is distended without adequate relaxation of the bladder wall or when the elastic limits of the bladder are approached. About 2/3 traverse the pelvic nerve to reach the sacral spinal cord with the remainder traversing the hypogastric nerve to reach the upper lumbar cord. The dorsal horn of the sacral spinal cord receives the majority of the central terminals of the bladder primary afferents, but putative, large, myelinated fibers also project through the dorsal columns to terminate in the dorsal gray commissure and lamina X from C3 to L3 levels and even to nucleus gracilis. Some of the large fibers may also travel through Lissauer’s tract from C3 to L1 to terminate in lamina I at those levels, as well as laminae V and VII at sacral levels.

Small, unmyelinated, C fibers are found in all areas of the bladder. Some are high-threshold stretch receptors while others are chemoreceptors. A third class are “silent” C fibers that only respond to distension after sensitization or inflammation. C fibers are involved in emergence of spinal micturition reflexes and, when sensitized, may increase the excitability of supraspinal reflex pathways. C fiber nociceptors also activate somatic motor neurons to the abdomen and rhabdosphincter. Afferent terminals in the bladder express excitatory ATP, tachykinin, TRP, and neurotrophin receptors. As discussed in previous presentation, the ligands for these receptors may be released from the urothelium and interstitial cells. Small fibers traverse the pelvic and hypogastric nerves to enter the sacral and upper lumbar cord and traverse Lissauer’s tract to terminate in lamina I from C3 to L1 and possibly laminae V and VII at sacral levels.

Activation of afferent terminals in the bladder has been recorded in vitro using a bladder – pelvic nerve preparation. The bladder is filled or probed for adequate stimuli to activate afferent terminals and an electrode placed in contact with afferent nerve fibers teased out of the pelvic nerve to record their responses. In vivo, an electrode can be placed in contact with nerve fibers teased out of the L6 or S1 dorsal rootlets. Dye labeling of bladder primary afferent neurons with acute dissociation in culture allows patch clamp recording and Ca\(^{2+}\) imaging of the isolated cell body. This is useful for identifying currents that can be switched on or off physiologically or pharmacologically to regulate the sensitivity of the bladder neuron. For example, spinal cord injury or chronic inflammation changes bladder primary afferent neuron firing patterns from a phase, single spike that is blocked by tetrodotoxin (TTX) to a continuous firing pattern that is resistant to TTX. Transmission of primary afferent activity to second order spinal interneurons can also show changes resulting from spinal cord injury or chronic inflammation that may involve glia. Importantly, chronic inflammation of the colon can also sensitize bladder afferent fibers. Some of this may be subsequent to glia or second order neurons that receive input from both the bladder and colon or in a small percentage directly on the primary afferent neurons since a small population of individual primary afferent neurons have terminal branches in both the bladder and colon in the rat.

Recording physiological downstream responses resulting from bladder afferent stimulation can be done using electrophysiology (spinal cord and brain neurons), urodynamic techniques (bladder and urethral responses), somatic EMG recording (abdominal and rhabdosphincter muscle), and blood pressure, for example. Localizing downstream responses resulting from bladder afferent stimulation can be done using c-Fos immunohistochemistry and functional imaging techniques such as NMR or PET.
SUMMARY
This presentation will begin with an introduction to biomechanics and how biomechanical principles and measurement techniques can be applied to the study of lower urinary tract (LUT) function. Next, the application of these principles to in vivo studies in humans and animals using classical physiological techniques will be described, tying together anatomical considerations and fluid mechanics to describe and mathematically model the system as a whole, as well as examining individual components in situ. Results from other manipulations, such as the simultaneous use of variable catheter placements and/or video imaging during fluid mechanical recordings, together with a more detailed anatomical view of the involved musculature, may force us to reassess some of our initial assumptions. Thus, more complex models and additional approaches may be required to more closely model in vivo biomechanical function in health as well as in disease.

OUTLINE
1. Biomechanics
   a. Some definitions
   b. States of being for contractile tissues
2. In Vivo Lower Urinary Tract Biomechanics
   a. A Simplified Approach
      i. Lower Urinary Tract Anatomy – Sphere and tube models
      ii. Fluid mechanical techniques
         - Whole LUT
         - Isolated Components
   b. A More Detailed Approach
      i. Lower Urinary Tract Anatomy – Smooth muscle anatomical and functional units considered
      ii. Combined Fluid Mechanical and Video Urodynamic techniques
3. Conclusions
   a. Approach depend on the questions
   b. Additional techniques to increase our understanding
      i. Pharmacological dissection
      ii. Ex Vivo studies
Elucidating mechanisms of post-SCI remodeling in the urinary bladder wall
Approximately 250,000 to 400,000 individuals in the United States have spinal cord injuries (SCI), with urologic complications among the most common clinical conditions (1), which have an enormous influence on an individual’s daily activities and can have an important impact on an individual’s mental state. Specifically, spinal cord injuries rostral to the lumbar spine can cause severe lower urinary tract dysfunctions including bladder outlet obstruction, urinary retention, overactive bladders, and detrusor instability (1, 2), which are characterized by areflexia, hyperreflexia, and detrusor-sphincter dyssynergia (3). These bladder abnormalities are reportedly accompanied not only by changes in the bladder wall tissue morphology, including increased thickness (4) and fibrosis (5), but also by drastic changes in compliance of the wall (6-8). Although extensive studies have been conducted on the effects of spinal cord injury on bladder function (1-3, 9-11), the specific alterations in mechanical behavior and structural and functional properties of the bladder wall tissue and the underlying mechanisms are not well understood. Elucidating the relation between tissue morphology, mechanical properties of the bladder wall, and the functional state is of high relevance.

It is clear that as a result of SCI, the bladder undergoes severe tissue remodeling. Specifically, our previous studies found that in the first ten days following the injury, which is called the areflexic phase, the rat bladder wall tissue became thicker, and significantly more compliant (12), but exhibited significantly less stress relaxation under planar biaxial loading as compared to the normal rat bladder (13). In addition, biochemical assays revealed that while the relative collagen concentration decreased, the relative elastin concentration of the SCI bladder was significantly greater compared to normal bladders (13). The up-regulation of molecules related to remodeling, such as tropoelastin, lysyl-oxidase, transforming growth factor-β1 (TGF-β1) and insulin-like growth factor-1 (IGF-1) was further confirmed by gene expression profiling techniques (14). These studies suggested that the increased levels of elastin resulted in the increased compliance that was observed following SCI. Another study from our lab found SCI induced smooth muscle cell hypertrophy and changes in smooth muscle bundle orientation from the longitudinally biased orientation in the normal bladders to the biphasic (both longitudinally and circumferentially biased) orientation in the SCI bladders (15). More recent results show that the long-term response (up to ten weeks after injury, called the hyperreflexic phase) differs from the response in the areflexic phase, i.e. bladder wall compliance was found to be significantly greater at three and six weeks post-SCI when compared to the normal bladders, but at ten weeks compliance substantially reduced to near that of normal bladders (16), which could eventually result in less compliance. This trend in mechanical compliance closely paralleled the collagen/elastin ratio. The study shows that while there are some similarities between the areflexic phase and the hyperreflexic phase, the overall alterations in the tissue are distinct (16).

Physiologically, the bladder is subjected to high levels of strain during the areflexic phase because of its inability to void, and to high levels of stress in the hyperreflexic phase due to re-innervation of the bladder resulting in uncontrolled contractions against a closed sphincter. Relating this to the changes in tissue structure as described above, suggests that the two distinct stimuli induce different remodeling events, to compensate for the change in mechanical environment and to restore function. Now we know the that there are significant changes in tissue structure after SCI that can be related to functional changes and malfunctioning of the bladder, the next step is to explain why the specific structural changes, e.g. smooth muscle cell hypertrophy and altered extracellular matrix components, occurring in the two phases after SCI, occur. The main question is what the bladder is trying to achieve by changing its structure in the course of time, and what drives this remodeling? In the vascular literature, it is assumed that blood vessels remodel in response to change in hemodynamic conditions by restoring circumferential wall stress back to its homeostatic value (17-21). The bladder is most likely not attempting to restore wall stress, but rather it is restoring function.
We hypothesize that 1) during the initial areflexic phase of SCI, the bladder wall undergoes smooth muscle cell hypertrophy to increase its contractile ability in order to compensate for increased wall stretch from over-distension, and produces more elastin to increase compliance in order to facilitate higher storage capacity during over-distension, and 2) during the later hyperreflexic phase the bladder wall further alters its structure by producing more collagen to resist the high stresses that arise from the contractions, resulting in decreased compliance.

References:
Pelvic floor anatomy is complex. While it is understood that pelvic floor muscles and structures contribute to continence and pelvic organ support, the exact mechanisms of their participation in the maintenance of these functions is not well understood. Likewise, the mechanisms of pelvic floor pathology resulting in incontinence and pelvic floor prolapse are ill defined. Therefore, it is of continuing importance that pelvic floor biomechanics in normal and pathological conditions is an active field of investigation. Several clinical studies with small groups of women have been undertaken to better understand the biomechanics of pelvic floor muscles and their participation in maintenance of continence and prevention of prolapse. Pelvic floor biomechanics has also been studied in animal models of incontinence and prolapse. Mathematical modeling contributes to our understanding of the participation of the pelvic floor in continence in health and the effects of pelvic floor pathologies on continence and prolapse. This talk will provide an overview of the current state of the field and directions for future work.
The urethra has two basic roles: to prevent urine leakage by providing a tight enough seal to overcome bladder pressure and to relax during bladder contraction in order to expel urine from the body. As a heterogeneous organ, the urethra has an intricate structure, which includes a smooth and striated muscle layer, a submucosal layer, and muscosal layer. Additionally, an extracellular matrix composes a significant portion of the urethral wall. Unfortunately, the urethral components and their contributions to overall urethral function are not yet fully understood. One way to achieve this understanding is to utilize biomechanical models and methods in order to derive structure-function relationships. While many researchers have focused on the urethra function in-vivo, most of these techniques characterize the urethra as a whole, not as individual components. Therefore, this presentation will focus on methods that have been developed to fully characterize the biomechanical properties of the urethra ex-vivo, where individual components may be directly studied (see below figure for example). The discussion will emphasize mathematical models used to quantify mechanical properties and how they correlate to urethral function. Furthermore, techniques used to manipulate each component will be described. Finally, these techniques and models will identify biomechanical changes of urethras isolated from animal models of health and disease (e.g., to determine the effects of birth trauma induced stress urinary incontinence). Employing this ex-vivo technique in conjunction with in-vivo models will not only aid our understanding of the urethra’s role in normal and pathological states, but also help us to discover more efficient therapeutics and techniques to aid lower urinary tract disorders.

1. Urethras are isolated and implanted into a bioreactor where a physiological environment is

2. Contractile inducing or inhibiting agents for smooth and striated muscle are added to the bath. This allows us to assess the

3. Pressure-outer diameter data is generated and, from here, we

4. Finally, we correlate ex vivo biomechanical results to

Drug-Induced Contraction

Phenylephrine

Acetylcholine

Pressure-Diameter Data

Pressure

Outer Diameter

25

1.8

1.2

1.0

0.8

0.6

0.4

0.2

0.0

Drug-Induced Contraction

Phenylephrine

Acetylcholine
Biochemical Changes and Genetics of Stress Urinary Incontinence
TIMP
Bertha Chen, MD

Stress Urinary Incontinence: Aberrant Extracellular Matrix Metabolism
Society for Urodynamics and Female Urology Winter Meeting, Basic Science Program, St. Petersburg, Fl, February, 2010

Bertha Chen, M.D.
Associate Professor
Urogynecology and Pelvic Reconstructive Surgery
Department of Obstetrics and Gynecology
Stanford University School of Medicine
Stanford, California, USA

Collagen/Elastin

- Rechberger et al, 1993 – decreased collagen in SUI
- Keane et al, 1997 – decreased collagen in SUI, premenopausal
- Falconer et al, 1998 – increased collagen concentration and fibril size in premenopausal SUI women
- Goepel et al 2003 – decreased collagen in postmenopausal women with SUI/POP
- Chen et al, 2004 – collagen synthesis not altered in SUI women
- Goepel et al, 2006 – visual differences in elastin and collagen fibers between postmenopausal women with SUI and ISD

Pelvic “Fascia”

- Scott Farrell et al, 2001
  - “The surgical “fascia” used during colporrhaphy consists of moderately dense connective tissue with smooth muscle. This tissue was indistinguishable from the deep layer of the vaginal wall using the criteria of cellular components as well as the criteria of distribution of collagen, smooth muscle, and elastin.”
- Phillips CH et al, 2006
  - Compared MMP and TIMP expression in vaginal tissue and uterosacral ligaments. Found that significant correlations existed between these markers of collagen metabolism, suggesting that vaginal tissue reflects that of the endopelvic fascia.
Proteins Involved in ECM Metabolism

- ECM Proteases
  - Neutrophil elastase
  - Cathepsins
  - MMPs

- Inhibitors of ECM Proteases
  - Alpha 1- antitrypsin
  - Alpha 2- macroglobulin
  - TIMPs

- Proteins involved in ECM Maturation
  - Lysyl oxidase-like 1
  - Fibulin-5
  - Lysyl oxidase-like 1
  - Fibulin-5

Extracellular Matrix and SUI/ Pelvic Organ Dysfunction

- Major components of ECM
  - Collagen (strength)
  - Elastin (elasticity)

- Pelvic muscles
- Bony Pelvis

- Pelvic Floor Support/Continence

- Correlated with Pelvic organ dysfunction

MMP-1 mRNA expression in vaginal wall tissue

N=15 N=7

* P=0.05

Chen et al, Int Urogynecol J, 2002
TIMP-1 mRNA expression in vaginal wall tissue
Chen et al, Int Urogynecol J, 2002

Ratio of MMP-1/TIMP-1 mRNA in vaginal wall tissue
Chen et al, Int Urogynecol J, 2002

SUI-Role of Gonadal Steroids

- Data from Falconer et al.
- Jackson et al., 2002 –
  - 6 mos, double-blind, placebo-controlled trial with ERT
  - Estrogen stimulated collagen degradation via increased protease activity
- Maolli et al., 2003 – ATFP, decreased collagen I in menopausal tissues
**SUI-Role of Gonadal Steroids**

- Fibroblasts cultured from control, continent subjects demonstrated an estrogen-mediated increase in TIMP-1 expression. A smaller, non-significant increase was observed for the SUI-derived fibroblasts. This suggests that SUI tissues differ in their response to estrogen and may explain the inability of estrogen replacement to ameliorate SUI in postmenopausal women.

Correlated with Genetic Predisposition Connective Tissue Metabolism Differences

Pregnancy • Hormonal effect • Trauma

Correlated with SUI/Pelvic Organ Dysfunction • Aging • Menopause • Surgery

SUI-Elastin Metabolism

• Hypothesis:
  – Collagen and elastin metabolism are both involved in the pathophysiology of SUI. Regulation of these pathways are hormonally dependent.
SUI-Role of Gonadal Steroids

- Relaxin (a peptide hormone)
  - Produced by the corpus luteum
  - 20-50-fold greater during pregnancy
  - Important in cervical ripening and collagenolysis
  - Increases MMP and inhibits TIMP expressions in uterine fibroblasts

Neutrophil Elastase Activity Is Increased in SUI in Secretory Phase

- Neutrophil Elastase Activity (nM/mg/ml)
  - Control
  - SUI

<table>
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<td>N=8</td>
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$P = 0.022$


Figure 3

Chen et al, 2004 Neurourol Urodyn

Figure 5

Alpha-1 antitrypsin Protein

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<th>SUI/POP Patients N=5</th>
<th>Control Patients N=5</th>
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$P = 0.03$
Alpha-1 Antitrypsin Inhibition of In Vitro Elastase Activity in Relaxin-Stimulated Cultured Vaginal Fibroblasts

Figure 4

Total Neutrophil Elastase Activity Is Reduced by Anti-NE Antibody, but not by Anti-MMP-2 Antibody

Figure 6
Chen, et al, 2007 Neururol Urodyn

Comparison of mRNA α-2 Macroglobulin Levels in Vaginal Wall Tissues from Controls and SUI Women during the Menstrual Cycle

Wen, et al, Hum Repro (submitted 2007)
Table II

<table>
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<tr>
<th>Phase of the Menstrual Cycle</th>
<th>Cell Group</th>
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<td>NS</td>
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Chen et al, Am J of Obstet Gynecol, 2005

Table III

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<th>Cell Group</th>
<th>Total Elastase Activity</th>
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Chen et al, Am J Obstet Gynecol, 2005

Role of TGF-β

- Growth promoting factor
- Growth inhibitor
- Stimulate extracellular matrix biosynthesis
- Involved in regulation of elastin and collagen synthesis
- Bound to LTBP
- Differential expression in women with SUI
**ECM Metabolism**

- **ECM Proteases**
  - Neutrophil elastase
  - Cathepsins
  - MMPs

- **Inhibitors of ECM Proteases**
  - Alpha 1-antitrypsin
  - Alpha 2-macroglobulin
  - TIMPs

- **Proteins involved in ECM Maturation**
  - Lysyl oxidase-like 1
  - Fibulin-5
  - LTBP
  - Fibrillin
  - Small glycoproteins

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**Genetic Alterations**

Injury/Hormones/Pregnancy

- Increase in Local Protease Activity Via Decrease in Inhibitors
  - TGF-β Activation via Cleavage from LTBP/ECM
  - Altered Collagen/Elastin fibers or content
The connective tissue structures that support the pelvic organs are rich in collagen and elastin matrix proteins. A decrease in collagen and/or elastin content in these tissues would be expected to reduce elasticity of these structures and weaken support of the lower genitourinary tract, resulting in stress urinary incontinence (SUI) or pelvic organ prolapse (POP). Differences in the collagen composition in the supporting structures of the pelvic organs and in the skin of women with SUI compared to unaffected women have been reported. Enzymes that degrade collagen affect the integrity of connective tissue matrix and, thus, its function in supportive tissues. The collagenases are matrix metalloproteinases (MMPs); over 20 soluble MMPs have been identified. However, the term "collagenase" refers to interstitial collagenase (MMP-1) and neutrophil collagenase (MMP-8) because these enzymes cleave triple helical collagen. MMP-1 is synthesized by fibroblasts and is equally active in degrading collagen I and III; MMP-8 is synthesized by neutrophils. Collagenolytic activity is regulated by synthesis, secretion and activation of proenzymes, requiring the synthesis of other proteolytic enzymes which are also regulated. In addition, collagenolytic activity is regulated by the balance of activated MMPs and their endogenous inhibitors or “the tissue inhibitors of metalloproteinases” (TIMPs); four TIMPs have been identified.

Work by other investigators has inferred abnormalities within the extracellular milieu of the urogenital tissue in subjects who are afflicted with SUI and POP. Edwall et al [1], with proper controls, showed that there was low tissue collagen marker levels in women compared to those without SUI. The markers measured in urogenital tissue and serum were carboxy-terminal propeptide of type I procollagen (PICP), the carboxy-terminal telopeptide of type I collagen (ICTP), and the amino-terminal propeptide of procollagen III (PIIINP); these products are related to collagen synthesis and breakdown and measured in this study using commercially available radioimmunoassay. Another group of investigators found increased elastase activity, using biologic assays, from vaginal tissue obtained from SUI subjects compared to controls [2]. This same group had looked at transcript expression of pro-collagen and anti-collagen transcripts within vaginal wall tissues. They found that there was increased in MMP-1 and decreased TIMP-1 mRNA expression in SUI subjects compared to controls [3]. These data obtained from urogenital vaginal tissue in both SUI and control subjects suggest that there is altered collagen turnover in SUI subjects.

Using genetic methods, polymorphisms were identified in the promoters of several MMP genes which are involved in degradation of connective tissue. There is a well recognized variation within the promoter of the MMP-1 gene where the insertion of an extra base (G), 1607 bases up stream of the transcriptional start site, creates an Ets transcriptional enhancer which up regulates MMP-1 expression [4]. The expected frequencies of the alleles based on their occurrence within the general population are GG/GG 0.248, GG/G- 0.475 and G-/G- 0.277. Our group’s preliminary data suggest that the frequency of the G-/GG genotype (a polymorphism found in the promoter region of which MMP genes) within a defined patient population with SUI and pelvic floor prolapse significantly exceeds that of the general population [5]. Of 12 SUI/POP patients, all possessed the GG genotype. Nine were heterozygous possessing both the GG and G- alleles (0.75) and the other 3 were homozygous for the GG allele (0.25). Moreover, the presence of this genotype correlates with the increased biochemical activity of MMP1 previously established in this population [6]. A control group of 8 non-SUI patients showed the expected allele frequency as noted above.

TWIN STUDIES: Early studies of familial contributions to urinary incontinence (UI) interviewed affected women about the presence of similar symptoms in female family members, but this technique has considerable ascertainment bias (Mushat 1996). The EPINCONT study in Norway found that women are more likely to develop UI if their mothers or older sisters have UI (Hannestad 2004). Buchsbaum and colleagues (2005) studied nulliparous Catholic nuns and their parous sisters, and found that while childbirth had no association with the development of UI after menopause, there was high concordance between sisters in their continence status, suggesting that an underlying familial predisposition to UI. Twin studies are commonly used to examine the contribution of genetics or environment to any familial predisposition. While related individuals share some genes, living together in the same environment may have a direct effect on the transmission of risk for UI, including smoking habits, socio-economic status, care seeking behaviour, attitudes towards physical exercise, dietary and drinking habits, and toilet training. By comparing monozygotic twins with identical genotype (share 100% of genes), and dizygotic twins (share 50% of genes), the relative proportions of inheritance from genetic and environmental factors can be estimated. Said another way, if monozygotic twins are more concordant for the condition than dizygotic twins, a genetic influence is likely; discordant monozygotic twins points to environmental factors when compared to dizygotic twins. Up to half of urge incontinence was found to be genetic in a study from the Danish twin registry (Rohr 2004). In the larger Swedish twin registry of 3376 monozygotic and 5067 dizygotic female twin pairs, there was greater twin similarity among the monozygotic twins, indicating a genetic component for SUI and POP. Genetic and non-shared environmental factors seemed to contribute equally to the development of pelvic floor disorders in these women, about 40% for each factor (Altman 2008.) Population databases have found increased rates of UI in even third degree family members (cousins).

LINKAGE STUDIES: Identification of candidate genes can focus the search for genetic elements contributing to diseases. While candidate genes that modify muscle, connective tissue and nerves can be examined using single nucleotide polymorphisms (SNPs), most of the major discoveries in genetics have been through genome-wide studies. The technique of sibling linkage analysis has been used to find many of the large genetic effects seen in even complex medical disorders. These studies rely on the fact that if family members affected by the disease of interest share a specific area of a chromosome (and unaffected members do not have that specific area), then the genes predisposing to that disease is likely to be on or near that area. At the University of Utah, we have been phenotyping women with pelvic floor disorders since 2002. In 2009 we reported on linkage evidence in pelvic organ prolapse: In families in which two or more women had undergone surgery for pelvic organ prolapse (two-thirds had also undergone surgery for SUI), we demonstrated linkage to a small area on chromosome 9 (Allen-Brady 2009). Linkage studies are reported in LOD scores (logarithm of the odds), a measure of the likelihood that two loci are near one another on the same chromosome. Significant linkage is evidence for a predisposition gene for pelvic floor disorders in this region of chromosome 9, for which fine gene mapping and eventual sequencing may lead to the identification of the actual genetic error. At this meeting we are presenting linkage evidence in a large sample of women operated for stress urinary incontinence.

Another important method of genome-wide genetic research is association analysis, a type of specialized case-control analysis that allows study of unrelated affected individuals, usually from specific phenotypes. While genome-wide association studies have not found major gene defects often occurring in special populations (which are usually found in linkage studies), association studies have identified important predisposition genes in many other systems. Several groups of researchers currently are collecting phenotypes in urinary incontinence for association studies.
IMPLICATION FOR PREVENTION AND TREATMENT OF URINARY INCONTINENCE

What are the implications for the field of lower urinary tract disorders if some of these conditions are confirmed to have genetic contributions? Establishing the familiality of stress urinary incontinence and other pelvic floor disorders may identify at risk populations of people who can be targeted for primary and secondary prevention studies, such as elective cesarean delivery. If specific genes can be identified, we understand why some patients do not respond to certain therapies. We have many basic questions about the etiology of stress incontinence and whether all pelvic floor disorders part of the same continuum (pelvic organ prolapse, urge and stress incontinence), or are they each discrete entities? In the bigger picture, we have much to learn about the etiologies and predisposition to LUTS and pelvic floor disorders.

REFERENCES

I. Introduction
   a. Definition of nanotechnology
   b. Novel properties of nanomaterials
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II. Use of nanotechnology in medicine: Nanoparticles
   a. Nanoparticles for cancer treatment
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   c. Novel properties: anti-infection, anti-inflammatory, anti-calcium stone formation, and promotion of tissue growth
IV. Future directions for the field of nanotechnology in medicine
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   b. Translation to industry
   c. Future methods to create nanomaterials inexpensively
The neurogenic bladder remains a relevant and unresolved target for regenerative medicine. Currently, intestinocystoplasty remains the gold standard for surgical reconstruction of the neurogenic bladder. It is well documented that this operation carries with it several potentially morbid long term complications including metabolic abnormalities, stone/mucus formation, perforation, and increased cancer risk. Thus, the need for new tissue for bladder replacement that obviates these complications has in large part driven forward the field of tissue engineering in urology.

Two basic technologies have been used in tissue engineering: “unseeded” and “seeded.” Unseeded technology involves the incorporation of a scaffold material (synthetic or biologic) into the host organ, which is used as a template for the ingrowth of native cells that then initiate the regenerative process. Seeded technology is similar to unseeded, but with the addition of cultured cells to the scaffold prior to implantation into the host. Both unseeded and seeded technologies have been shown in numerous animal studies to be successful in being able to induce successful regeneration of bladder tissue. Regardless of which technique is used, there appears to be limitations in the size and function of the regenerated bladder tissue that can be achieved. This is due to numerous problems that have yet to be solved. In unseeded technology, there is the inability of native bladder cells to invade an unseeded graft for long distances. With seeded technology, there is a lack of adequate nutrition to the seeded cells during the early stages of regeneration. Importantly, both unseeded and seeded technology is hampered by inadequate uniform neovascularization and complete innervation of the graft. Nevertheless, based on some of the successes noted in the laboratory, one clinical trial has been performed in humans utilizing seeded technology. Seven patients with a neurogenic bladder were augmented with seeded PGA composite grafts. While biopsies of the regenerated tissue showed successful histologic regeneration of all three layers of the bladder, urodynamic studies demonstrated a lack of functional restoration of normal bladder capacity and compliance in all but one patient. This study demonstrates the need for additional work to improve upon our current techniques if we are to be successful in being able to tissue engineer bladder tissue that can be used as alternative to bowel for augmentation or replacement of the bladder.

One of the critical issues that require improvement in this field of research is scaffold design. Biologic scaffolds that have been used to date with success have consisted of decellularized pieces of tissue that are obtained from an animal source. Small Intestinal Submucosa (SIS) is an example of this. A significant problem with most biologic materials is that they often have inherent differences in biologic activity from graft to graft since they are derived from different animals. This can in turn result in unpredictable degrees of tissue regeneration. Also, the sterilization process that is needed to use these biologic materials in humans may alter important active properties of the scaffold that diminishes its regenerative potential. Synthetic scaffolds by definition are more uniform in their content and configurations than biologic scaffolds. Successful bladder regeneration with synthetic materials has only been noted with seeded technology. The synthetic material that has been studied most extensively in this setting is a synthetic biodegradable polymer sheet of non-woven polyglycolic acid. This comes from the chemical family of poly-\(\alpha\)-esters: poly-L-lactic acid (PLLA), polyglycolic acid (PGA), and their copolymers (PLGA). These polymers are easily processed into highly porous fibrous meshes, which can support cell ingrowth and proliferation.
The advantage of a biomaterial like SIS is that it has inherent biologic activity that is important for regeneration but a major disadvantage is the variability present in this biologic activity. The advantage of synthetic materials like PGA is its uniformity but its major disadvantage is precisely its absence of biologic activity. Recent advancements in nanotechnology may allow us to utilize the advantages of both types of material to develop synthetic biomaterials that have predictable biologic activity. We broadly define “nanotechnology” as the creation of objects or surfaces whose unique functions are a direct result of their nanoscale dimensions and/or organization. The field of molecular self-assembly has recently made significant strides towards applications in regenerative medicine. The concept is to intentionally engineer materials in the organization observed throughout nature; e.g. non-covalent assembly of phospholipids into bilayers, vesicles, and micelles. An example of this is the use of peptide-amphiphiles molecules that are triggered to self-assemble when placed in aqueous solution, or by changing the pH or ionic gradient. When this technology has been applied to bladder tissue engineering, significant effects on bladder smooth muscle growth on nanodesigned grafts were noted. Current work by several laboratories is being directed at nanodesigning synthetic materials that can be integrated with important growth factors known to facilitate bladder regeneration and neovascularization. This technology is quite promising for the delivery of intrinsic factors found to be necessary for support of both seeded cells and native cells in the bladder that invades the graft.

Despite continual progress in advancing our ability to regenerate bladder tissue, the field has yet to produce a complete solution for functional restoration of bladder tissue. Researchers continue to strive toward scaffolds which signal cells directly, via their own biochemical language, rather than through indirect means. Increasingly, the many faces of nanotechnology appear to be immediately relevant to this need. Future efforts toward incorporating nanotechnology into bladder tissue engineering will hopefully overcome the hurdles that are limiting this technology for widespread clinical application.
Urinary tract infection (UTI) is among the most common bacterial infections and carries a significant morbidity and economic cost. While management of simple symptomatic community-acquired UTI is generally straightforward, diagnosis and treatment of UTI in patients with anatomic, functional, and neurologic impairment of the urinary tract remain challenging. In these patients with complicated UTI, the history and physical examination are frequently nonspecific, prediction of causative pathogen(s) inaccurate, empiric treatment inappropriate, and antimicrobial resistance more prevalent. These situations of complicated UTI create a need for technology platform capable of rapid decision making to optimize clinical management.

Lab-on-a-chip (LOC) is a miniaturized device that integrates one or several laboratory analytical functions on a single chip usually made of glass, plastic, or silicon. Potential advantages of LOC include point-of-care application, cost reduction, and improved efficiency given integration of complex multistep analytical processes. Technological innovations from several disciplines, including microfabrication, microfluidics, biosensors, nanotechnology, and molecular biology have enabled development of LOC. Analogous to how integrated circuitry revolutionized the computer industry, LOC has the potential to transform clinical diagnostics. Significant bottlenecks remain, however, before LOC can be utilized in clinical settings, particularly in the processing of heterogeneous clinical samples, integration of diverse sample processing techniques, and elimination of the bulky supporting equipments for the LOC.

LOC technology is ideally suited for UTI diagnostics, as this technology shows promise to be implemented in a point-of-care care setting and can perform analysis rapidly and at low-costs. Expediting the UTI diagnosis with objective microbiological diagnosis will enable more judicious utilization of antibiotics. Development of LOC technology for UTI, furthermore, will likely be applicable for diagnosis of other urological diseases utilizing urinary diagnostics, as well as detection of infectious agents in other body fluids.

We have thus been developing and applying LOC technologies and samples processing techniques for rapid identification of uropathogens. The core component of our LOC is a microfabricated electrochemical biosensor array. This array is composed of 16 sensors, each of which is treated with a nanoscale surface modification process called self-assembled monolayer, followed by immobilization of DNA probes specific to the most common uropathogens. After bacterial lysis, the DNA probes hybridize to target 16S rRNA (i.e. molecular fingerprint of the bacteria), followed by electrochemical signal amplification with an enzyme tag; thus effectively transducing a molecular recognition event (DNA-RNA hybridization) into a quantitative electrical signal (nano-ampere). The entire process from sample-to-answer can be achieved within 1 hour, without the need for complex intermediate step such as nucleic acid purification or PCR amplification. A series of validation studies have demonstrated pre-clinical utility of the biosensor comparing biosensor results with urine culture, using urine samples obtained from clinical microbiology laboratory as well as directly from spinal cord injury patients susceptible to polymicrobial UTI. More recently, we have developed a complementary biosensor-based antimicrobial susceptibility test (AST) directly from urine samples. Using bacterial 16S rRNA as a growth marker, we are able to rapidly quantify the 16S rRNA level using the biosensor in the setting of different antibiotics to determine the susceptibility and resistance profile. In contrast to standard AST, which requires initial isolation of the pathogen (an 18 hour delay), the biosensor AST is able to utilize clinical samples directly.
In addition to our progress in pathogen detection, we are addressing several fundamental requirements to automate the LOC operation including fluid delivery, separation, concentration, and mixing. Towards that goal, we are collaborating with our engineering colleagues to develop a versatile electrokinetic bioprocessor with a unique multifunctional electrode design capable of different sample preparation tasks (e.g. mixing and concentration), in addition to detection. Lastly, we will present our ongoing efforts to develop an integrated reader instrument for the LOC to enable future point-of-care application for UTI diagnosis.

Additional reading:


Urinary tract infections (UTIs) represent one of the most common bacterial infections of humans. During their lifetimes, 10-20% of American females will receive medical attention for a UTI and nearly 3% will experience more than one infection per year. A common treatment for reducing recurrence involves extended daily antibiotic prophylaxis, nevertheless, as many as 60% of women will return to their prior frequency of infection shortly after cessation of prophylaxis. While a portion of the recurrence could be attributable to development of antibiotic resistance, most recurrent UTIs are attributed to the pathogen seeking intracellular refuge within bladder cells. Once bacteria gain entry into bladder epithelial cells (BECs), they avoid elimination by the host’s immune system and any antimicrobial agents that are applied.

Type 1 fimbriated uropathogenic *E. coli* (UPEC) accounts for over 80% of all UTIs. The virulence of the bacteria is associated with its capacity to invade the superficial bladder epithelium and avoid elimination in the urine. Because of its role in storing urine, the epithelium of the bladder is highly impregnable. Therefore, how UPEC penetrates the highly fortified epithelium of the bladder has remained a mystery. The bladder epithelium uniquely functions as a regulator of bladder volume, which is achieved by apical exocytosis of specialized membrane containing (fusiform) vesicles when the bladder is distended. This stretch-induced exocytosis of fusiform vesicles in BECs is associated with marked increase in intracellular levels of the prominent second messenger, cAMP. We have recently discovered in an experimental model of UTI that during infection, UPEC were directly entering and harboring within fusiform vesicles of superficial epithelial cells of the bladder (1,2). The signal transduction events in BECs associated with the entry of UPEC involved a novel pathway involving the generation of cAMP and the contribution of the immune surveillance molecule, Toll Like Receptor (TLR) (2,3,4). These observations reveal that pathogenic *E. coli* are co-opting the natural physiological functions of BECs in regulating bladder volume, to overcome the powerful defenses of the bladder and establish infection.

Since infecting UPEC are harbored in cAMP regulatable compartments within BECs, we reasoned that treatment of BECs with modulators of cAMP could artificially increase intracellular cAMPs levels and induce spontaneous exocytosis of bacteria from fusiform vesicles. Forskolin (a derivative of the plant herb *Coleus forskohlii*) is a highly potent inducer of cAMP and has been employed for medicinal purposes for centuries in Asia. We found that treating acute UTIs with forskolin significantly reduced intracellular bacterial numbers in the bladder of infected mice (1). These studies reveal a novel strategy to abrogate persistent UTIs. Since these drugs act on the host, the likely hood of developing microbial resistance to them is nonexistent.

References
I. Fetal Bladder Function

Fetal urine output commences in the ninth week post-conception and varies directly with gestational age. The output is 10 ml/hr at 30 weeks and increases to 27 ml/hr at term due to the increased size of the fetus. The output then falls dramatically by 20 weeks postnatally to 2-5 ml/hr, as concentrating ability increases in the developing nephrons.

Fetal bladder filling is noted on sonograms as early as 20 weeks gestation. The bladder capacity rises with fetal growth from 1 ml at 20 weeks to 10 ml at 32 weeks. At term, bladder capacity is typically 35 ml or 7 ml/kg. Fetal bladder emptying is usually incomplete with a typical average duration of 9.5 seconds. The frequency of emptying increases directly with bladder capacity, occurring every 30 minutes at 28 weeks and every 60 minutes at term. However, very little is known about fetal bladder storage and emptying pressures, sphincteric development and function, and gender differences in these parameters.

II. Basic Embryology and Formation of the Spinal Cord

Following fertilization, the zygote divides 5 times in the first four days to create the 32 cell blastocyst. There is an eccentrically located inner cell mass within the blastocyst that separates the amniotic cavity and the yolk sac. This inner cell mass develops two layers: the epiblast and the hypoblast. Concurrently, the blastocyst implants into the uterine wall at seven days. The hypoblast begins to thicken cranially by thirteen days in the first sign of craniocaudal orientation. Next, gastrulation occurs to create the three cell layers: ectoderm, mesoderm, and endoderm. At sixteen days, the primitive streak develops in the ectoderm on the caudal end and progresses cranially over the next three days. This cleft will then began to regress caudally and give way to the notochord. The notochord is the axial strut that directs and maintains the axis of body development. It elongates over days 17-21 to reach full length. The notochord is the precursor and substrate of the developing spinal cord and will govern segmentation of the body into somites from head to tail. The caudal portion develops last and has five lumbar, five sacral, four coccygeal, and seven tail segments; the latter of which will involute in humans. Abnormal compression of notochord at this critical time can alter development of the spinal cord/column, the midline separation of the cloaca, and the development/involution of the Wolffian and Mullerian ducts.

The neuro-ectoderm above the notochord begins to fold into a groove and then closes over days 17-23. This was previously thought to close like a zipper from head to tail but is now thought to proceed from at least four initiation sites. Signaling molecules, such as Shh (sonic hedgehog) from the notochord, influence this process. The cutaneous ectoderm must separate from the cord, or neural tube defects, most commonly spina bifida, can occur. Maternal folic acid plays a role in this process as well, since folic acid dietary supplementation can significantly reduce the risk of spina bifida.

III. Fetal Development of the Distal Spinal Cord

The end bud of the developing neural tube must regress properly for normal neural function. Alteration can lead to a thickened filum terminale, a myelocystocele, or a tethered cord. Ascent of the conus medullaris from the C1 to its normal postnatal position at L1-2 occurs between 8-25 weeks. Proper ascent is a consequence of both differential growth of the spinal cord within the vertebral column and retrogressive differentiation of the rostral somites. Abnormal occurrence of the latter process can lead to caudal regression syndrome with associated limb and trunk anomalies in addition to neurogenic bladder and bowel.
IV. Development of Peripheral Nerves
Neuroblasts divide asymmetrically to create three histiotypes: **neurons**, **astrocytes** (support cells), and **oligodendrocytes** (produce myelin). Time and spatial localization directs differentiation and ultimate cell fate. A precise number of neurons are generated from single neuroblasts in a defined temporal sequence. Neurons will then exit the cell cycle, undergo terminal differentiation, and then migrate to their final position. Certain neuron subtypes are born at different times and aggregate into discrete domains, such as the dorsal root ganglia which are derived from neural crest cells. An example of spatial localization is the segregation of proprioceptive and cutaneous sensory nerves within dorsal root ganglia. Neurons pattern along rostral-caudal and dorsal-ventral axes in response to gradients of signaling molecules produced by neighboring tissues. Specific modifiers include proneural genes, transcription factors (specifically, neurotransmitter and receptors), negative regulators, and apoptosis, as post-mitotic neurons compete for limited amounts of trophic support from target tissues. As such differentiation occurs, there is progressive loss of multipotentiality and plasticity.

V. Importance of Neuroembryology to Urologic Practice & Research
This loss of plasticity means humans are unable to recover normal bladder function after neural injury. However, neuropathy during fetal development is fundamentally different because the insult occurs before normal bladder function is established. The absence of normal neural networks may lead to maldevelopment of normal lower urinary tract anatomy and prevent the attainment of normal bladder form and function.

In spina bifida, prenatal back closure has not been shown to lead to better outcomes in bladder function. This suggests that the cause of the bladder dysfunction is not just exposure of the developing nerves to amniotic fluid or potential trauma; the altered bladder function is likely caused by distal neural maldevelopment which leads to altered target organogenesis of the bladder and sphincter. Thus, our current models of pediatric neurogenic bladder using post-natal spinal cord injury are likely unrepresentative of what occurs in developing fetuses. Models with true neural maldevelopment (i.e., true spina bifida) and not just injury to normally developed nerves and urinary tracts are needed.
Spinal cord injury (SCI) can cause a significant re-organization of the neural pathways controlling the lower urinary tract. It is known that the micturition reflex changes from Aδ-fiber mediated bladder-to-bladder reflex to C-fiber mediated spinal reflex after SCI. Meanwhile, abnormal spinal reflexes such as detrusor hyperreflexia and detrusor sphincter dyssynergia emerge. This lecture will focus on the neuroplasticity of pudendal-to-bladder reflex induced by chronic SCI by comparing the reflexes in adult normal and chronic SCI cats. Tactile perigenital stimulation activated an inhibitory pudendal-to-bladder reflex in normal cats, but it activated an excitatory pudendal-to-bladder reflex in chronic SCI cats. However, electrical stimulation applied to the perigenital skin area or directly to the pudendal nerve induced a frequency dependent pudendal-to-bladder reflex in both normal and chronic SCI cats. It was inhibitory at 3-7 Hz, but became excitatory at 20-30 Hz. The inhibitory reflex activated by electrical stimulation significantly (P<0.05) increased the micturition volume threshold (i.e. bladder capacity) to 135-177% of control capacity in normal and chronic SCI cats. The excitatory reflex significantly (P<0.05) reduced bladder capacity to 40-78% of control capacity only in chronic SCI cats, but failed to change bladder capacity in normal cats. A bladder volume about 60% of bladder capacity was required in normal cats for the excitatory pudendal-to-bladder reflex to induce large amplitude bladder contractions comparable to the contractions induced by distension alone, but less than 20% bladder volume was needed in chronic SCI cats. Understanding the neuroplasticity of pudendal-to-bladder reflex after chronic SCI could further elucidate the physiology underlying neural control of the bladder, and provide neurophysiological bases for clinical treatments of bladder dysfunctions following neurological disorders.
Spina bifida is a congenital defect affecting approximately 0.2/1000 live births in the United States.\(^1\) Xiao introduced the concept of an artificial voiding reflex by the intradural microanastomosis of a healthy lumbar motor root to a sacral motor recipient root.\(^2\) By performing the procedure at the intradural root level, the sensory limb is left intact, allowing for the voluntary initiation of micturition by stimulating the appropriate cutaneous dermatome.

Initial studies done in rats involved a microanastomosis of the left L4 ventral root to the left L6 ventral root.\(^2\)\(^3\) After scratching the skin surface, afferent information travels through the intact L4 dorsal root and initiates the reflex. Further studies have established this technique in higher taxonomic species\(^4\) and recently been brought from bench to clinical practice in humans, involving the microsurgical anastomosis of L5 and S2/3 ventral roots.\(^5\)\(^6\) Initially described in spinal cord injury patients in 2003, the principle was expanded to spina bifida where 85% regained satisfactory bladder control and continence postoperatively. Xiao\(^7\) updated his intradural artificial reflex arc experience with 110 spina bifida patients in 2005, reporting an 87% success rate at one year.

All of the human data reported in the literature in spina bifida was performed in China and there is a need to duplicate this data in the United States. We have reported our experience on 9 patients who underwent lumbar to sacral nerve rerouting to restore voiding and improve bowel function. Seven of nine subjects developed a cutaneous to bladder reflex suggesting the rerouting can occur in humans. It is imperative that we gather robust clinical data to determine the risk benefit profile. If this technique is proven to work, then we can focus on making this a better procedure and identifying ways to improve outcomes and reduce adverse events.

A significant challenge is to diminish lower extremity weakness. Rather than sacrificing a nerve to donate to the sacral plexus, perhaps we can perform an end to side anastomosis and still get nerve sprouting. This could be studied in an animal model. Additionally, successful nerve rerouting is dependent on nerve growth, thus perhaps we can pump nerve growth factor at the site of the anastomosis or introduce stem cells that produce NGF at the time of the surgery. Additionally, are there any pre-operative factors that can predict a good clinical response with this surgery? Perhaps bladder compliance, lower-extremity integrity, continence mechanism, age, previous surgeries, etc. would be predictors of success? There are technical challenges of nerve identification, particularly in the spina bifida population where the neuroanatomy is atypical. Challenges arise is appropriate consenting for this procedure and obtaining quality urodynamic studies in the pediatric population. A difficult aspect of this study is to how to define success given there is a constellation of symptoms associated with neurogenic bladder and bowel. Importantly, does the benefit of the procedure outweigh the inherent risks, particularly to the lower extremity? Is success defined as demonstrating a detrusor contraction with stimulation of the dermatome? If this is the definition of success than this surgery clearly works for the majority of patients. In addition, a number of patients have noted a change in their voiding and bowel function with several reporting improvements including increased sensation of the bowel and bladder, new ability to initiate voiding, improved bowel function, less detrusor overactivity and the ability to stop antimuscarinics. Is this enough to define success? These challenges will be discussed in this talk and our goal is to overcome as many of these challenges as possible and determine clearly whether nerve rerouting should be a part of our treatment algorithm.

References:
1. There is a need for biomarkers that can provide a molecular differentiation of the forms of BPH/LUTS (molecular fingerprinting)

2. Gene expression analyses demonstrate that there are distinct forms of the disease
   a. Differentiation between histologic and highly symptomatic disease

3. Among the genes that can differentiate between symptomatic and histologic disease are members of the cancer/testis (CT) antigen family

4. The member of CT antigen family with the largest differential expression is JM-27 (aka PAGE-4)
   a. 18-fold higher expression in highly symptomatic BPH/LUTS
   b. Appears to be involved in androgen regulated growth
   c. May be regulated, at least in part, through histone acetylation

5. This can be used as a biomarker for highly symptomatic disease
   a. Tissue
      i. Stromal expression
      ii. Increased in individuals with severe symptoms
   b. Serum
      i. Increased in individuals with severe symptoms

6. JM-27 can serve as a therapeutic target for BPH
   a. Modulating the expression of the protein can significantly influence growth rates and response to therapy in in vitro models
Benign prostatic hyperplasia (BPH) is the most common proliferative disease of the prostate of men in the United States. More than two-thirds of males over age 50 have histologic evidence of BPH; after age 70, the proportion increases to 80% or more [1]. While only a proportion of men with BPH will suffer symptoms, symptomatic BPH still effects 40% of men over age 60 [2]. Symptoms of BPH include urinary urgency, dysuria, nocturia and frequency, and if left untreated, the disease may lead to recurrent urinary tract infections and acute urinary retention [2]. Pathologically, BPH is characterized by prostatic enlargement due to nodular expansion of the transition zone (TZ) of the prostate. The TZ flanks the urethra as it courses through the prostate and includes the periurethral region of the proximal urethra [3]. Histologically, the nodules of BPH are composed of glandular, smooth muscle and fibrous elements in variable proportions. Within the TZ, multiple discrete or coalescing nodules may be present that vary in size. Individual nodules may be predominantly composed of glandular elements, but more often display stromal overgrowth with some nodules consisting entirely of stroma. The nature and composition of this stromal overgrowth has been of considerable interest in understanding the development and progression of BPH. In small young stromal nodules, the mesenchyme often exhibits an appearance similar to embryonal mesenchyme with a high concentration of acid mucopolysaccharide-containing ground matrix. As nodules become larger, stromal mass increases with increased smooth muscle and extracellular matrix accumulation [4]. Glandular elements may become more prominent developing from either concomitant reciprocal epithelial-stromal growth or from recruitment from surrounding glands with ingrowth from the periphery of the nodules. With continued nodular enlargement, the glands often become attenuated and atrophic.

Stromal overgrowth may be important for symptom progression. Studies from our lab using computer-assisted image analysis on the relative tissue composition of baseline biopsies from men with symptomatic BPH in the Medical Therapy of Prostate Symptoms (MTOPS) trial show that prostate volume and symptom progression in BPH are correlated with a relative percent volume increase in the stromal (smooth muscle and fibrous tissue) compartment of the transition zone [5]. It has been proposed that BPH is primarily a mesenchymal disease process resulting from “embryonic reawakening” of inductive interactions between stroma and epithelium [3]. Others have suggested that the qualitative changes that occur in the stroma resemble those of a wound healing process [6]. Indeed, inflammation is a common finding in BPH tissues. However, the role of inflammation in the development and progression of BPH is less clear. Studies have demonstrated associations between the degree of inflammation in BPH tissues and IPSS symptom scores and prostate volume [7,8]. In 1198 men in the MTOPS trial that had biopsy information collected at baseline, we found that those with inflammation present at baseline had larger prostate volumes than those without (41.1 cc vs. 36.8 cc; p=0.0002) [9]. For all treatment groups including placebo, the risk of acute urinary retention (AUR) due to BPH was greater in men with inflammation compared to those without (2.4 versus 0.6%, p=0.011). In the placebo group, only men with inflammation experienced AUR (5.6 versus 0.0%, p=0.003). Furthermore, there was a trend for increased overall clinical (largely symptomatic) progression in men with inflammation compared to those without (21.0 versus 13.2%, p=0.08). From these data we conclude that inflammation does appear to contribute at least in part to the clinical progression of BPH.
Differential expression of cytokines in BPH tissue also implicates inflammation in the pathogenesis of BPH [10,11]. Toll-like receptor (TLR) dependent signaling pathways lead to the activation of immune responses including the expression and release of various pro-inflammatory cytokines that can also stimulate epithelial and stromal cell growth. TLR-4, -5, -7, and –9 expression is pronounced in BPH tissue [12]. Furthermore, BPH tissues and/or BPH stromal and epithelial cells produce a number of growth factors (ex. FGF-2, FGF-7, IGF-I) and pro-inflammatory cytokines including IL-1, IL-8, IL-15, IL-17, and CXCL10 [10]. As T-cells and macrophages are recruited into prostate tissues, they in turn produce cytokines and chemokines that amplify the inflammatory reaction and stimulate stromal and epithelial cell growth. For example, the pro-inflammatory cytokine IL-17 produced by T-cells can stimulate production of IL-8 and other cytokines by epithelial cells and activated T-cells. IL-17 was found to be negligible in normal prostate tissue but was increased in 79% of BPH specimens [13]. In turn, IL-8 stimulates prostatic stromal and epithelial cell growth [14] and production of fibroblast growth factor-2 (FGF-2), a potent stromal growth factor, by BPH stromal cells [15]. Furthermore, IL-8 and vascular endothelial growth factor (VEGF) produced by macrophages and T-cells may stimulate angiogenesis further supporting BPH growth.

In a theoretical model of the pathogenesis of BPH shown in figure 1 below, there is a complex interaction of the prostatic epithelium, stroma, and inflammatory cells at multiple levels that arises in response to a stimulus, the nature of which is currently unknown. Are the epithelial, stromal and inflammatory cells responding to an exogenous environmental stimulus (ex. infectious, dietary, chemical) or are they responding in an abnormal fashion to an endogenous or physiologic stimulus (ex. hormonal, urinary)? Although the stimulus itself could lead to abnormal growth factor expression, inflammatory cells may also be recruited at one or more “steps” along this pathway serving to disturb normal functional equilibrium in the prostate as an early event, stimulate epithelial and/or stromal growth, or accelerate clinical progression as a relatively late event. As the precise mechanisms of this interaction are unraveled, new treatments for BPH will ultimately emerge.

![Figure 1. Adapted from: Lucia MS, Lambert JR. Curr Urology Rep 9:272-78, 2008.](image_url)
While the current indications for the utilization of Synthetic Mesh to augment prolapse repair remain very controversial, I feel in the following clinical situations the risks of mesh complication outweigh the theoretical advantages of better long term durability with the utilization of the mesh.

1. An elderly patient who definitely has no further desires of any sexual activity. In such a situation destructive type procedures, whether they be a partial colpocleisis with aggressive perineoplasty in a patient with a uterus vs a colpectomy and complete colpocleisis in a post hysterectomy patient can result in a close to 100% anatomic success rate with minimal morbidity and complications. The cost and potential complications of synthetic mesh augmentation in such a setting is, in my opinion, not warranted.

2. The relatively young, sexually active patient with fairly advanced pelvic organ prolapse. I think the risk of significant pain and dyspareunia as well as vaginal erosion in such a patient does warrant consideration of this being a relative contraindication. In such a setting if mesh augmentation is necessary I think this is best done via some sort of abdominal sacral colpopexy.

3. I think there is still a good argument that mesh augmentation should really only be considered in recurrent or selected cases of prolapse. Women presenting with primary prolapse are in my opinion still best treated with a traditional suture repair.
Pelvic organ prolapse in women is a common condition, and with this era of longevity including more active life styles during these “golden years”, the demand for surgical correction will continue to rise. Unfortunately, traditional suture placation or repair of endogenous tissue has carried a high recurrence rate. Failure rates have been cited as high as 20-40% after surgical repair, with over 50% occurring within the first three years. When prolapse does reoccur, 60% of recurrences are at the same site.

In attempts to minimize recurrence and considering many patients with pelvic organ prolapse have defective connective tissue. Reconstructive surgeons have turned to the use of adjuvant materials for vaginal support, including the use of synthetic, allogenic, xenogenic or autologous materials. Historically these materials have been delivered through the Trans abdominal approach and more recently via Robotic surgery. All these methods have their own set of challenges for the operating surgeon.

Over the past 6 years Trans vaginal mesh delivery systems have evolved. Recently, meshes have been developed that meet the unique requirements for use in the vagina. Innovative tension free approaches to the placement of these meshes will facilitate successful surgical outcomes while maintaining a minimally invasive Trans vaginal approach.

There are unique considerations that must be carefully reviewed prior to undergoing a transvaginal mesh procedure. As with all evolving newer technologies and surgical procedures, one must have even a “higher” level of commitment to reviewing with the patient where in the development of evidence-based medicine, (as well as your own surgical expertise), the surgical technology currently exists.

The most technically challenging part of the procedure is in performing the proper dissection for optimal placement of the mesh. The transvaginal approach must enter the same pelvic spaces, placing the mesh “deep” to all of the histological layers, comprising the vaginal wall, in order to achieve low exposure rates as those of traditional trans abdominal mesh placement methods. The surgeon must be skilled at entering the true vesicovaginal space anteriorly, as well as the rectovaginal space posteriorly and placing the mesh into these spaces as opposed to within the vaginal wall.

Following proper dissection the next step is to optimize the use of the delivery system. Most delivery systems use needles and trocars anchoring the trans vaginal mesh to the ischial spine. This is achieved by careful and precise placement of the trocars, thereby achieving anatomical restoration.

We favor a trocar based system which allows delivery of the mesh following the closure of the vaginal incision. After the incision has been closed, one of the most critical steps of the procedure follows, and that is mesh deployment. Setting of the mesh is accomplished with the vagina completely closed then displaced inwardly, replicating or reproducing inward vaginal displacement such that occurs with coital function. The trocar systems offer an advantage of more “dynamic” adjustment than non-trocar systems, thereby providing functional restoration.
Our utilization of trocar based transvaginal mesh systems as evolved over the past 5 years. We began with selective cases on older patients, who were not sexually active and had undergone prior surgery which had failed. Today, with our expertise in the proper dissection, confidence in optimizing needle placement and mesh deployment, and with the latest development in lower weight hybrid mesh construction, it has evolved as our procedure of choice in most all patients. The learning curve was not as steep or long when compared to our laparoscopic reconstructive surgery skill development during the 1990s, and our patient outcomes with transvaginal mesh have also become more favorable.

Although there has been recent interest in non-trocar delivery systems, to date these systems do not allow “setting” of the mesh after closure of the vagina with an endpoint of vaginal displacement simulating that which occurs during intercourse (especially deep penetration).

As such we continue to favor trocar based systems which allow for such “adjustability” after initial placement and vaginal wall closure. We do however remain receptive to material science and instrumentation innovation in the future, hopefully allowing even better outcomes, improved patient safety, ease of widespread use and cost efficiency.
Currently there is much debate about the role, if any, of transvaginally placed mesh for the treatment of pelvic organ prolapse. The underlying assumption driving the debate is the fact that the recurrence rates for traditional transvaginal repairs are higher than most would like and that the addition of a permanent mesh might prevent the majority of recurrences.

Most published studies that have evaluated the outcomes of mesh repairs report only on groups that have had such surgery performed – without a comparable group without mesh. However, a few recent studies have compared patients with and without the use of mesh. The majority of these studies report better anatomic outcomes when mesh is used. However, at relatively short/intermediate follow up (1-3 years) most studies do not find a significant difference between functional, symptomatic outcomes. Despite that some of the studies do report a separation in the “curves” for functional outcomes – however at this time those differences are not statistically significant. For many the use of mesh is predicated on the assumption that as time goes on and follow-up increases those “curves” will continue to diverge such that at longer follow-up the functional outcomes will be significantly different.

It is reassuring to note that most of the studies report relatively low rates of dyspareunia and many of those that compared mesh to no mesh actually had lower rates of dyspareunia in the mesh group. Mesh extrusions appear to be less frequent as surgeon experience grows and there are a number of technical factors that may allow for relatively low exposure rates. Nevertheless, mesh exposure will continue to be a potential risk and concern for physicians and patients alike.

Further follow-up of patients who have had mesh placed and more randomized trials will be necessary to define the exact role of transvaginal mesh for the treatment of pelvic organ prolapse.
This talk will briefly cover the presentation and evaluation of patients with suspected mesh complications as well as management and important patient counseling issues.

I. INTRODUCTION
The widespread and increasing use of synthetic meshes for pelvic floor reconstructive surgery has begotten both advantages and complications with which the pelvic surgeon must contend. It is imperative for surgeons to be aware of the potential risks of mesh and management strategies of complications associated with mesh in order to provide optimal care for our patients.

II. PRESENTATION
A. Pain
B. Vaginal discharge
C. Urinary tract infection
D. Urinary incontinence

III. EVALUATION
A. History
B. Pelvic examination
C. Cystoscopy
D. Exam under anesthesia
E. Radiographic imaging

IV. MANAGEMENT
A. Vaginal extrusion
   1. Local estrogen
   2. Observation
   3. Surgical excision
B. Urinary tract erosion
   1. Surgical excision
      a. Approach
   2. Concomitant surgery?
Debate: Robotics for POP Repair, State-of-the-Art or Gimmick?

State-of-the-Art

Jeffrey L. Cornella, MD


Vaginal prolapse remains an area of considerable controversy with respect to the optimal surgical treatment. Both abdominal and vaginal approaches have been utilized for many years. Choice of approach, success and failure rates and complications are related to many factors including patient selection, technical factors and surgical expertise. Robotic sacrocolpopexy (rASC) has recently been explored by several innovative surgeons and limited early data is now available with respect to efficacy, safety and complications. Robotic surgery offers several potential advantages to traditional open abdominal surgical approaches for a variety of pelvic surgical procedures including shorter hospitalization and convalescence, and reduced postoperative pain. However, there is no Level I evidence to support rASC as superior to either traditional open abdominal sacrocolpopexy (oASC) or transvaginal repair. Potential disadvantages using robotics in this setting include the inability to access and repair SUI or perineal defects through the same incision, lengthy time for setup and surgery, unknown long-term durability, high cost of technology, and an extensive learning curve. Many factors must be taken into consideration before labeling a given procedure as “state of the art”. The data currently available is not sufficient for such a designation for rASC.
At present, effective treatment options for women with stress urinary incontinence (SUI) is limited. In North America there are two completed and one ongoing study utilizing muscle derived cells (MDC) for the treatment of SUI in women. The first North American clinical trial utilizing MDCs was performed by Carr and colleagues at the University of Toronto. Eight patients received treatment with pure MDCs that were obtained from biopsies of the lateral thigh. Two injections into the middle urethra and external urethral sphincter were delivered either trans- or periurethrally. Five of the eight (63%) of the women enrolled in the study demonstrated significant improvement at 16.5 months post MDC injection. However the improvement in stress incontinence did not occur until 3 to 8 months post-injections. These findings suggest that muscle regeneration and restoration may be the mechanism of action by which MDCs work in comparison to standard bulking agents. Two out of eight patients subsequently required midurethral tape placement. As reported, neither the degree of placement difficulty, nor the outcomes of this procedure were negatively impacted by MDCs.

The second multicenter Canadian trial has been completed and Dr. Hirshorn will be presenting the final result at this year’s SUFU: Autologous Muscle-Derived Cells as Therapy for Stress Urinary Incontinence: a Randomized, Blinded Trial. Sender Herschorn, Lesley Carr, Colin Birch, Magnus Murphy, Magali Robert, Ronald Jankowski, Ryan Pruchnic, David Wagner, Michael Chancellor.

In the Fall of 2008 the first cellular therapy in the United States was begun at William Beaumont Hospital (Royal Oak, MI; PI Kenneth Peters). After study participant screening and enrollment, the biopsy procedure is performed. The muscle cells are then sent to Cook MyoSite, Inc. (Pittsburgh, PA), where researchers isolate and grow the stem cells. University of Toronto and Vanderbilt University are the other two sites participating in this multicenter North American trial. In conclusion, our hope is that transplantation of autologous adult muscle cells, with their promise for regeneration of sphincter and the restoration of continence, will become the preferred procedure for treatment of SUI.
Panel Discussion: Nocturia
Defining the Problem
Treatment Options: Today and Tomorrow
Jeffrey P. Weiss, MD

The International Continence Society (ICS) defines nocturia as waking during the night at least once to urinate, irrespective of bother. The ICS additionally suggests that a nocturic void is preceded and followed by sleep. The etiology of nocturia falls into five broad categories: a) nocturnal polyuria (NP); b) low nocturnal bladder capacity (NBC) despite normal global bladder capacity; c) diminished global bladder capacity; d) mixed (a combination of NP and low bladder capacity); e) global polyuria. These categories are derived from the 24 hour voiding diary in which is tabulated each voided volume and its corresponding time. A large Finnish population-based mailing study identified the prevalence of nocturia (defined as arising at least twice to void) to be 12.5% (95% CI: 10.7-14.3) among men and 12.9% (95% CI: 11.0-14.9) among women.

Evaluation of nocturia begins with a focused history and physical exam considering aspects such as sleep, urinary complaints, fluid intake, cardiac problems, medication, prior lower urologic tract surgery and other comorbidities which might account for excessive nocturnal urine output, detrusor overactivity or sensory urgency. Of paramount importance is a frequency/volume chart (FVC) also known as a voiding diary. The voiding diary includes the volume and time of each voided urine, the time of retiring for sleep, and the time of rising during a 24-72 hour period. The patient is instructed to perform the diary during a typical day and inform the doctor whether the night measured was representative of a normal sleep cycle.

On the basis of the voiding diary, the patient is categorized as having NP, low nocturnal or global bladder capacity, a mixed disorder, or polyuria. Nocturnal urine volume (NUV) is the volume of urine voided throughout the night. It includes the first morning void since this void was excreted by the kidneys during the hours of sleep. However, the first morning void is considered a normal diurnal voiding episode and should not be included with the tally of actual nightly voids. Maximum voided volume (MVV) is defined as the largest volume of urine voided throughout the 24 hour period. Nocturia index (Ni) is calculated by dividing NUV by MVV. When Ni is greater than 1 the nocturnal urine volume exceeds the bladder maximal storage capacity and nocturia occurs. An increased Ni may be due to either NP, low NBC, or both. Of course patients with low nocturnal bladder capacity may have low global bladder capacity as well. Thus, a patient with low voided volumes both day and night is likely to produce more urine at night than the bladder can possibly hold regardless of the time; nocturia is inevitable in these patients. Nocturnal polyuria (NP) is an increased production of urine at night which is offset by lowered daytime urine production creating a normal 24 hour urine volume. Nocturnal polyuria index (NPI) is defined as NUV divided by the 24 hour urine volume. Normally, urine is produced in a circadian pattern which is age-dependent: In young people (<25 years), mean NPI=14% as compared with those over the age of 65 whose mean NPI=34%. Accordingly, the accepted ICS definition of NP is when NUV is more than 33% of the total 24 hour urine production, at any age. Nocturnal polyuria may be secondary to a variety of factors including congestive heart failure, diabetes mellitus, obstructive sleep apnea, cerebrovascular accident, peripheral edema, or late evening diuretic or fluid intake. Nocturia due to diminished nocturnal bladder capacity is of two types – a global decrease in bladder capacity as expressed by low maximum voided volume, and decreased nocturnal bladder capacity. In both conditions, nocturnal urinary volume exceeds bladder capacity and the patient is awakened by the need to void because the bladder does not hold enough. Urologic causes of both low nocturnal and global bladder capacity include infravesical obstruction, idiopathic nocturnal detrusor overactivity, neurogenic bladder, cystitis, bladder calculi, ureteral calculi, and neoplasms of the bladder, prostate, or urethra. A urologic workup for etiology of diminished NBC includes endoscopic and urodynamic techniques for diagnosing these disorders. Other causes of decreased nocturnal bladder capacity are learned voiding dysfunction, anxiety disorders, and medications, emphasizing the importance of a detailed history in the evaluation of nocturia. Many patients with nocturia are found to have a combination of NP and low NBC. A recent evaluation of 850 patients with overactive bladder showed that diminished NBC plays a greater role in the pathogenesis of nocturia in younger patients, whereas in
older patients NP assumes relatively greater importance. In a study of 194 nocturic patients, nocturia was due to NP in 7%, low NBC in 57%, global polyuria in 23%, and a mixture of NP and low NBC in 36%. Polyuria is defined as a 24-hour urine output greater than 40ml/kg and causes both daytime urinary frequency and nocturia owing to a general increase in urine output, overpowering even normal bladder capacity. This is unlike nocturnal polyuria where the 24-hour urine production remains normal, but there is an increased production of urine throughout the night. Inappropriate excretion of water in polyuria leads to polydipsia to prevent circulatory collapse. The causes of global polyuria are: diabetes mellitus, diabetes insipidus (DI), and primary polydipsia.

Therapeutic options for nocturia are optimally selected on a cause-specific basis. Thus, when nocturnal polyuria, for example, has a specific underlying cause such as obstructive sleep apnea, the latter may be treated with continuous positive airway pressure at bedtime. Antidiuretics have proven useful in patients with nocturia owing to nocturnal polyuria when the latter is idiopathic and likely related to abnormal circadian secretion of serum antidiuretic hormone. Peripheral edema may be treated using timed diuretics, stockings and correction of underlying cardiac issues. Diminished bladder capacity may be related to infravesical obstruction, overactive bladder, medications such as beta-blockers, or sensory urgency. Each of these conditions has remedies in the form of multiple conventional urological treatment algorithms.

In conclusion, nocturia is a common disorder in both men and women which increases with age. Nocturia can be caused by NP, low nocturnal or global bladder capacity, mixed etiology, or global polyuria. The etiology of nocturia is multifactorial and often unrelated to an underlying urologic condition. A voiding diary is the principal tool for an accurate diagnosis allowing for cause-specific treatment of nocturia. Various studies have shown such targeted therapies to be successful at improving nocturia, although further studies are needed to further elucidate its most efficacious treatments.

References

Panel Discussion: Nocturia
Effect on QoL
Mary Pat FitzGerald, MD

Nocturia not only affects the quality of our lives, it also affects the length of our lives. As such, it may be the most important lower urinary tract symptom of all.

Nocturia and mortality
There is an accumulating body of evidence linking moderate nocturia with increased mortality. The first paper to establish this link was Asplund\textsuperscript{1} who conducted a study of nocturia and mortality in a sample of 6,143 members of the Swedish pensioner’s association (mean age of 73). In a follow-up period of 54 months, men reporting three or more nocturnal voiding episodes had a higher mortality rate, 1.9 (1.4-2.6) times higher than the whole group of men, while for women the difference was 1.3 (0.9, 2.0) times higher. In that study, men who voided 3+ times nightly had a death rate of 3.4% per 6 months, significantly higher than the death rate of 1.9% per 6 months in those who voided less often at night (p<0.001).

\textit{In 5 years, about 30% of men with 3+ nocturia had died – a mortality risk greater than that of many cancers.}

Bursztyn\textsuperscript{2} reported only 44\% twelve-year survival when nocturia (2+) and heart disease co-existed. Others have published abstracts supporting this link between nocturia and mortality in other populations (e.g. Nakagawa, AUA 2009, Japan; FitzGerald, ICS 2009, Puerto Rico).

Nocturia and sleep disturbance
Symptoms of urinary frequency and incontinence are troublesome whenever they occur, but especially so when they occur at night. In their lifetime, most adults endure interrupted sleep for only short periods – such as during the first months with a newborn infant – and yet will always remember the significant impact that interrupted sleep had on the quality of their lives. For those who do not suffer from severe nocturnal frequency, it is difficult to imagine nights that are interrupted 5, 6, 7 or more times every night by the urge to void.

In fact nocturia is the leading cause of sleep disturbance in older adults: on average, nocturia patients sleep for an initial period of only 2-3 hours before their first void, so that nocturia interrupts our critically important slow-wave sleep. Not surprisingly, nocturia is then associated with reports of poor sleep quality, daytime sleepiness, napping and sick leave.\textsuperscript{3}

Nocturia and falls, hip fractures
As might be expected among elderly people who are rushing to the bathroom in the dark, nocturia has been associated with a significantly increased risk of falls and hip fractures,\textsuperscript{4} long known to be associated with severe morbidity and mortality in the elderly.

\textbf{In summary, nocturia merits our attention as a life-altering and possibly life-threatening symptom.}

References:
Health care costs
1. Medical costs and hospitalization days increase with nocturia even after adjustment for age, sex and various diseases/risk factors. (Nakagawa H et al, ICS 2009)
2. Increased caregiver stress

Morbidity
1. Falls: In a racially diverse, community-based sample of older adults who had not fallen in the past year, nocturia 3 times a night was associated in multivariable analysis with a 25% increased risk of an incident fall within 3 years. (Vaughn C, http://pid.emory.edu/ark:/25593/199kx)
3. Impaired nocturnal blood pressure control in patients with chronic kidney disease (Agarwal R. et al, Hypertension 2009)

Missed diagnoses. Perhaps the biggest impact of nocturia in older persons comes from the failure of clinicians to fully appreciate the broad range of underlying conditions that cause nighttime voiding. The assumption that nocturia in older person is due to BPH (in men) and/or OAB (men and women) can lead clinicians to miss significant underlying comorbid conditions.
1. Sleep apnea. Multiple authors have demonstrated the association between nocturia and obstructive sleep apnea, and there is evidence that nasal CPAP reduces OSA and nocturia and improves quality of life of elderly patients. (Guilleminault C et al, J Psychosomatic Res 2004)
2. Depression. Men with depressive symptoms were at 2.8 times higher risk (95% CI 1.5-5.2) for moderate or severe nocturia than men without depressive symptoms. (Hakkinen JT, J Urol 2008)
3. Cardiovascular disease: hypertension, cardiovascular, and cerebrovascular disease all independent risk factors for nocturia (Gourova LW et al, BJUI 2008)
4. Moderate alcohol consumption
5. Restless leg syndrome (Tikkinen K, Am J Epidemiol 2009)
6. Primary sleep disturbance: pain, Alzheimer, Parkinsons
7. Poor glycemic control in diabetes

Inappropriate treatment
Many conventional treatments for nocturia have scant evidence for efficacy and have associated risks.
1. Polypharmacy, increased ADEs, and costs from inappropriate meds
2. Antimuscarinics (oxybutynin-IR, solifenacin, tolterodine) decrease nocturia related to OAB or urgency UI, but the net benefit over placebo is small (0–0.3 episodes), and a secondary analysis of a RCT found behavioral therapy decreased nocturia more.
3. 5-Alpha reductase inhibitors and melatonin have no clinically significant effects on nocturia episodes.
4. DDAVP has a prolonged half-life in older persons and can cause significant hyponatremia, especially in the frail.
5. COX-2 inhibitors cause GI upset and bleeding and increase cardiovascular risk

Summary: Although the impact of nocturia is usually characterized as bother and impaired quality of life, nocturia also significant impacts older persons through increased health costs, morbidity, missed diagnosis of significant medical conditions, and inappropriate treatment.
Part 1 – Management of prostatic urethral-bladder neck stricture/Vesicourethral (VU) anastomotic stricture after prostate cancer treatment

4:30 – 4:40  Endoscopic treatment of posterior urethral stricture and obstruction  
Sean P. Elliott, M.D.  
Minneapolis, MN

4:40 – 4:50  Urolume Stent and Open Reconstruction  
Christopher M. Gonzalez, M.D.  
Chicago, IL

Part 2 – Management of SUI after prostate cancer treatment

4:50 – 5:00  Male Sling and AUS  
Karl J. Kreder, M.D.  
Iowa City, IO

Part 3 - Complex Cases: Panel Discussion  
Brian J. Flynn, MD  
Denver, CO

Case 1: S/P Robotic RP: mild UI, moderate (4 Fr) stricture  
Case 2: S/P Brachytherapy and XRT: mild UI, 2 Fr bulbomembranous stricture  
Case 3: S/P Robotic RP: Complete obliteration of the VU anastomosis  
Case 4: S/P Salvage cyrotherapy: mild UI, prostatic urethral necrosis/stricture
In this presentation, visualization of the dynamic response of the pelvic floor muscles (PFM) to maintain urinary continence is presented using ultrasound imaging. Because the entire duration of the guarding reflex response is only 1-2 seconds, we focused on the analysis of events contributing to urinary continence during such short time window. Given that protection from leakage is contributed to by the activation of fast reflex contractions, we developed an approach to study such fast reflex events using primarily asymptomatic women and comparing the results with those presenting with urinary incontinence. Using this method of image analysis, we aim to generate a set of parameters that can be used to functionally define the mechanism of continence by analyzing the sequence of anatomical changes taking place during the guarding reflex.

These aims have been facilitated using a combination of imaging and computational technology, which enabled the acquisition of unprecedented amounts of dynamic information and the generation of new quantitative parameters. A clear advantage of such an imaging approach is the provision of accurate and unambiguous representation regarding the influence of forces acting on the urethra, vagina, bladder, and other abdominal structures that is difficult to measure using sensors. Thus based on the visualization of the displacement of these structures, as induced by their reflex response, we can begin to characterize the relevant parameters associated with continence and better understand the mechanisms involved.

Clinically, it is well known that damage to the PFM by events such as childbirth and trauma the anatomical support mechanism can be compromised and the application of closure forces to the appropriate structures may be ineffective and likely to result in urinary incontinence. What is more important is that the reflex actions recruited to respond to urine loss events occur over short periods of time, rendering the study of the mechanisms involved during these critical moments difficult. With these concepts in mind, we will attempt to demonstrate that application of trans-perineal ultrasound imaging provides a challenging opportunity for the diagnosis and more importantly the cause of incontinence.

While historically imaging provides anatomical evidence of the importance of urethral support, current measurement strategies are rudimentary; capturing a limited number of observations discounting important dynamic factors of the PFM. To benefit from the large amount of information available from ultrasound imaging, the application of segmentation and complex motion analysis of the bladder, urethra and the PFM, was used to provide valuable dynamic data. Furthermore as a translational research priority, it is constructive to apply visualization technologies that would extract and parameterize the dynamics of PFM function to the fullest extent possible. Functional parameters identified using this approach depend on the particular testing protocol used and position of the subject. A number of parameters generated through image analysis from a single cough is presented by the Figure and details and definitions are given by [1, 2]. As shown, by segmenting frame by frame the outline of the symphysis pubis (SP), anorectal angle (ANA), and urethrovesical junction (UVJ), the history of their relative displacement with respect to the SP was obtained. From the values obtained the velocity and acceleration of the ANA was calculated (green for asymptomatic and red for SUI). Additionally the trajectory that the urethra travels during a cough is also presented.
Parameters generated from 2D ultrasound imaging and their characteristic patterns.

The potential number of parameters that can be obtained using other type of stimuli such as Valsalva, PFM contraction and Knack was similarly evaluated and will be presented.

Analysis derived from segmented video clips show, in time resolved increments, that reflex activation of the PFM in continence displaces the urethra towards the pubis while in SUI there was an absence of ventral displacement. In the SUI group displacement was over a significantly greater distance, with also a significantly different trajectory rebounding with an increased velocity. Max acceleration forces were applied for a longer time before the restoring forces were sufficient to re-establish equilibrium suggesting that in SUI the urethra was exposed to uncontrolled transverse acceleration, and was displaced over twice as far at almost twice the velocity of the continent urethra. Change in position from supine to standing resulted in a significant decent of the urethra in a dorsal caudal direction and was only significant in incontinence. During a cough, SUI subjects demonstrate higher urethral acceleration, while supine compared to standing while the effect was less in the continent group.

Clearly, at the present level of imaging technology ultrasound can resolve the temporal sequence of events associated with the guarding reflex while MRI remains a much slower but spatially more accurate imaging modality.

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5. Interesting Urodynamics Case Presentations
Craig V. Comiter, MD; Stephen R. Kraus, MD; Sandip P. Vasavada, MD

- **Urodynamics**
  - The investigation of the function of the lower urinary tract - the bladder and urethra - using physical measurements such as urine pressure and flow rate as well as clinical assessment

- **Aim of Urodynamic Evaluation**
  - To reproduce the patient’s symptomatic complaints
  - To provide a pathophysiological explanation for the patient’s problems

- **Storage**
  - 4 essential measurements:
    1. Intravesical pressure ($P_{ves}$)
    2. Rectal pressure (equivalent abdominal) ($P_{abd}$)
    3. Detrusor pressure ($P_{det} = P_{ves} – P_{abd}$)
    4. Urine flow rate to detect leaks
  - Other optional measurements include:
    1. Bladder volume
    2. Electromyography
    3. Urethral pressure

- **Voiding**
  - Premicturition pressure - the pressure recorded just before the initial isovolumetric contraction
  - Opening time - time between initial rise in detrusor pressure to the onset of flow
  - Opening pressure - pressure recorded at the onset of measured flow
  - Maximum pressure - max value of measured pressure
  - Pressure at max flow - pressure recorded at Qmax
  - Closing pressure – pressure recorded at cessation of measured flow

- **Four simple questions:**
  1. Is the bladder relaxed during filling?
  2. Is the urethra contracted during filling?
  3. Does the bladder contract adequately during voiding?
  4. Does the urethra open properly during voiding?

During this session we will present interesting urodynamic cases – in men with LUTS, in women with LUTS, and in patients with pelvic pain.

During this session, we will focus not only on the basic urodynamic findings, but more complex findings, including the role of video, and the role of urodynamics in the evaluation of pelvic pain, failed incontinence surgery, failed TURP, pelvic prolapse, and men with LUTS.
Neurogenic lower urinary tract dysfunction (NLUTD) may be caused by various diseases and events affecting the nervous systems controlling the LUT including brain tumors, normal pressure hydrocephalus, basal ganglia pathology (Parkinson’s disease, Huntington’s disease, Shy-Drager syndrome, etc), cerebral palsy, cerebrovascular pathology, demyelinating diseases such as multiple sclerosis, peripheral nerve lesions, and spinal cord diseases to name a few. The resulting lower urinary tract dysfunction (LUTD) depends grossly on the location and the extent of the neurological lesion. There are no figures on the overall prevalence of NLUTD in the general population, but data are available on the prevalence of the underlying conditions and the relative risk of those for the development of NLUTD.

Classification of NLUTD helps to facilitate the understanding and management of NLUTD and to provide standardized terminology of the disease processes. The normal LUT function depends on neural integration at, and between, the peripheral, spinal cord, and central nervous systems. The gross type of NLUTD is dependent on the location and the extent of the lesion: suprapontine or pontine, suprasacral spinal cord, or subsacral and peripheral.

The evaluation and management of NLUTD is often not a life-threatening issue; it is a quality-of-life issue. It affects the patient, the family and the environment. Patients with NLUTD often benefit from a holistic, multi-specialty, all-inclusive service often found at outpatient rehabilitation facility. If a dedicated NLUTD center does not exist locally, the urologist can establish a dedicated NLUTD center from his office. Recommendations for the setup and promotion of an office-based dedicated NLUTD center often require attention to the following items:

**Provider Staff:**
- Urologist should have a special interest, commitment, and expertise in the evaluation and management of NLUTD.
- Mid-Level providers (Perform initial assessment/Physical examination/Medical review/R/o transient causes of incontinence/Initiate trial of preliminary behavioral techniques/voiding diary/dietary modification/help to determine who pt should see/another physician n) for further evaluation, if necessary)
- Triage nurse (Responsible for case management/Coordination of pt flow and education/Communicate w/case managers from other hospitals/Insurance companies/Employers/Pt calls

**Referral Network:**
- Medical specialists (PM&R, Neurology, Gastroenterology, Internal medicine/Family practice)
- Surgical specialists (Neurosurgery, Orthopedics, Plastic surgery, Urogynecology/Colorectal surgery)
- Supportive provider services (Physical therapist/Nutritionist/Laboratory and X-ray technicians/Clinical pharmacologist/Social worker/Psychologist )

**Physical Setting and Equipment**
- Must be handicap accessible
- Hydraulic chairs/tables/hydraulic lift for handicapped patients
- Procedure rooms (endoscopy, Cystoscopy) accessible for stretcher, wheelchair, etc.
- Urodynamics lab w/fluoroscopic capabilities
- Electromyography/sacral latency equipment
- Dynamap auto BP recording system, Pulse Oximeter, “Crash cart”
- Beds, wheelchairs, stretchers
- Pt education room w/video equipment

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Enterostomal device room
Professional and patient libraries
Interactive video for patient education
Equipped mobile unit

Comprehensive NLUTD Services Offered

- Diagnostic services (Urodynamics, ultrasonography, urethroscopy, biofeedback/conservative treatments)
- Clinical Services/Consultation
  - Management of patients with NLUT symptoms including incontinence, UTI, erectile dysfunction, infertility, neurogenic bladder, neurogenic bowel, renal and bladder calculi and neurogenic voiding dysfunction
  - Surgical offerings, comprehensive approaches
  - Urodynamic studies
  - Patient education
- Case Management
  - Patient care coordinator to work w/referring physician, other sub-specialties
  - Education and community resources for patients/families
- Education/Development
- Research – Clinical trials, data collection, outcomes

Marketing
In order to attract and retain patients, an effective marketing plan is essential.

- Establish an identity w/name, logo design.
- Develop advertising material (brochures, etc.)
- Establish and maintain public relations links with affiliating hospital
- Place articles about the clinic newspapers and magazines
- Establish referral lines with referral network physicians and specialists
- Develop and produce educational forums for the lay public and health professional
- Provide services at assisted living centers, rehabilitation centers, nursing homes

Public educational program
- Provide continuing education to physicians, nurses, social workers, physical therapists and other interested health professionals.
- Provide educational materials to industry (pharmaceutical companies/manufacturers of durable medical equipment)
- Develop seminars and classes for Religious groups, Men’s and women’s social/service organizations
- Direct educational materials to organizations (Multiple Sclerosis Society, Cerebral Palsy Association, PVA, Home Health Agency, AARP)
- Participate in radio and TV talk shows to broaden public awareness of the problems associated with NLUTD.
- Engage in liaison with people who live in (Retirement communities/Assisted-living centers/Nursing homes)
- Provide consultation services (Rehab centers/Spina bifida clinics/Oncology centers (prostatectomy patients)
- Provide services to people with NLUTD via home health organizations.
Management of the Adult Spina Bifida Patient
David A. Ginsberg, MD

Introduction/Definitions
- Spina bifida (SB) results in a malformation of the vertebral arches and often results in a concomitant malformation of the neural tube
  - SB occulta - only involves the vertebral arches
  - SB cystica (aperta) - involves the vertebral arches and the spinal cord
  - >90% of pts with SB cystica subclassified as myelomeningocele (MMC) - evagination of nerve roots or spinal cord beyond the vertebral bodies
    - Primary MMC locations - 26% lumbar, 20% sacral and 47% lumbosacral
- SB affects approximately 1/1000 live births
- Is true incidence greater → birth certificate underreporting and voluntary abortion?
- > 85% of children with SB should expect to survive into adulthood
- Therefore, urologic management of spina bifida is NOT confined to the field of pediatric urology
- Adult urologic care of utmost importance as it is well known that life expectancy for these pts is shortened with renal failure being a primary cause
- Adult SB pt often has several hurdles standing in way of appropriate medical care

Specific Urinary Tract Considerations Affecting the Adult SB Patient
- Adult patients with SB may present with a variety of urological symptoms
- Several adult “types” of SB patients that might be seen. Typical examples include
  - Pt who underwent LUT reconstruction as a child, now needs follow-up
  - Pt w/o prior surgery being transitioned from the peds SB clinic
  - Pt who has not had any significant urologic evaluation for years
- Typical presentation and findings of these patients will therefore differ
- The most common urologic presentation for adults with SB is urinary incontinence
  - Common urodynamic reasons include an areflexic bladder and an open bladder neck with a fixed external sphincter
  - SUI and detrusor striated sphincter dysynergia may also be seen
- Other possible presenting urinary signs/symptoms include recurrent UTI, incomplete bladder emptying, renal insufficiency, VUR and urinary tract stones
-Pts with prior reconstruction may present with a malfunctioning urinary stoma
- As SB pts mature from pediatric to adult urologist impotence and infertility may become an issue
- As transition from adolescence to adulthood previously incontinent pts may be able to obtain continence at the time of puberty
  - Regular urodynamics are needed as increased outlet resistance could lead to increased detrusor storage pressure with the potential for future renal damage

Evaluation of the patient with SB
- No specific guidelines mandated for surveillance of these patients
- Most recommendations inferred from literature looking at adults with NGB (primarily pts with SCI) and data from pediatric patients with SB
- Upper tract eval: CTU, renal scan, US, KUB, IVU, labs
- Lower tract eval: UDS primary method → evaluate bladder and outlet
  - Can be challenging in SB population
  - Pts at risk for upper tract damage with Pdet > 40 cm H2O
  - Need to follow over lifetime, never consider these bladder as stable
- Typical UDS findings include areflexic bladder, no internal sphincter function and a variable degree of external sphincter function
Treatment of Specific Conditions Affecting the Lower Urinary Tract

Increasing urethral resistance

- Most patients with incontinence secondary to sphincteric incontinence will require some type of surgical intervention
  - Male pts – injectable, male sling, AUS, bladder neck closure
  - Female pts – injectable, pubovaginal sling, bladder neck closure
- Potential for increased Pdet and upper tract deterioration after outlet enhancing procedure → pts continue to benefit from regular radiographic and uds follow-up

Decreasing storage pressures

- Pharmacologic
  - Anticholinergics
  - Botulinum toxin (off-label in US) for anticholinergic failures
- Surgical options if medical therapy is inadequate
  - Bladder augmentation
  - Consider continent urinary stoma in pts requiring BN closure or pts who prefer to catheterize per stoma (female pts?)
  - Conduit or ileovesicostomy for pts unwilling, unable or not reliable enough to perform regular catheterization
- Complications related to prior lower urinary tract reconstruction
  - Stones – increased risk after reconstruction; greater risk if stoma
  - Cancer – unclear association
  - Perforation of an augmented bladder - rare but potentially fatal
  - Management of pregnancy - Caesarean vs. vaginal delivery
  - Vitamin B12 deficiency – ↑ risk with ↑ time post-op; avoid with annual B12 screening or empiric admin if prior reconstruction using distal ileum

Impotence and Fertility

- Prevalence of ED in adult men with SB ~75%
- Infertility thought to be a common problem for men with SB
- Fertility thought to be normal in women with SB
- Prospective parents need to know offspring are at risk of a neural tube defect

Latex Allergy

- High rate (~60%?) of latex allergy in patients with SB
- Signs/symptoms of a intra-op latex allergy reaction → precipitous drop in BP related to reaction of latex gloves in contact with the intra-abdominal contents
- Should operate on SB patients with non-latex surgical gloves, latex-free catheters and latex-free surgical drains, even without a prior history of latex allergy
- If a reaction does occur → instant interruption of contact with possible antigens (change gloves, drains, contaminated instruments), copious irrigation, expeditious completion/termination of surgery, volume expansion, and appropriate resuscitation and management of anaphylaxis by the anesthesia team
Overactive bladder (OAB) is defined by the International Continence Society as a syndrome characterized by urgency with or without urge incontinence, usually with frequency and nocturia. About 33.3 million adults suffer from OAB in United States. The overall prevalence of OAB was 16.9% in women and 16.2% in men. The impact of OAB on quality of life is psychological, social, and profound. Currently it remains as a therapeutic challenge for clinicians to successfully treat OAB. This lecture presents our studies in cats of somatic modulation of bladder activity by stimulating pudendal nerve, perigenital skin, tibial nerve, or the foot. The goal of these investigations is to develop new strategies to meet the therapeutic challenge of OAB. Our studies indicate that electrical stimulation of the pudendal nerve or the perigenital skin can suppress bladder overactivity depending on stimulation frequency. 3-10 Hz is inhibitory, but 20-30 Hz is excitatory. However, electrical stimulation of the tibial nerve or the foot can suppress bladder overactivity in a wider range of stimulation frequency (5-20 Hz). Furthermore, tibial nerve stimulation has a post-stimulus inhibitory effect lasting more than an hour, while this long-lasting effect is not observed in pudendal or foot stimulation. The purpose of our studies is to create several new treatment strategies for OAB with high efficacy, less adverse effect, less invasiveness, easy management, and acceptable for more patients, especially for the elderly and children patients who can not tolerate the adverse effects of pharmacotherapy or invasive surgery of sacral neuromodulation. Our studies could potentially benefit millions of Americans suffering from OAB.
Pelvic pain is a very complex syndrome with many different etiologies and clinical manifestations. Usually what is classified as “pelvic pain” is a combination of pain and/or painful muscle spasms in one or more of four different locations: a-Pain felt in the pelvic organs b-Pain felt in the pelvic floor c-Pain felt in the sacrum d-Pain felt in the lower abdomen/pubic area.

Often severe chronic pelvic pain is not curable and is refractory to most conventional treatment modalities. Implantable neurostimulation techniques can be helpful in further reducing the pain in such situations. While in neurostimulation for urge incontinence the goal is to stimulate a complex spinal reflex which involves both the sensory and motor nerve roots, in neurostimulation for chronic pain the goal is to stimulate exclusively the sensory) afferent structures.

Target for neurostimulation include: the spinal cord, the sacral nerve roots in the sacral canal, the lower thoracic nerve roots in the spinal canal and the small subcutaneous nerve fibers. Foraminal stimulation of the sacral nerve roots is less effective, since in most instances, the pain distribution goes beyond the innervation of one or two individual nerve roots.

Stimulation of the dorsal columns of the spinal cord is usually ineffective for chronic pelvic pain. Stimulation of the S3-4-5 nerve roots bilaterally is usually necessary for widespread pain affecting the pelvic organs. The electrodes are usually placed in the dorsal epidural space at the L5-S1 level. Electrode placement above the L5 spine level will most likely not activate the small sacral nerve roots. Supra-pubic pain usually requires stimulation of the T11-12 nerve roots bilaterally. The electrodes must be placed on the nerve roots, intraspinally, at the T11-T12 spine levels.

This type of stimulation is usually best accomplished with multi-contact paddle leads placed surgically through a laminotomy approach. Percutaneous leads placed either in a retrograde fashion or through the sacral hiatus are often utilized for a temporary test trial.

Besides reduction of the pain, neuromodulation of the bladder function can be achieved, just as it could via tranforaminal S3 stimulation.
1. New Insights into MOA of Botulinum Toxin
   a. Neuritogenic effects of Botulinum toxin
   b. Capsaicin protective effects against Botulinum toxin
   c. BoNT-C induces degeneration of motorneurons
2. Engineered Toxins
   a. Improved efficacy in pain conditions
   b. Ability to extend therapeutic intervention
      i. Lipid and cationic polymer based transduction
      ii. Retargeting catalytic activity
         1. Useful for tissues that do not express SNAP-25
3. Effects on Wound Healing
   a. Reduced Fibrosis
   b. Decreased TGF B-1 secretion
   c. Increased Angiogenesis
   d. Improved flap and graft survival
   e. Benefit demonstrated in treatment of post-prostatectomy anastomotic strictures
4. Novel Methods of Toxin Delivery
   a. DMSO
   b. Liposome
   c. Transcutaneous needle-free injection
Botulinum toxin type A (BoNT-A) has been utilized to treat idiopathic and neurogenic overactive bladder conditions for over a decade. As the large multicenter clinical trials are completed and FDA approval is sought for this new use of BoNT-A, it is clear that many unanswered questions remain. This talk will focus on some of the clinical questions emerging about BoNT-A use for OAB conditions as we prepare for its more widespread use and application. The following topics will be addressed:

How common are antibodies to BoNT-A? Can antibodies explain the failure in response noted in some patients, particularly after repeated injections?

How durable are repeat injections? Is there evidence emerging that while most parameters remain improved, the degree of improvements (especially urodynamic improvements) may be less substantial over time?

Are there other neurological indications possible? New data for Parkinson’s disease and Multiple Systems Atrophy. Data for pediatric neurological uses.

Impaired bladder emptying is a known risk of BoNT-A injections. Are there urodynamic predictors of voiding dysfunction after BoNT-A injections?

Not all patients respond similarly after BoNT-A injections. While, on balance, most patients with refractory OAB do show some improvement, in some patients, symptoms may persist. Are there urodynamic parameters of persistent LUTS following BoNT-A injections?

Injecting BoNT-A into the bladder remains an obstacle for some and drug delivery is not necessarily predictable. Are other forms of intravesical delivery, without injection, possible? How effective are they?
Neuromodulation with Neurotoxins
Neurotoxin Applications for Pelvic Floor Muscle Dysfunction
Courtenay K. Moore, MD

Objective: To review the potential role of Botulinum toxin in the treatment of detrusor sphincter dyssynergia (DSD), chronic pelvic pain, and vaginismus.

I. Introduction:
Over the last 10 years the urological indications for botox have increased dramatically. Initially botox was used for the treat neurogenic detrusor overactivity in spinal cord injury patients and now has been extended to the treatment of other urologic conditions such as idiopathic detrusor overactivity, detrusor sphincter dyssynergia (DSD), chronic pelvic pain, and vaginismus.

II. Botox In DSD:
A. Clinical studies:
1) Dykstra et al. 1988
   a) 11 male spinal cord injury (SCI) pts with DESD
   b) BTX A to sphincter- transperineal & transurethral
   c) Decrease in UPP by 27cm H20 & PVR 146ml
2) Dykstra et al. 1990
   a) Double-blind placebo controlled study 5 male SCI with DESD
   b) Sphincter was injected with either a low dose of BTX or normal saline
   c) Electromyography of the external urethral sphincter indicated denervation, decrease in UPP by 25cm of H20 & PVR 125cc and bladder pressure during voiding by 30cm of H20
   d) Pts that received saline no change in baseline parameters
3) Schurch et al. 1996
   a) 24 male spinal cord injury male patients with DESD
   b) 21 of 24 significantly
   c) Effects lasted 3 to 9 months

III. Botox In Chronic Pelvic Pain:
A. Painful Bladder Syndrome
1. Smith et al. 2004
   a) 13 female pts with IC
   b) 9/13 (69%) subjective improvement
   c) Interstitial Cystitis Symptom Index and Interstitial Cystitis Problem Index mean scores improved by 71% and 69%, respectively (P <0.05).
   d) Frequency, nocturia & pain decreased by 44%, 45%, and 79% (P <0.01)
   e) 1st desire to void and MCC increased by 58% and 57%, (P <0.01)
2) Kuo et al. 2009
   a) 67 patients with IC/PBS refractory to therapy
   b) 44 patients received BTX + hydrodistension (HD) 2 weeks later
   c) 23 patients received the HD procedure but no BTX
   d) BTX + HD produced significantly better clinical results than HD alone
B. Chronic Pelvic Pain Syndrome (CPPS)
   1) Bentivoglio et al. 2000
      a) 7 male pts with CPPS BTX injection to external sphincter
      b) Normal resumption of voiding after BTX
   2) Zermann et al. 2000
      a) 27 males with CPPS injected with 200u to sphincter
      b) Symptomatic improvement in pain, increase flow rates, decrease in UPP

C. Pelvic Muscle Spasm
   1) Jarvis et al. 2004
      a) 12 women with chronic refractory pelvic pain
      b) 40 units B/L pubococcygeus & puborectalis
      c) 37% reduction in resting pelvic floor pressure
      d) Improvements in dyspareunia & dysmenorrheal
      e) QOL & sexual activity scores improved
   2) Abbott et al. 2006
      a) Double-blind, randomized, placebo controlled study 60 women
      b) Randomized to BTX (80u) and saline pelvic floor injections
      c) BTX group significant change from baseline in for dyspareunia, nonmenstrual pelvic and reduction in pelvic floor pressure
      d) Placebo group only dyspareunia was significantly reduced
      a) Randomized, placebo controlled, crossover study 12 pts with levator ani-synrome (7 males/ 5 females)
      b) 100 u into levator ani muscle
      c) No improvement in frequency, duration or intensity of pain

IV. Botoxin Vulvodynia & Vestibulitis:
   1) Yoon et al. 2007
      a) 7 women with intractable genital pain, 20u @ pain site
      b) Marked improvement in VAS pain score
      c) Mean 11mo without recurrent symptoms
   2) Dykstra et al. 2006
      a) 12 pts with provoked vestibulodynia
      b) 35u BTX injected into 3-4 pain sites
      c) Significant reduction in mean pain scores
   3) Ghazizadeh et al. 2004
      a) 24 women with vaginismus BTX (150-400u) injected puborectalis
      b) At 1 week, 23 little or no vaginismus, 18 able to have intercourse

V. Conclusions
Stimulation Parameters as Predictors for Success
Magdy M. Hassouna, MD, PhD

In 1997 and 1999, the U.S. Food and Drug Administration has approved, the Interstim® devise (Medtronic, Minneapolis, Minn), for refractory urge urinary incontinence, urinary frequency and urgency, and non obstructive urinary retention respectively. The procedure carried out initially as screening test, percutaneous nerve evaluation (PNE),then permanent implantation for respondent patients. Since its introduction, several modifications in the technology have lead to changes in the surgical technique and subsequently reducing the system related complications. Despite all modifications there are failures of the implanted system and loss of its efficacy in the absence of mechanical problems. This study was sought to determine the association between stimulation parameters at the time of implantation and the loss of neurostimulation efficacy over long term follow-up.

Between 2002 -2007 , 120 patients who underwent sacral neuromodulation for voiding dysfunction using InterStim®, of which, 14 patients (11.6%) were permanently explanted due to pain (5/14) & loss of efficacy (9/14). We retrospectively reviewed the charts of patients who were explanted due to lack of efficacy, and compared their voiding behaviour (voided volume/void) and stimulation parameters (amplitude and impedance) to a group of 12 positive responders, who were well-matched for sex, age, duration of symptoms, waiting period for implant and duration of implantation. Prior to implantation, all patients were required to pass a PNE screening test that showed >50% improvement in voiding parameters over a 1-week period. A 2-tailed t-test was used to determine differences in voiding parameters and stimulation parameters between both groups, and the significance was set at p<0.05.

All 9 patients who had loss of efficacy were females, mean age was 47.31±14.42 years, 6 patients (67%) were implanted for urgency/frequency symptoms, and 3 patients (33%) were implanted for urinary retention. The duration of stimulation was 3.87±2.72 years, the duration of symptoms was 5.32±1.5 years, and the waiting period for implantation was 2.9±0.63 years. Comparison was done to 12 female patients, mean age was 45.28±11.89 years, 7 patients (58%) were implanted for urgency/frequency symptoms, and 5 patients (42%) were implanted for urinary retention. The duration of stimulation was 4.53±1.06 years, the duration of symptoms was 5.24± 1.42 years, and the waiting period for implant was 2.6± 0.8 years. Improvement in voided volume/void in the urge/frequency patients was significantly lower in the explanted group due to loss of efficacy (43.6±3.2 ml) than non-explanted group (75.2±11.37 ml) (p=0.028).
The base line amplitude levels in patients who lost the efficacy were significantly higher than non-explanted group (2.08±0.35v) Vs (1.27±0.25v) (p=0.008). The amplitude difference between the base line and 4 years follow up was significantly higher in explanted group than non-explanted (3.1±1.2v)Vs (0.7±1.8v) (p=0.04). The Impedance levels in explanted group were significantly higher than non-explanted group (1032.4±181 Ω) Vs (590±44.6 Ω) (p=0.025).
Initial Amplitudes in both groups

![Graph showing initial amplitudes for loss of efficacy and good response groups.]

Impedence Levels

![Graph showing impedance levels for loss of efficacy and good response groups.]
Discussion:
Loss of efficacy leading to explantation of the entire InterStim® system was reported to be 5.6%. Those patients had normal impedance testing levels, and there were no clear reasons to be identified other than disease progression, interference at the lead/tissue interphase with impulse or central nervous system factors. (A. Hijaz et al, 2006).
Sutherland et al, 2007 reported a long term study on InterStim® therapy in one institute. Authors pointed out that the loss of efficacy is more prevalent in non-tined leads compared to tined leads.
Complications leading to explantation in our study were pain and loss of efficacy. There were no mechanical reasons to be attributed to the lack of efficacy after a period of good response. The impedance testing which was within normal range became significantly higher in patients who had loss off efficacy. Also, the amplitude measurements were significantly higher in this group of patients, whether at initial stimulation or during follow-up programming sessions. These high amplitudes could be related to interference at the lead/tissue level, and might have progressed over time to complete loss of efficacy.
Conclusions:
High stimulation parameters at the time of implantation may contribute to loss of efficacy and explantation on the long term follow-up.

References:

Basic Aspects of Programing and Best Parameters for Stimulation
Norbert Kaula, PhD and Steven Siegel, MD

Abstract—The success of a peripheral nerve stimulation implant is, besides surgical technique, heavily dependent on neurostimulation parameters and the understanding of the underlying neurophysiology. While there are still many open questions in neuromodulation therapy, a well founded body of experimental and clinical knowledge exists in neurosciences. We present an assimilated summary of basic scientific principles in neurostimulation, geared to be beneficial in clinical practice.

I. INTRODUCTION
Electrical nerve stimulation, in particular the sacral spinal nerves, has been proven to be an effective treatment in urinary incontinence, pelvic pain management, and other refractory urinary disorders. The clinically important action of neuromodulation is believed to be on the afferent pathway, although typically, electrical excitation by a stimulation lead, placed in the vicinity of the peripheral nerve, elicits action potentials in both, afferent and efferent fibers. The resulting nerve response is orthodromic and antidromic. Though an electrode placed in the close locality of a peripheral nerve limits the selectivity of small and large population, a limited selective activation can still be achieved. To use the full potential of neuromodulation requires an understanding of the effect of the stimulation parameters of amplitude, pulse width, frequency and electrode polarity.

II. NERVE - ELECTRODE GEOMETRY
The electrical stimulation effect is reliant on the type of electrode and placement in relation to the nerve. In general, a wrap-around electrode, covering the nerve trunk, proofs more effective than a lead with electrode contacts placed close the the nerve. But a wrap-around electrode is invasive, surgically more challenging, or often unfeasible. Clinically, the rationale for an electrode implant in close nerve vicinity is a better choice. The discussion here refers to a lead implant.
III. ELECTRICAL EXCITABILITY OF A NERVE
The basis of electrical nerve stimulation is a rapidly changing electric field near the nerve. An electronic current, cathodal monophasic, delivered through the metal contact is carried over to an ionic current of the axon and hyperpolarizes the cell membrane. An action potential is created when the threshold is reached. The threshold is indirectly proportional to the fiber diameter, thus a large diameter motor fiber requires less stimulation than a smaller pain fiber.

IV. STIMULATION PARAMETERS
A. Waveform
The shape of the stimulation waveform has an influence on the threshold of activation, fiber type and the type of electrode used. A fast changing negative current over time, $di/dt$ has been shown to be most effective. The following will be based on a cathodal, monophasic and rectangular current waveform.

B. Amplitude
The excitability of neural tissue has a distinct nonlinear behavior. The initial neural response of a nerve trunk or onset, requires a minimal stimulation amplitude. By steadily increasing the stimulation current a threshold is reached, 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.

C. Pulse Width
A minimal amount of current or threshold charge, $Q_{th}$ is required to produce neural excitation. The threshold charge per phase is simply the stimulation amplitude, $I_{th}$, multiplied by the pulse width $PW$. ($Q_{th} = I_{th} \cdot PW$). As a rule of thumb, a larger pulse width recruits more fibers with smaller diameter. Larger pulse widths also deliver more current into the neural tissue and may cause nerve damage, besides draining the implantable stimulator battery.

D. Frequency
Often, the stimulation frequency is selected according to the patients’ perception. Characteristically, patients report stimulation frequencies below 15 pulses per second (Hz) as throbbing, but higher frequencies are perceived as a continuous fluttery sensation. Physiologically, frequencies of 50 Hz or greater can cause damage in peripheral nerves shown in animal experiments. Further, recent findings report selectivity on the sensory portion of the pudendal nerve for frequencies of less than 5 Hz and higher frequencies for the dorsal genital branches.

E. Stimulation Polarity and Programming
The contacts of the stimulation lead are routinely assigned a negative or cathodal polarity and the IPG case acts as the positive or anodal return (see section III). Stimulation takes place only at the electrode (small area), where the current density is substantially larger in comparison to the generator case. Today’s generator cases are conductive on one side and insulated on the other. The conductive side should be facing away from the skin, to avoid unwanted sensation at the IPG site. A bipolar arrangement, where one electrode is the cathode and another the anode, provides a more localized response. As long as both electrodes have a similar area, the charge density will the similar. But the action of the neural response at the anode is much different than that the cathode. It requires significantly more current amplitude and the action occurs later as compared to the stimulation pulse.

V. AMPLITUDE - PULSE WIDTH RELATIONSHIP
This relationship is 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.
VI. OPTIMAL PARAMETERS

Clinical stimulation parameters are dependent on the current perception thresholds of the patient, such as comfort and can differ substantially from laboratory experiments. For example, the recruitment of smaller afferent fibers may require higher stimulation amplitudes than the patient could tolerate. A compromise could be a train of cycling stimulation pulses interrupted by off phases.

A. Useful and Successful Neurostimulation Response

It is difficult to describe what constitutes a useful and successful response to neurostimulation in the patient. One is specificity, where the stimulation parameters recruit the targeted neural pool to achieve the therapeutic effect. Another is sustainability of the therapeutic response, a factor of lead migration and encapsulation of the electrode implant over time. A different response to neurostimulation can be neuroplasticity, where inefficient neural circuits are rerouted and new ones are assigned, often referred to “synaptic pruning”. This may occur on a peripheral and/or a higher level of the central nervous system.

VII. CONCLUSION

Understanding the physiological principles of electrical peripheral nerve stimulation can greatly improve the efficacy, safety, and reliability of this modality. While individual stimulation parameters are well understood, the complexity of implanted stimulation devices in the human leaves open questions.

REFERENCES

23 year old female discharged from the military for medical reasons. She was a rescue swimmer.

She presents with chronic urinary retention self cathing 6 times a day.

History of Present Illness- The urinary retention started following a laparoscopy for evaluation of chronic abdominal pelvic pain while still in the military.

Past Medical History includes a diagnosis of nephrolithiasis, endometriosis, fibromyalgia, porphyria (AIP) and prior L4/5 and S1/S2 vertebral body fractures.

Medication included Lyrica, B and O supp, Vicodan, Dilaudid, Flexeril, and Tramadol.

Physical Exam reveals a slightly anxious woman, with normal affect, cooperative and alert. PVR 300cc, culture neg, diffuse abdominal wall pain. Inadequate pelvic exam because of pain. US of pelvis normal. Medical exam non-revealing.

Impression?

Outline of Therapy?

The rest of the Story!
3. Urinary Incontinence and Sexual Health in Older Adults

Tomas L. Griebling, MD, MPH; Gregory T. Bales, MD; Suzette E. Sutherland, MD; Allen D. Seftel, MD

INCONTINENCE AND SEXUAL HEALTH IN OLDER MEN

Allen D. Seftel, MD

Both sexual dysfunction and male BPH/LUTS are age-related events. Data suggest that a relationship exists between BPH/LUTS and male sexual dysfunction. Although prevalent, urinary incontinence is not well studied in this population. However, urinary incontinence and sexual dysfunction are both quite common post treatment for prostate cancer.

Health-related quality of life after primary treatment of prostate cancer is a major source of concern to patients, partners and payers. Efforts are underway to measure the effects of such determinants on satisfaction with the outcome of treatment in patients and their spouses or partners.

A large study of this issue was conducted by Sanda et al. They prospectively measured outcomes reported by 1201 patients and 625 spouses or partners at multiple centers before and after radical prostatectomy, brachytherapy, or external-beam radiotherapy. They evaluated factors that were associated with changes in quality of life within study groups and determined the effects on satisfaction with the treatment outcome.

Adjuvant hormone therapy was associated with worse outcomes across multiple quality-of-life domains among patients receiving brachytherapy or radiotherapy. Patients in the brachytherapy group reported having long-lasting urinary irritation, bowel and sexual symptoms, and transient problems with vitality or hormonal function. Adverse effects of prostatectomy on sexual function were mitigated by nerve sparing procedures. After prostatectomy, urinary incontinence was observed, but urinary irritation and obstruction improved, particularly in patients with large prostates. No treatment-related deaths occurred; serious adverse events were rare. Treatment-related symptoms were exacerbated by obesity, a large prostate size, a high prostate-specific antigen score, and older age. Black patients reported lower satisfaction with the degree of overall treatment outcomes. Changes in quality of life were significantly associated with the degree of outcome satisfaction among patients and their spouses or partners.

Each prostate-cancer treatment was associated with a distinct pattern of change in quality-of-life domains related to urinary, sexual, bowel, and hormonal function. These changes influenced satisfaction with treatment outcomes among patients and their spouses or partners.

While this was only 1 study, it is nonetheless quite revealing. The data are very important and shed light on this specific issue.

Ref:
Prevalence of storage and voiding symptoms among men aged 40 years and older in a US population-based study: results from the Male Attitudes Regarding Sexual Health study Int J Clin Pract, August 2007, 61, 8, 1294–1300

2. Martin G. Sanda, M.D., Rodney L. Dunn, M.S., Jeff Michalski, M.D., Howard M. Sandler, M.D., Laurel Northouse, R.N., Ph.D., Larry Hembroff, Ph.D., Xihong Lin, Ph.D., Thomas K. Greenfield, Ph.D., Mark S. Litwin, M.D., M.P.H., Christopher S. Saigal, M.D., M.P.H., Arul Mahadevan, M.D., Eric Klein, M.D., Adam Kibel, M.D., Louis L. Pisters, M.D., Deborah Kuban, M.D., Irving Kaplan, M.D., David Wood, M.D., Jay Ciezki, M.D., Nikhil Shah, D.O., and John T. Wei, M.D.
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D. Summary/Conclusions
Multiple terms are used to describe the constellation of symptoms that occur in aging men with benign prostatic hyperplasia. These change with clinical anatomic, and pathophysiologic alterations. Since the early 90s the term LUTS (lower urinary tract symptoms) which was coined by Abrams has largely replaced other terms such as benign prostatic enlargement (PBE), bladder outlet obstruction (BOO), and prostatism. Whatever we choose to use, this constellation of symptoms will continue to become more important as the population of aging men dramatically increases over the next several decades.

The progression of LUTS has been well described in a number of large epidemiologic studies including the Olmsted County Study as well as the Medical Treatment of Prostate Symptoms trial which was funded by the National Institutes of Health. Both of these studies have documented the relatively minimal risk of serious adverse events in men with LUTS such as upper tract deterioration or acute urinary retention. Largely what drives men to seek care for urinary symptoms is concern about the possibility of prostate cancer or secondarily the interference with activities of daily living. Recent studies such as the PROBE (Emberton 2008) have documented health seeking behavior in older men. In general what men seek is relief of symptoms.

Since the introduction of the American Urologic Symptom Index in 1993 the principle measurement tool for BPH has been a self administered index which records both irritative and obstructive urinary symptoms. In the mid-1990s the International Consulation on BPH urged the adoption of the International Prostate Symptom Score (IPSS) which includes an eighth question in addition to the seven questions of the AUA Symptom Score. This measures the impact of symptoms and is frequently known as the Bother Score. Although a single question is only a surrogate measure for quality of life, it has strong predictive value for the progression of symptoms in men with LUTS. In fact, the single most important predictor of failure in several clinical trials (notably the VA cooperative trial study published by Flanigan in 1988) is the degree of bothersomeness of symptoms.

Pressure flow studies have been considered the gold standard for the evaluation of bladder outlet obstruction for the last several decades. Classification of patients as either obstructed or unobstructed urodynamically allegedly improves the predictability of success of surgical treatments for outlet obstruction. In the 21st century the majority of patients that present with LUTS are treated pharmacologically. Is there a role for urodynamic evaluation in the patient with mild to moderate urinary tract symptoms who is unlikely to need or for that matter want surgical intervention? Is the predictive value of pressure flow studies of enough merit to justify the costs and invasiveness of the procedure? Notwithstanding this, is intraindividual variation in patients which has been documented at 10 to 15 cm of H2O pdet.QMAX and 0.05- 2 ml/sec for QMAX small enough to justify a urodynamic study? At least one large study of 121 men with confirmed obstruction urodynamically followed over six months demonstrated mean change in QMAX 2.3 ±2.1 ml/sec second and a change in pdet.QMAX 15.6 ±14.8 cm of H2O. Twenty-nine percent of these patients show within individual differences in QMAX of greater than 2.8 mL/sec and 13% within individual differences in pdet.QMAX greater than 27 cm of H2O (Witjes, J. Urol 1996). If intraindividual and short term changes may result in up to 20% change in the classification in Abrams Griffiths nomogram can we justify the substantial costs of urodynamics considering most of the literature documents 70-80% likelihood of successful outcome for outlet obstructive surgical procedures? If we do not have precise criteria for the definition of obstruction, it is unclear what the standards are for diagnosing poor contractility and it is difficult to justify the routine use of video urodynamics in the evaluation of men with LUTS. Concomitant urologic diseases in a older population such as Parkinson’s disease further complicate the picture. Finally, what about patient anxiety during testing? This almost certainly has substantial deleterious effects in our ability to interpret pressure flow studies.
We are increasingly asked to consider opportunities to decrease cost. We need to become more creative in utilizing non-invasive and low cost methods of improving diagnostic accuracy and potential for therapeutic efficacy. Recently Griffith’s and colleagues (J. Urol 2005) modified their nomogram using isovolumetric bladder pressure in place of detrusor pressure at maximum flow and concluded that this new proposed nomogram classified more than two thirds of patients who are obstructed on standard pressure flow studies. Van Venrooij in the Netherlands evaluated patients undergoing TURP with pressure flow studies preoperatively and post operatively and concluded that voiding diaries and symptom evaluation are more predictive of improvement in symptoms than pressure flow studies. Boormans and colleagues (Urology 2007) evaluated 150 consecutive men with LUTS who underwent pressure flow studies and then had treatment recommendations by experienced urologic surgeons and found that symptom score and quality of life assessment were more predictive of urologist treatment recommendations than were pressure flow studies. Perhaps newer methods of bladder wall and prostate imaging with ultrasound may allow rapid and noninvasive evaluations of bladder outlet obstruction. Recent literature has also suggested that serum PSA can predict bladder outlet obstruction.

It is not likely that video urodynamics will become obsolete anytime soon however it would be of clear benefit to redefine their role in men with BPH/LUTS.
MARK YOUR CALENDARS!

SUFU at the AUA 2010 Annual Meeting
May 29, 2010
Hilton San Francisco
Grand Ballroom Salon A
12:00 p.m. – 4:00 p.m.
San Francisco, California

SUFU 2011 Winter Meeting
March 1 – 5, 2011
Arizona Biltmore
Phoenix, Arizona

Society for Urodynamics & Female Urology
POSTER ABSTRACTS
Poster# BS1

EFFECTS OF IMPLANT GEOMETRY ON BLADDER PRESSURE TRANSDUCTION IN THE SUBMUCOSA
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(Presented by: Paul Fletter)

Introduction and Objectives: Current bladder pressure measurement methods require catheterization, which restricts movement and complicates long-term monitoring. We are developing a MEMS-based pressure-sensing device to be implanted within the submucosa of the bladder wall to monitor long-term pressure during normal activity. This study tested the effect of implant geometries on submucosal transduction of bladder pressure.

Methods: Standard implant dimensions (4x7x16 mm) were defined as those required for device design. This implant size, along with implants with a 50% increase in circumference, length, and combination of both were tested. To simulate the geometry and pressure-sensing capability of the final device, microtip pressure sensing catheters were fixed within liquid-filled plastic implants with latex diaphragms for pressure transmission. All test implants had identical diaphragm and internal chamber sizes regardless of external dimensions. Using an in vitro porcine bladder model, pockets for implants were surgically created in the bladder submucosa and the implants were inserted such that diaphragms faced the bladder lumen. The bladder was preconditioned with two filling cycles to 325mL. The bladders were then stepwise filled to 300 ml in 100 ml increments three times, with an 8 minute pause at each increment, referred to as quasi-static phase. The bladders were subsequently filled continuously to 300 ml three times. Infusion volume, lumen pressure, and pressure recorded by 2 submucosal implants were simultaneously recorded during bladder filling.

Results: Submucosal pressures were linearly related to lumen pressure, with all geometries having R² > 0.90. No significant differences existed between the ratios of submucosal to lumen pressures between implants. Peak pressures for all implants are comparable to lumen pressure at each volume. During the quasi-static phase, the standard size implant exhibited the most consistent relationship with lumen pressure. The mean quasi-static pressure was below 80% of lumen pressure in 3 instances, all of which involved implants with increased circumference.

Conclusions: Submucosal pressure is linearly related to lumen pressure, giving this modality clinical applicability. The standard design of the probe may perform better than a probe design with increased circumference. Having verified the functionality of the standard size implant, future studies will examine the effects of bladder stimulation and ambulatory movement.

Poster# BS2 – WITHDRAWN

Poster# BS3

CALCIUM SENSING RECEPTOR EXPRESSED IN INTERSTITIAL CELLS MODULATES BLADDER FUNCTION
Vivian Cristofaro, PhD, Samar Lowalekar, MD, Subbarao V. Yalla, MD and Maryrose P. Sullivan, PhD
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(Presented by: Vivian Cristofaro)
Introduction and Objectives: Although morphologic evidence indicates the presence of interstitial cells (ICs) in the bladder, their role in regulating bladder function remains unclear. In the suburothelium and interstitial spaces between bundles of bladder smooth muscle (bsm), fluctuations of extracellular [Ca2+] in the restricted microenvironment continuously occur in response to cell activity. This study proposes a new mechanism by which ICs may sense these extracellular Ca2+ variations via the Calcium Sensing Receptor (CaSR), and thus may modulate bsm contraction.

Methods: Immunofluorescence analysis of human, pig and rat bsm tissue was performed to detect expression, distribution and co-localization of CaSR and c-Kit, an IC marker. CaSR expression was also investigated by immunofluorescence in primary ICs isolated from the mucosa. For functional studies, rat bladder strips were stretched and mounted in organ bath at 37°C. Spontaneous bladder activity (SA), contractile response induced by electrical field stimulation (EFS) and carbachol (CCh) administration were measured before and after exposure to spermine, a CaSR agonist. The effect of spermine on SA and EFS was also determined in the presence of semaxinib, an agent used to inhibit ICs.

Results: CaSR was expressed in human, rat, and pig bladder tissue and partially co-localized with c-Kit. Isolated ICs also showed positive immunoreactivity to CaSR. In rats, both amplitude and frequency of SA were significantly attenuated by spermine. Spermine administration significantly decreased the contractile response to EFS at all frequencies and significantly decreased the slope of the contractile response induced by CCh without affecting its amplitude. Semaxinib also caused a significant decrease in the amplitude of SA and EFS induced contraction. In the presence of semaxinib, the inhibitory effect of spermine was markedly reduced.

Conclusion: ICs appear to express CaSR, potentially expanding the role of these cells to include integrating extracellular Ca2+ fluctuations induced by signaling from multiple cell types, thus modulating bsm responses. Accordingly, activation of CaSR induced by spermine is associated with an inhibition of the IC mediated contribution to bladder SA and agonist-induced contractions. Thus CaSR may present a new target for pharmacologic intervention in the management of bladder dysfunction.

Funding: Supported by OAB-LUTS grant & Medical Research Service, Department of Veterans Affairs

Poster# BS4

REGULATION OF TREK-1 CHANNEL BY ESTROGEN FOLLOWING ESTRUS STAGES
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(Presented by: Sang Don Koh)

Introduction and Objectives: Cyclic variations in the levels of female hormones during the menstrual cycle have been shown to lead to changes in urodynamic variables, with 37% of women noticing a deterioration in symptoms before menstruation. The mechanism of overactive bladder via estrogen reduction has not been examined directly. We reported that stretch-dependent K+ (SDK) and TREK-1(molecular candidate of SDK) channels are an important novel conductance in bladder smooth muscle that contribute to stabilization of the membrane potential. In last year of SUFU meeting we reported that TREK-1 channel expression was determined by an estrogen-regulated genomic mechanism and overactive bladder in ovariectomized animals is a result of TREK-1 channel down-regulation by estrogen depletion. Therefore we hypothesized that oscillation of plasma estrogen concentration following estrus stages affects the expression of TREK-1 channels which in turn influences the bladder excitability.

Methods: We employed isometric force measurements, conventional microelectrode recordings, molecular biology, and Western blot in various stages of the estrus cycles in control female mice. Estrus stages were confirmed by cytological examination.
**Results:** Mechano-electrical responses to TREK-1 channel blocker. Application of L-methionine (1mM) had no significant effects on bladder contractility in metestrus and diestrus stages. However bladder contractility was significantly increased by L-methionine in estrus and proestrus stages. Furthermore contractile responses to L-methionine were significantly higher in estrus stage than in proestrus stage. The resting membrane potential in estrus and proestrus was more negative than that in metestrus and proestrus stages. Application of L-methionine induced significant depolarization in estrus stage but not in diestrus stage. Molecular and protein expression following estrus stages. The order of expression of TREK-1 transcript in various stages of estrus cycles was proestrus>estrus> metestrus=diestrus. In Western-blot analysis, TREK-1 protein expression was estrus> proestrus>metestrus=diestrus suggesting that protein and functional expression may follow transcriptional expression by one day delay.

**Conclusion:** TREK-1 channel expression is determined by an estrogen-regulated genomic mechanism. These findings support the relative high incidence of overactive bladder symptoms during the menstrual period in reproductive aged women.

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

**Poster# BS5**

**A MOUSE MODEL OF CONDITIONAL SMOOTH MUSCLE-SPECIFIC DELETION OF THE MANGANESE SUPEROXIDE DISMUTASE GENE ALLOWS EXAMINATION ROLE OF OXIDATIVE STRESS IN DIABETIC BLADDER DYSFUNCTION**

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(Presented by: Nan Xiao)

**Introduction and Objectives:** Evidence strongly suggests a key role for exaggerated Oxidative Stress (OS) in decompensated phase of diabetic bladder dysfunction (DBD). We aimed to generate a smooth muscle-specific manganese superoxide dismutase (MnSOD) knockout mouse to examine the role of OS in DBD.

**Methods:** We crossed the floxed MnSOD (MnSODlox/lox) mouse with mouse containing a heterozygous knock-in of the CreERT2 gene in the SM22α promoter locus (SM-CreERT2(ki)Cre/+ ), which is transgenic mouse lines expressing a tamoxifen-activated Cre recombinase. Both MnSOD alleles modified to contain loxP sites bounding exon 3, using a modified Cre recombinase estrogen receptor fusion protein, CreERT2, to catalyze the knockout. SM22α is a calponin related protein that is expressed specifically in smooth muscle. SM-CreERT2(ki)Cre/+ activated by a lower amount of 4-hydroxytamoxifen (OHT). Mature offsprings (8 weeks after birth) were injected with OHT at 40 mg/kg for 5 consecutive days. Three days after the final injection, 31 male mice were sacrificed, and tissues of detrusor of the bladder, urothelium, aorta, heart, liver, skeletal muscle and skin of the tail were examined for MnSOD exon 3 by polymerase chain reaction (PCR).

**Results:** The phenotypical characterization of the created MnSODlox/lox, SM-CreERT2(ki)Cre/+ mouse shows normal growth, and function with no gross abnormalities. Three days after OHT injection, the PCR of the harvested tissues shows deletion of MnSOD exon 3 in the bladder smooth muscle and aorta of the MnSODlox/lox, SM-CreERT2(ki)Cre/+ mouse. The MnSOD exon 3 was present in heart, liver, skeleton muscle, urothelium, and tail of the mouse, suggesting a conditional and smooth muscle specific deletion of the MnSOD exon 3 in the created mice.
**Conclusion:** We have successfully deleted MnSOD exon 3 in the detrusor smooth muscle bladder of a MnSODlox/lox, SM-CreERT2(ki)Cre/+ mouse in a time selective manner by activation of the Cre recombinase system. Upon induction of diabetes in these mice, we will be able to examine the mechanistic role of OS in remodeling of the bladder in a time specific manner according to the temporal alteration of the DBD previously described by us and other investigators.

Poster# BS6

**PROSTAGLANDIN-E2 IS PRODUCED BY THE DETRUSOR LAYER AND MEDIATES SPONTANEOUS RHYTHMIC CONTRACTIONS IN THE URINARY BLADDER**

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(Presented by: Adam Klausner)

**Introduction and Objectives:** Bladders from patients and animals with overactive bladder display increased spontaneous rhythmic contraction. We previously demonstrated that prostaglandins generate spontaneous rhythmic contraction in rabbit bladder strips free of urothelium and that COX-1 and COX-2 are expressed in Interstitial Cells of Cajal surrounding detrusor smooth muscle. In the current study, we tested the hypothesis that prostaglandin production is an intrinsic process that arises from detrusor smooth muscle or surrounding Interstitial Cells of Cajal.

**Methods:** Rabbit detrusor smooth muscle strips free of urothelium were incubated in physiological salt solution with or without the non-selective COX inhibitor, ibuprofen, the selective COX-1 inhibitor, SC-560, and the selective COX-2 inhibitor, NS-398. Enzyme immunoassays were used to measure total prostaglandin production and specific production of PGE2. A bioassay in which medium from donor bladder tissue was transferred to recipient strips of detrusor muscle free of urothelium or control artery tissue was performed to demonstrate the physiologic effect (increased rhythmic frequency) of prostaglandin E2 production. A selective PGE2 antagonist, SC-51089, was used to demonstrate selectivity.
Results: Enzyme immunoassay experiments demonstrated that total prostaglandin production increased by 2.5 fold and PGE2 production increased by 4.8-fold after 15 minutes incubation. Pre-treatment with a non-selective COX antagonist (ibuprofen) and a COX-1 selective antagonist, SC-51089, reversed the observed increase in prostaglandin and PGE2 production. A bioassay demonstrated that rhythmic frequency, abolished by indomethacin, was restored in strips of detrusor treated with donor medium and that this effect was blocked after the addition of PGE2 antagonist. These effects were seen when donor medium was obtained from sections of detrusor without urothelium, with urothelium, and in sections of urothelium alone, demonstrating that PGE2 production likely arises from detrusor layer in addition to other bladder sources.

Conclusion: Prostaglandins, and specifically PGE2, were produced by strips of rabbit detrusor free of urothelium, suggesting that production is intrinsic to the detrusor muscle or surrounding Interstitial Cells of Cajal. Further research is required to explore prostaglandin-mediated signaling in the detrusor and identify targets for drug development in the treatment of overactive bladder.

Poster# BS7

OREXIN HAS A DIRECT EFFECT ON BLADDER FUNCTION
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(Presented by: Samar Lowalekar)

Introduction and Objectives: The orexin peptides, first thought to exist only in the central nervous system, are increasingly being found to exist in peripheral organs. Orexins play an important role in the central control of REM sleep, arousal, metabolic regulation and energy balance while alterations in the orexin system are involved in the pathogenesis of narcolepsy and obesity. However, their role in peripheral organs and their mechanism of action are still unclear. Our previous studies suggested that orexin may have a functional role in the bladder, and an effect in the spinal micturition reflex has recently been reported. The goal of this study was to further characterize the role of orexin in bladder function and elucidate its mechanism of action.

Methods: Bladders procured from male rats (8-12 weeks) were opened lengthwise and bladder base removed. Strips of bladder were suspended in a temperature controlled bath and force was continuously recorded. The effect of orexin-A on spontaneous activity (SA) and electrical field stimulation (EFS) of detrusor muscle in presence of agonists/antagonists was measured. To verify the presence of orexin receptor 1 (OX1R), western blotting (WB) and immunofluorescence microscopy (IFM) were performed.

Results: Orexin-A (1µM) caused a significant increase in both EFS (p=0.003 at 32Hz) and the amplitude of SA (p<0.001). This effect of orexin-A on EFS was abolished by pretreatment with a selective OX1R antagonist but was unaffected by atropine pointing to a non-muscarinic mechanism of action. The orexin-A induced increase in EFS was also blocked by pretreatment with antagonists to α1a and α1d -adrenoceptors, TRPV1 receptors and the vesicular monoamine transporters. The increase in SA induced by orexin-A was completely abolished only by pretreatment with the OX1R antagonist suggesting the possibility of a dual mechanism of action of orexin in bladder function. A band corresponding to OX1R was detected by WB. IFM showed the presence of OXR1 on nerve fibers interspersed within detrusor muscle, subepithelial regions and around blood vessels.

Conclusion: The expression of OX1R in bladder shown by WB and IFM and the significant functional effect of orexin-A suggest that orexin may play a role in local modulation of bladder function. Alterations in the orexin system may contribute to bladder dysfunction associated with sleep disorders, obesity and metabolic syndrome.

Funding: Supported by Medical Research Service, DVA
**Introduction and Objectives:** Myofibroblasts have been characterized in the lamina propria of the bladder with cytological properties of both fibroblast and smooth muscle cells. These cells are possibly involved in overactive bladder symptoms, inflammation and cancer since they are closely associated with afferent nerves and the urothelium. Several reports have characterized these cells using immunomarkers such as α-SMA, cadherin-11 and connexin 43. However, these markers are not specific for only myofibroblasts. In the present study, novel markers were used to characterize myofibroblasts in the bladder suburothelium.

**Methods:** We applied molecular and immunohistochemistry techniques to ascertain PDGFRα and TMEM16a (molecular candidate for Ca2+-activated Cl- channels) expression in myofibroblasts of the murine bladder. We also used TMEM16a knock-out and PDGFRα knock-in transgenic mice to confirm the expression of TMEM16a and PDGFRα in myofibroblasts.

**Results:** Qualitative PCR revealed the transcriptional expression of TMEM16a from whole bladder tissue of control mice. Following surgical separation of the detrusor muscle and lamina propria, molecular studies were performed to compare TMEM16a expression in these two layers. Transcriptional expression of TMEM16a was revealed in the lamina propria but not the detrusor muscle layer. Therefore, we performed immunohistochemistry to identify the location of TMEM16a positive cells. Both cryostat and whole-mount images revealed networks of TMEM16a positive immunoreactivity in cells underneath the urothelium. In TMEM16a knockout mice, these immunopositive cells were absent. We also performed immunostaining using additional markers including PDGFRα (fibroblast marker), PGP9.5 (neuronal marker) and ACK-2 (ICC like cell). PDGFRα was colocalized with TMEM16a. These findings were also supported by double-labeling studies. In addition, TMEM16a was colocalized with PDGFR in PDGFRα knock-in mice.

**Conclusion:** TMEM16a and PDGFRα are expressed in murine bladder myofibroblasts. These immunomarkers will be important to identify the functional involvement of myofibroblasts in pathological conditions such as inflammation and/or cancer.

**Funding:** Supported by NIH P20-RR18751
Methods: Autologous ADSC from Lewis rats were isolated, cultured in proliferation media, amplified to passage four and allowed to achieve confluence. Thirty-five Lewis rats underwent either sham operation, BOO plus detrusor injection of normal saline, or BOO followed by detrusor injection of autologous ADSC (1 x 10^5 cells) in a chitosan gel matrix. Postoperative urodynamic parameters including bladder volume and detrusor pressure at peak flow (PdetQmax) were assessed at 4, 8, 12, and 16 weeks post-surgery. Organ bath studies and processing of bladder tissue for histology and immunohistochemistry was performed.

Results: Cell survival in the chitosan based gel was confirmed using live dead staining. BOO resulted in a significant sustained increase in bladder volume and PdetQmax which was partially reversed by the detrusor injection of chitosan gel with autologous ADSC. Histology confirmed the presence of a detrusor mass of hybrid tissue resulting in localization of DiI labeled ADSC at 4 weeks. No significant cell migration was noted. Significant increases in bladder weight were noted in both BOO groups, with significantly greater weights in the ADSC group. Organ bath studies confirmed smooth muscle contractility in the bladder segments with minimal differences between groups or time points.

Conclusions: Detrusor co-injection of chitosan with autologous ADSC provides a potential method of improving the bladder function as assessed by urodynamic parameters in an animal model of BOO. This effect is sustained up to 16 weeks post-op in this immunocompetent model. Additionally, we have identified a gel matrix that allows cell viability and prevents cell migration. Future studies evaluating the effects of stem cell replacement on the structure and function of the decompensated, obstructed bladder are warranted.

Poster# BS10

COMPARISON OF FESOTERODINE AND TOLTERODINE EXTENDED RELEASE FOR THE TREATMENT OF OVERACTIVE BLADDER: A HEAD-TO-HEAD PLACEBO-CONTROLLED TRIAL
Sender Herschorn, MD, CM¹, Steven Swift, MD², Zhonghong Guan, MD, PhD³, Martin Carlsson, MS², Jon D. Morrow, MD, CM³, Marina Brodsky, PhD³ and Jason Gong, MD³
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(Presented by: Sender Herschorn)

Introduction and Objectives: To compare the efficacy and tolerability of fesoterodine 8 mg (FESO) with tolerodine extended release 4 mg (TER) and placebo (PBO) in subjects with overactive bladder (OAB)

Methods: In a 12-week double-blind, double-dummy trial, subjects reporting OAB symptoms for ≥3 mos and ≥8 micturitions and ≥1 urgency urinary incontinence (UUI) episode per 24 h (mean) in 3-day baseline diaries were randomized to FESO (4 mg for 1 wk, 8 mg for 11 wk); TER 4 mg; or PBO. Endpoints were change from baseline to week 12 in UUI episodes (primary endpoint), total and nocturnal micturitions, urgency and severe urgency episodes, and frequency-urgency sum per 24 h; mean voided volume per micturition (MVV); and Overactive Bladder Questionnaire (OAB-q), Patient Perception of Bladder Condition (PPBC), and Urgency Perception Scale (UPS). UUI data violated normality assumptions and were analyzed with Van Elteren test with baseline quartiles as strata; decreases in UUI episodes were estimated with 5% Winsorized means. Analysis of covariance was used for secondary diary and OAB-q data, with covariates of country and baseline, and Cochran-Mantel-Haenszel test for PPBC and UPS.
Results: FESO significantly improved UUI episodes at week 12 vs TER (P=0.0172) and PBO (P<0.0001; Table). Diary-dry rates (proportion of subjects with >0 baseline UUI episodes and 0 UUI episodes on week 12 diary) were significantly higher with FESO (64%) vs TER (57%; P=0.0153) and PBO (45%; P<0.0001). FESO significantly improved MVV vs TER (P=0.0048) and all diary endpoints vs PBO (P<0.0001) except nocturnal micturitions (P>0.05). TER significantly improved all diary endpoints vs PBO (P≤0.0005) except nocturnal micturitions and MVV (P>0.05). Improvements in patient-reported outcomes (PROs) were all significantly better with FESO vs PBO (<0.001) and TER (P<0.0005, post hoc analysis except OAB-q Sleep domain (P>0.05). Dry mouth and constipation rates were 28% and 5% with FESO, 16% and 4% with TER, and 6% and 3% with PBO. Discontinuation rates due to treatment-emergent adverse events for FESO, TER, and PBO were 6%, 4%, and 2%.

Conclusion: FESO showed superior efficacy over TER and PBO in reducing UUI episodes (primary endpoint) and in improving MVV and most PROs.

| Table 1. Changes in Bladder Diary Variables from Baseline to Week 12*  |
|---------------------------------------------------------------|-------------------------------|
|                                                              | Placebo [n=132] | Tolerodine [n=64] | Fesoterodine [n=236] |
| UUI episodes (mean change)                                    | 2.1              | 2.5              | -1.6              |
| Urgency (mean change)                                         | 1.0              | 1.5              | -1.2              |
| MVV (mean change)                                             | 10.9             | 18.8             | 15.2              |
| Nocturnal micturitions (mean change)                          | 1.9              | 2.1              | 2.3               |
| Baseline mean                                                | 11.7             | 11.7             | 11.7              |
| Nocturnal micturients (mean change)                           | -1.5             | -2.1             | -2.2              |
| Baseline mean                                                | 2.3              | 2.5              | 2.4               |
| Nocturnal micturients (mean change)                           | -5.9             | -4.5             | -4.6              |
| Baseline mean                                                | 9.4              | 3.1              | -3.2              |
| Diaries mean                                                  | -2.0             | -2.1             | -2.6              |
| Baseline mean                                                | 5.9              | 5.9              | 5.9               |
| UUI episodes (mean change)                                    | -1.9             | -2.8             | -3.2              |
| Frequency-urgency (mean change)                               | -1.0             | -0.5             | -1.2              |
| Baseline mean                                                | 6.2              | 6.3              | 6.0               |
| UUI episodes (mean change)                                    | -2.2             | -2.1             | -2.6              |

*UUI episodes from 2 sites were not included in the efficacy analyses because of data inaccuracies detected at these sites. This issue was more pronounced in database linking and documentation for the first statistical analysis plan. A sensitivity analysis showed that omitting these subjects from the analysis of the primary endpoint did not affect the result.

**Rounded to the nearest whole number.

**UUI episodes were estimated using a 5% binomial mean. N=198 for TER group and N=217 for FESO group.

Poster # BS11

EARLY ONSET OF FESOTERODINE EFFICACY IN SUBJECTS WITH OVERACTIVE BLADDER
Howard B. Goldman, MD, FACS¹, Jon D. Morrow, MD, CM², Jason Gong, MD², Li-Jung Tseng, PhD² and Tim Schneider, MD³
¹Glickman Urologic and Kidney Institute, The Cleveland Clinic, Cleveland, OH; ²Pfizer Inc, New York, NY; ³Praxisklinik Urologie Rhein/Ruhr, Mühlheim an der Ruhr, Germany
(Presented by: Howard B. Goldman)

Introduction and Objectives: To assess the onset of efficacy of fesoterodine 4 mg once daily on overactive bladder (OAB) symptoms after 1 week of treatment.

Methods: This was a secondary analysis of data from a 12-week, open-label, single-arm, flexible-dose trial of fesoterodine in subjects with OAB who had been previously treated with and dissatisfied with tolterodine. Subjects (men and women aged ≥18 y) reported urinary frequency (mean ≥8 micturitions per 24 h) and urgency (mean ≥3 episodes per 24 h) in 5-day bladder diaries at baseline, at least moderate bladder-related problems on the Patient Perception of Bladder Condition, and dissatisfaction with tolterodine or tolterodine extended release treatment within 2 years of screening. Subjects received fesoterodine 4 mg once daily for the first 4 weeks of treatment with an optional dose increase to fesoterodine 8 mg after week 4. Early onset of fesoterodine 4 mg efficacy was assessed based on changes from baseline to week 1 in 5-day bladder diary variables: total and nocturnal micturitions, urgency urinary incontinence (UUI) episodes, urgency and severe urgency episodes, and frequency-urgency sum. Urgency and severe urgency episodes were those rated ≥3 and ≥4 on the 5-point Urinary Sensation Scale (USS), respectively; frequency-urgency sum is a combined measure of micturition frequency and urgency defined as the sum of all USS ratings recorded over 24 hours and averaged over the diary period.
**Results:** After 1 week of treatment with fesoterodine 4 mg, all bladder diary variables, including total and nocturnal micturitions, UUI episodes, urgency and severe urgency episodes, and frequency-urgency sum per 24 hours, were significantly improved compared with baseline (all P<0.0001; Table). The diary-dry rate was 38% (subjects reporting >0 UUI episodes at baseline who reported 0 UUI episodes on week 1 diary).

**Conclusion:** Fesoterodine 4 mg, the initial dose received in a flexible-dose regimen, demonstrated a rapid onset of efficacy at 1 week in subjects with OAB who had been previously treated and dissatisfied with tolterodine.

<table>
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<th>Table: Changes From Baseline to Week 1 in Bladder Diary Endpoints*</th>
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<tr>
<td>Total micturitions</td>
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<td>UUI episodes‡</td>
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<td>Nocturnal micturitions</td>
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<tr>
<td>Urgency episodes</td>
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<tr>
<td>Severe urgency episodes‡</td>
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<tr>
<td>Frequency-urgency sum</td>
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*Data represent the full analysis set (N=516).
†P<0.0001 vs baseline.
‡Includes only subjects reporting this symptom at baseline.

**Poster# BS12**

**IMMUNIZATION WITH SELF UROPLAKIN II CAUSES AUTOIMMUNE CYSTITIS; NOVEL MURINE EXPERIMENTAL AUTOIMMUNE CYSTITIS MODEL**

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(Presented by: Lauren N. Byrne)

**Introduction and Objectives:** Little is known about the pathophysiology of interstitial cystitis (IC), yet deficits in urothelial cell layers and autoimmune mechanism are speculated. The aim was to examine whether immunization of mice to recombinant Uroplakin (rmUPII) will provoke an autoimmune response against bladder urothelium sufficient to create IC phenotype in mice.

**Methods:** Mouse UPII cDNA was generated and transferred into a pET bacterial expression vector. Recombinant (rm)PII is produced and isolated by Ni Column. 8 week old SWXJ mice were randomized to rmUPII antigen immunization or Complete Freund’s Adjuvant (CFA-control) (100 µg/mice) by subcutaneous injection. For assessment of immune response, 10 days after immunization, mice were sacrificed, and axillary lymph nodes were removed and analyzed by a battery of tests including proliferation assay of rmUPII in culture; proliferation assay of CD4 and CD8 T cells by magnetic cell separation; measurement of total Ig and IgG subtype; and RT-PCR for TNF alpha, IFN gamma, IL17, IL1beta in the bladder and several other organs. For functional analysis, mice were placed in urodynamics chambers for 24 hours for measurement of micturition frequency and total voided urine.
Results: Immunized SWXJ mice activated CD4 and CD8 T cells and induced experimental autoimmune cystitis (EAC). Bladder to body weight ratio was increased in EAC mice. Immunization with rmUPII resulted in increased UPII-specific antibody response compared to controls. Cystitis in mice is initiated by CD4 Th1 T cells that stimulate B cells to produce rmUPII antibodies to create EAC. Anti-CD3 demonstrated T-cell infiltration, which accumulated specifically in urothelium. Real time PCR analysis clearly showed the tissue-specificity of infiltration to bladder urothelium; whereas isolated kidney, uterus and ovarian tissue showed no expression of TNF alpha, INF gamma, IL17 and IL1beta. 24-hr evaluation of micturition of EAC mice showed increased urinary frequency (P <0.02) and decreased urine output per void (P< 0.21) when compared to control group.

Conclusion: Our study shows a large immune response mounted in mice immunized with UPII; this response is specific to bladder tissue. EAC mice show significant evidence of frequency and decreased urine output. Further characterization of EAC should include evidence for pain and/or afferent hypersensitivity, and evidence of urothelial cell layer damage.

Poster# BS13

CATHETERIZING INTERSTITIAL CYSTITIS/PAINFUL BLADDER SYNDROME (IC/PBS) PATIENTS FOR INTRAVESICAL INSTILLATION: DOES CATHETER SIZE MATTER?
Marina Ruzimovsky, BSN, MSN, Soroush Rais-Bahrami, MD, Kathleen Donlon, RN and Robert Moldwin, MD
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(Presented by: Marina Ruzimovsky)

Introduction and Objectives: Interstitial Cystitis (IC) and Painful Bladder Syndrome (PBS) patients frequently complain of urethral pain. This patient population often requires repeated catheterization for intravesical treatments, and catheter size is believed to influence the degree of pain experienced. This study sought to determine whether catheter diameter is related to level of discomfort patient endure during and after instillation treatments.

Methods: A prospective patient-blinded study was performed in a group of 30 IC/PBS patients whose multimodal treatment regiment included at least two sessions with intravesical instillation therapy. The study group included both male and female IC/PBS patients with a wide range of ages and socioeconomic backgrounds. Instillations were administered via two different sizes of urinary catheters, 10Fr and 16Fr, on two consecutive visits each two weeks apart. Lidocaine 2% jelly was injected intrarethrally prior to catheterization at all sessions. Assessment of pain using a visual analog pain scale of 0-10 was performed during introduction of the urinary catheter into the urethra, when the catheter was indwelling within the bladder, and immediately following catheter removal.

Results: In the group of 30 patients, (24 female, 80%) the mean age was 58.9±18.9years (range 26-81). At the time of catheter placement, treatment sessions with the 16Fr catheter yielded a mean pain score of 5.57±2.60 compared to 4.93±2.61 using the 10Fr catheter (p=0.0012). Similarly, pain scores immediately after catheter withdrawal were higher during the therapy using a 16Fr catheter, 2.93±2.70 versus 2.40±2.58 with 10Fr catheters. There was only one patient (3%) who reported a higher pain score on insertion of a 10Fr catheter. Three patients (10%) had worse pain immediately after withdrawal of 10 Fr catheter. There was no significant difference in the pain level when comparing the catheter size used during the indwelling phase of treatment (p=0.25).

Conclusion: Urinary catheter size used for intravesical instillations has no bearing on the pain level experienced by IC/PBS patients during the indwelling phase. However, smaller catheter sizes are better tolerated during insertion of the catheter and following the instillation session immediately post-catheter removal. Hence use of smaller diameter catheters should not be considered routine in IC/PBS population for intravesical instillation therapies.
DO THE SURGICAL COMPONENTS OF SLING PROCEDURE CONTRIBUTE TO THE POST-SURGICAL BLADDER COMPLICATIONS?
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(Presented by: Lauren N. Byrne)

Introduction and Objectives: Slings are the most commonly performed anti-incontinence procedures with short (voiding difficulty) and long term (urgency, urge incontinence; UTIs) complication reported as high as 30% (Anger 2006); however the pathophysiology of these complications is poorly understood. We hypothesized that various surgical steps related to the sling procedure, including vaginal dissection may contribute to the complications. To examine the impact of various surgical elements of the sling procedure on the bladder function as measured by in-vivo cystometrogram in a previously described rat model of sling.

Methods: 30 Virgin Sprague Dawley rats were randomized to 5 groups: pudendal nerve transaction (PNT) only, PNT with vaginal dissection (VD), PNT with sling placement, VD only, and control group. Six weeks following the assigned procedure, rats underwent suprapubic tube placement followed by cystometrogram and leak point pressure (LPP) measurements by a blinded investigator to the group assignment. CMG data was analyzed for storage and voiding variables and LPP measurements. Comparisons amongst the groups were made using the Wilcoxon rank sum test and the Kruskal Wallis tests.

Results: There was no statistically significant difference in the CMG parameters among all groups. Bladder capacity and compliance were comparable as well as peak micturition and intercontraction interval. There was no evidence for bladder outlet obstruction as no changes in the voiding pressures was noted (Figure1). The LPP was decreased at 6 weeks in both PNT and PNT+VD groups compared to controls and were comparable to controls in the Sling and VD only group (Figure 2).

Conclusion: In the absence of frank bladder outlet obstruction, surgical components of the sling procedure including vaginal dissection do not alter the key bladder functions as measured by CMG; while the LPPs are affected by the PNT Model as expected and restored by sling. Whether CMG measurements at 6 weeks in our animal model lack sufficient sensitivity to detect the alterations in the bladder function responsible for short and long term complications of sling warrants further investigation.
**Poster# BS15**

**GHRELIN- A PUTATIVE MECHANISTIC LINK BETWEEN OAB AND OBESITY**

Pradeep Tyagi, PhD¹, Vikas Tyagi, MD¹, Kenneth Peters, MD¹, Erich Wetteemer², Yao-Chi Chuang, MD³, Hann-Chorng Kuo, MD⁴, Naoki Yoshimura, MD, PhD⁵ and Michael Chancellor, MD¹

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(Presented by: Pradeep Tyagi)

**Introduction and Objectives:** Several epidemiological and clinical studies suggest obesity as a risk factor in the pathology and poor management of overactive bladder (OAB), yet no information exists on the mechanistic link between the two disorders. In the present study, we hypothesized that appetite inducing peptide hormone ghrelin and its cognate receptor GHSR (growth hormone secretagogue receptor) are key members that link obesity with OAB.

**Methods:** Human bladders were obtained from organ donors and total RNA was extracted from preserved tissue specimens. Isolated RNA was reverse transcribed and PCR-amplified (40 cycles) using GHSR primers. Expression of β-actin was used as positive control. After PCR amplification, cDNA was analyzed by electrophoresis on 2% agarose gel and visualized by ethidium bromide staining. In addition, relaxant effect of ghrelin peptide was investigated in pre-contracted human and rat bladder strips by cumulative dose addition.

**Results:** Expression of GHSR mRNA was detected in human bladder. PCR yielded cDNA products with the expected length of 110bp for GHSR in human bladder tissue specimens. Cumulative addition of ghrelin into the myobath evoked concentration-dependent reduction in the frequency of spontaneous contractions in human bladder strips. In addition, ghrelin addition to isolated rat bladder strips pre-contracted with 75mM KCl produced dose dependent reduction in contractility with maximum recorded reduction of ~40% at 10-6 mol/L conc.

**Conclusion:** This is the first study to demonstrate the expression of GSHR in human bladder and its inhibitory effect on bladder contractions. We have identified a new mechanism whereby obesity can directly cause the overactive bladder. This effect represents a potential novel mechanism through which, besides cholinergic and adrenergic systems, detrusor acutely modulate its contractility and thereby voiding frequency. These findings indicate the mechanism underlying the association of obesity with OAB and promise of a new drug target.

**Poster# BS16**

**URINARY NERVE GROWTH FACTOR IN OAB AND CYSTITIS**

Hana Yoon, MD, PhD¹, Suk Seon Yoo, MD², Jae Yup Hong, MD, PhD³ and Ju Tae Seo, MD, PhD⁴

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(Presented by: Hana Yoon)

**Introduction and Objectives:** Urinary nerve growth factor (NGF) levels are known to be increased in IC/PBS and OAB. The key symptoms of those diseases are related with bladder sensation. And similar symptoms of LUTS are common in acute cystitis or other urinary tract infections or urinary tract pathologic conditions. Therefore, we aimed to investigate the urinary NGF levels in both OAB and cystitis condition and the significance of its role as a marker for a certain disease.
Methods: Urine samples from 50 female and male patients were collected; 20 healthy control patients, 15 acute cystitis patients and 15 OAB patients. Mean age of each group of patients are; control group 47.2±7.1 (37~66) years old, acute cystitis group 58.2±22.2(26~86) years old, OAB group 48.3±15.9(28~75) years old, respectively. Urinary NGF levels were measured by ELISA (Emax® ImmunoAssay System (Promega, Madison, WI, USA).

Results: Mean urinary NGF level in acute cystitis group was 1.17±0.46ng/ml(0.55~2.46), which was significantly elevated compared with the control group(0.89±0.34ng/ml(0.45~2.02), p=0.005, Mann Whitney U-test). Mean urinary NGF level in OAB group was also significantly elevated(1.31±0.41ng/ml(0.8~2.01)) compared with the control group (p=0.001, Mann Whitney U-test). However, the level of the two groups (OAB, acute cystitis) were not significantly different (p=0.363, Mann Whitney U-test).

Conclusion: In this study, we confirmed that the urinary NGF levels are elevated in both acute cystitis and OAB conditions. Both conditions have similar LUTS; frequency, urgency and urge incontinence but different etiology. This study suggest that storage symptoms closely related to bladder sensation may have correlation with increased urinary NGF but also suggest that urinary NGF may not be the absolute biomarker for the differentiation or diagnosis of OAB.

Poster# BS17

EFFECTS OF OBESITY AND TYPE 2 DIABETES ON RECOVERY FROM PUDENdAL NERVE INJURY IN FEMALE ZUCKER RATS
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¹Cleveland Clinic, Cleveland, OH; ²Cleveland VA Medical Center, Cleveland, OH
(Presented by: Bradley C. Gill)

Introduction and Objectives: Along with childbirth, obesity and Type 2 Diabetes (DM) are risk factors for Stress Urinary Incontinence (SUI). Diabetic peripheral neuropathy and pre-diabetes are also associated with SUI. The ongoing obesity epidemic and related increase in DM incidence highlight the value of understanding their effects on SUI after childbirth. Using a rat model, this study investigated the impact of obesity and DM on pudendal nerve (PN) recovery after crush injury.

Methods: For 10 weeks, female, leptin-resistant, Zucker Diabetic Fatty (ZDF) rats were given low-fat [N=12] or high-fat [N=6] diets and Zucker Lean (ZL) rats received standard feed [N=11]. ZDF rats naturally become obese and only develop DM when given a high-fat diet. Approximately half of each group then underwent 2 consecutive 30 second bilateral PN crushes. Recovery was assessed 4 weeks later with urinary leak point pressure (LPP), PN electroneurography (ENG), and external urethral sphincter (EUS) electromyography (EMG). Specifically, the bladder was filled and intravesical pressure recorded via a supra-pubic catheter while electrodes recorded PN motor branch and EUS potentials at rest and while the exposed bladder was compressed with a cotton swab to induce leakage. Histology was analyzed in additional rats.

Results: At injury, ZL rats weighed 210g with 104mg/dl blood glucose (BG), obese rats weighed 392g with 114mg/dl BG, and obese+DM rats weighed 388g with 345mg/dl BG. Uninjured obese+DM rats showed significantly lower ENG amplitude at rest and in the bladder-to-EUS guarding response during LPP than uninjured ZL rats. Trends in ENG frequency were similar. Obese rats had significantly impaired PN recovery compared to ZL rats at rest and during LPP. All uninjured ZDF rats had significantly lower EMG amplitude at rest compared to uninjured ZL rats. EMG amplitude during LPP and change from rest to LPP was significantly lower in injured obese+DM rats compared to injured ZL rats. Trends in EMG frequency were similar. There were no significant differences in bladder pressures between groups. Obese rats showed increased EUS fibrosis.

Conclusion: Obesity and DM combined was associated with significantly lower PN activity in uninjured animals and impaired EUS guarding recovery after injury. Obesity alone was associated with lower EUS activity and impaired PN recovery. These results suggest obesity may impact sphincter function and nerve recovery, while DM may contribute to PN dysfunction.
Poster# BS18

DIABETIC BLADDER DYSFUNCTION IN TYPE 2 MOUSE MODELS MAY DIFFER FROM THAT REPORTED FOR TYPE 1 DIABETES
Guiming Liu, PhD, Nan Xiao, MD, PhD, Michael Kavran, MS, Nicholas Boncher, MD and Firouz Daneshgari, MD
Case Western Reserve University, Cleveland, OH
(Presented by: Nicholas Boncher)

Introduction and Objectives: Diabetic bladder dysfunction (DBD) is a common and bothersome complication of diabetes mellitus (DM). Type II DM (T2DM) comprises 90% of DM diagnosed in human. However, little is known about the effects of T2 DM on bladder function and its difference with DBD in type 1 DM (T1DM). We examined the functional effects of T2DM on the bladder on the db/db as a mouse model of T2DM.

Methods: Eight-week-old male (n=7) db/db (strain BKS.Cg-m+/-Leprdb/J) mice and 7 background strain (WT) C57BLKS/J mice, were studied. Body weights and glucose levels were measured in both groups. Bladder function was assessed with 24-hour micturition habits using metabolic cages, and conscious cystometrogram (CMG) via an indwelling suprapubic catheter. Comparisons were made using students T-test.

Results: The body weight (34 vs 16gm), fluid consumption (40 vs 21ml), and glucose levels (524 vs 243mg/dl) of DM mice were higher than controls. DM mice trended toward higher blood Hb1Ac and bladder weight compared to controls. Respectively, measurements of 24 hour micturition showed increased frequency of urination (99 vs 67 voids p<0.05), increased voided volume per micturition (0.08 vs 0.04mL p<0.05) and total diurnal voided volume (33 vs 18g p<0.05) in the DM mice compared to controls. CMG measurement showed increased intercontraction interval (319.83±50.39 vs 161.17±9.72 seconds p<0.05). There were no significant alterations in peak voiding pressure between DM mice and controls.

Conclusion: T2DM mouse model shows significant increase in voiding volumes and frequency suggesting a similar effect to those reported for T1DM mouse models (Daneshgari AJP 2006). However, the doubling of T2DM mouse body weight is a significant potential confounder, which hints that T2DM mice may conversely not develop a diuretic state, in contrast to T1DM. These findings warrant further studies of alterations of the bladder function in T2DM over time with a diuresis control.

Funding: Supported by NIH Grant DK61018-02S1

Poster# BS19

LIPOSOMES FACILITATE EFFICIENT BLADDER UPTAKE OF ANTISENSE OLIGONUCLEOTIDES
Vikas Tyagi, MD, Yoshio Sugino, MD¹, Naoki Yoshimura, MD, PhD¹, Jonathan Kaufman, PhD², Yao-Chi Chuang, MD³, Hann-Chorng Kuo, MD⁴, Michael Chancellor, MD⁵ and Pradeep Tyagi, PhD⁵
¹University of Pittsburgh; ²Lipella Pharmaceuticals; ³Chang Gung Memorial Hospital, Kaohsiung, Taiwan; ⁴Buddhist Tzu Chi General Hospital, Hualien, Taiwan; ⁵William Beaumont Hospital
(Presented by: Vikas Tyagi)

Introduction and Objectives: Anticholinergic medications, which are currently the mainstay of the treatment of OAB, are not always effective and often have undesirable side effects such as dry mouth and constipation. Sequence-specific gene-silencing mechanism is a promising approach to develop new therapeutic approaches with fewer side effects, as well as greater efficacy. Drug development of this approach for the intravesical route has been hampered by inefficient intracellular delivery and cellular uptake of the oligonucleotides ODN. The aim of this study was to examine the feasibility of cationic liposomes for bladder uptake of oligonucleotides.
Methods: Female Sprague rats were anaesthetized with isoflurane and their bladders were catheterized with 24-gauge angiocatheters (Becton Dickinson) to instill 0.5ml of liposomal fluorescent ODN (6uM) for 30min. Fluorescent ODN 5' tag of TTYETM 563 and sequence of 5'GCCCGAGAGCCTCCCGA3' were complexed with cationic liposomes by incubation at room temperature for 30min in the molar ratio of ODN to lipid of 1:10 (Lipella). Rats were sacrificed at 8 and 24h after instillation and bladders were harvested at the time of sacrifice and cryopreserved for cryosectioning into tissue sections of 8 microns.

Results: Bladder sections examined for fluorescence signal from instilled ODN in bladder by Zeiss LSM 510 META confocal microscope attached to a CCD camera revealed bright red fluorescence from TTYE 563. Bladder uptake accumulation was best seen at 24 h, while intensity of fluorescence was greater at 8h. Localization of fluorescence in urothelium demonstrates successful bladder uptake and retention in target cells presumably due to binding with target mRNA.

Conclusion: Intravesical route can allow selective exposure of high concentration of antisense ODN to the NGF producing cells in urotelium and avoid systemic side effects from genetic manipulation of NGF expression and the safety concerns noted with systemic administration of monoclonal human NGF antibodies (tanezumab) such as paresthesia, hypoesthesia and arthralgia.

Poster# BS20

INJECTION OF BOTULINUM TOXIN TYPE A AS A THERAPEUTIC OPTION FOR BLADDER PRESERVATION IN PATIENTS WITH SEVERE NEUROGENIC DETRUSOR OVERACTIVITY
Taisha Williams, MD¹, M.E. Beck, PA-C², T.J. Lehrfeld, MD², J. Serio, RN², T. Nguyen, MD² and D.A. Gordon, MD²
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(Presented by: Taisha Williams)

Introduction and Objectives: Botulinum toxin A (BoNT-A) has shown promise in treating neurogenic detrusor overactivity (NDO), but studies conducted to date have not been in patients with severe urinary urge incontinence (UII). This study examines our experience using BoNT-A in such patients.

Methods: This was a retrospective review of patients with UII secondary to NDO who were treated with BoNT-A. Some of these patients were almost globally wet. Many of these patients developed perineal skin complications. BoNT-A (200 U) was injected transurethrally and intramuscularly into 30 detrusor sites. Patients could receive repeated BoNT-A injections at the treating physician's direction. Follow-up was every 3 weeks for the first 6 weeks, then every 6 weeks for the next 18 months. Urodynamic examination was conducted at follow-up visits in patients who did not experience clinical improvement. A total of 21 patients (9 men, 12 women) with proven NDO and UII were included in the study. Patients received one (n=6), two (n=5), three (n=5), four (n=3), or five (n=2) treatments with 200 U of intradetrusor BoNT-A. The interval between injections was anywhere from 1-17 months and patients were followed up yearly.

Results: At the end of follow-up, maximum cystometric capacity (MCC) had improved from baseline in all patients (mean change +107.3 mL; p<0.001). Treatment was considered successful in patients who achieved a MCC of >200 mL without leakage per urethra (n=17). These patients could then be managed by a variety of treatment strategies which included: 1) suprapubic catheter alone (SPT), 2) SPT with anticholinergic medication, 3) time voiding and clean intermittent catherization (CIC), 4) compressive suburethral sling and CIC.

Conclusion: In patients with refractory urinary urge incontinence secondary to endstage NDO, intradetrusor injection of Botulinum Toxin Type A improves urodynamic parameters and can achieve dryness with or without minor procedural intervention and circumvents the need for major surgical reconstruction with intestinal urinary diversion.
**Poster# BS21**

**ELECTRICAL STIMULATION OF THE URETHRA EVOKES BLADDER CONTRACTION AND EMPTYING IN MEN WITH SPINAL CORD INJURY**

Michael Kennelly, MD¹, Kimberly Arena, PA-C¹, Nell Shaffer, RN¹, Maria Bennett, MS², Warren Grill, PhD³ and Joseph Boggs, PhD²  
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(Presented by: Joseph Boggs)

**Introduction and Objectives:** Electrical stimulation of the urethra can evoke bladder contractions in persons with spinal cord injury (SCI). The objective of this study was to determine if electrical stimulation of the urethra could evoke bladder contractions that empty the bladder. Ultimately the goal is to develop an implanted device using electrical stimulation that enables persons with SCI to empty their bladder on demand.

**Methods:** This is a case report of two men with SCI, who enrolled in this IRB approved research study. The first patient was a 45-year-old man with a T6 ASIA A SCI secondary to a gunshot wound 15 years prior. The second patient was a 51-year-old man with a T2 ASIA A SCI secondary to a fall from scaffolding 2 years prior. Both patients demonstrated neurogenic detrusor overactivity on urodynamics and managed their bladder with clean intermittent catheterization and oxybutynin medication. Following informed consent, each patient discontinued oxybutynin 2 days prior to urodynamic testing. Urodynamics were performed with a custom 12 French balloon catheter mounted with ring-shaped electrodes (3 mm) positioned 1 cm, 3 cm, and 5 cm from the balloon corresponding to the bladder neck, proximal and distal prostatic urethra. The inflated balloon was placed against the bladder neck. Urodynamics were performed at a filling rate of 25 ml/minute until a distention-evoked bladder contraction was observed. At approximately ¾-bladder capacity, the urethra was stimulated with a range of parameters to determine if electrical stimulation could evoke a bladder contraction and empty the bladder.

**Results:** Electrical stimulation via the urethral electrodes evoked bladder contractions that emptied the bladder in both subjects. In the first subject, stimulation of the prostatic urethra (9-12 mA, 20 Hz) emptied 64-75%, leaving a post-void residual volume (PVR) of 41-20 ml. In the second subject, stimulation of the prostatic urethra (20 mA, 20 Hz) emptied 68-77%, leaving PVRs of 56-45 ml. Peak detrusor pressures of 60-80 cm H2O were evoked by urethral stimulation trains applied for 20-140 s with amplitudes of 9-20 mA, a frequency of 20 Hz, and a pulse width of 200 us.

**Conclusion:** Urethral stimulation evoked bladder emptying in persons with SCI.

**Funding:** This investigation received extramural funding from the National Institute of Neurological Disorders and Stroke (R43NS055393) and NDI Medical, which is now Medtronic Urinary Solutions.

**Poster# BS22**

**COLLAGEN INGROWTH ASSESSMENT: SYNTHETIC AND ALLOGRAFT/XENOGRAFT IN A TWO-SITE ANIMAL MODEL**

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(Presented by: Dobie Giles)
**Introduction and Objectives:** Vaginal surgery has been associated with a 29.2% reoperation rate. Addition of a graft material may improve surgical outcome. Results of vaginally placed grafts are limited and varied due to the numerous commercially available grafts. The recent Public Health Notification by the FDA about mesh demonstrates the need for more information about vaginal tissue interaction with graft material. To describe the histologic and biomechanical characteristics of three commercially available graft materials in the rabbit.

**Methods:** Thirty-two rabbits were divided into four groups of eight. Each group had one of four graft materials randomly assigned and implanted into the abdomen and vagina. Autologous fascia, Surgisis® four-ply porcine small intestine submucosa (Cook Medical, Bloomington, IN), Gynemesh PS® nonabsorbable polypropylene mesh (Ethicon Inc, New Brunswick, NJ) or Ultrapro® partially absorbable polypropylene mesh (Ethicon Inc). Abdominally implanted grafts served as control. Pre-op and pre-necropsy cultures were obtained. At 12 weeks the grafts were harvested and sent for histologic (collagen ingrowth and inflammation) and biomechanical (tensile strength and elastic modulus) analysis.

**Results:** There was no difference in tensile strength (normalized force) of vaginally implanted graft when compared to abdominal implanted graft of the same material. Only Gynemesh PS® decreased significantly in elastic modulus from 0.72 N/mm to 0.47 N/mm (p<0.003). Collagen ingrowth was moderate to strong in implanted nonabsorbable and partially absorbable polypropylene grafts. Minimal to moderate ingrowth was noted in implanted fascia and small intestine submucosa. Pre-op vaginal cultures were positive in 11 (34%) of the 32 samples. Pre-necropsy vaginal cultures were positive in 22 (69%) of the 32 samples. Erosion was noted in 12 (37.5%) of the vaginally implanted grafts.

**Conclusion:** Collagen ingrowth was high with non-absorbable and partially absorbable grafts and suggests good incorporation of material into surrounding area. This was not seen with fascia and submucosa, suggesting minimal remodeling and incorporation and therefore possibly a less durable repair. There was no significant change in tensile strength of abdominally versus vaginally implanted graft material suggesting the vaginal environment does not adversely affect the grafts ability to resist force.

**Funding:** Funded by a Mayo Clinic intramural CR5 grant.

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**STEM CELL HOMING CYTOKINE UPREGULATION IN LYSYL OXIDASE LIKE 1 (LOXL1) KNOCKOUT MICE AFTER VAGINAL DISTENSION**

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(Presented by: Una Lee)

**Introduction and Objectives:** Vaginal distension (VD) has been used in rodents to simulate human maternal childbirth injuries. Adult mesenchymal stem cells (MSCs) home to the urethra in female rats after VD due to upregulation of stem cell homing cytokines in pelvic tissues and can accelerate recovery. Lysyl Oxidase Like-1 Knockout (LOXL1 KO) mice develop female pelvic floor disorders (FPFD) after pregnancy and delivery. The objective was to determine if cytokines and cytokine receptors involved in stem cell homing and tissue repair are differentially expressed by pelvic floor tissues after VD in LOXL1 KO mice.

**Methods:** Age-matched, nulliparous, vaginal LOXL1 KO mice underwent either VD or control (no VD). For VD, the vagina was serially dilated and the balloon of a pediatric Foley catheter was distended in the vagina with 0.3 mL for 6 hrs. The urethra, anterior vaginal wall, and bladder base were harvested, snap frozen, and stored at -80 °C. Quantitative real-time RT-PCR was performed on RNA extracted from the urogenital organs. mRNA expression of the cytokines and receptors: monocyte chemotactic protein-3 expression (MCP-3) and stromal derived factor-1 (SDF-1) and a receptor for MCP-3, chemokine receptor-1 (CCR-1), was normalized to GAPDH.
Results: MCP-3 expression was increased 15 fold in the vagina (p=.03), 5.3 fold in the urethra (p=.19), and 1.8 fold in the bladder (p=.27) after VD compared with controls. SDF-1 expression was increased 1.8 fold in the vagina (p=.30), but was unchanged in the urethra (p=.46) and bladder (p=.64). CCR-1 expression was increased 4 fold in the vagina (p=.02) and 1.8 fold in the urethra (p=.09), and unchanged in the bladder (p=.79). Both MCP-3 and its receptor CCR-1 are significantly over expressed in LOXL1 KO mouse vaginal tissues immediately following VD, consistent with previous work. As in rats, SDF-1 expression is not upregulated. In contrast to rats, vaginal expression of MCP-3 and CCR-1 is greater than urethral expression, correlating with functional differences in these animal models since the mice develop pelvic organ prolapse and the rats do not. Conclusion: Stem cell homing plays an important role in recovery from simulated childbirth injury in LOXL1 KO mice. Increased understanding of the role of MCP-3 and its receptor CCR-1 overexpression in targeted stem cell migration could contribute to the development of novel treatments and preventive measures for FPFD.

Poster# BS24

THE EFFECT OF AGING, PARITY, AND HORMONE REPLACEMENT STATUS ON THE BIOMECHANICAL PROPERTIES OF VAGINAL TISSUE IN WOMEN WITH PELVIC ORGAN PROLAPSE

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(Presented by: Una Lee)

Introduction and Objectives: The role of vaginal biomechanical properties in the pathophysiology of pelvic organ prolapse (POP) is poorly understood. The objective was to examine the effect of aging, parity, hormone replacement therapy (HRT) on the biomechanical stretch properties of vaginal tissue in women with stage III or IV POP.

Methods: Full thickness vaginal wall tissue was harvested from the anterior and posterior wall of women undergoing repair of stage III or IV POP. Vaginal tissue (n=19) was harvested at time of surgery and stored in saline in -80 C. After vaginal tissue was prepared into identical 1cm x 5cm strips, specimens were affixed to metal plates and manually tightened to a consistent length. The biomechanical properties were measured using the following 5 parameters: maximum stress (measure of stiffness), τ₁/₂ (time for tissue to hold maximum stretch prior to decreasing to 76%), rate 1 (slope from time of maximum stretch to 76%), rate 2 (slope from 76% to zero), and Tr expire (calculated value). These parameters were then correlated with clinical data- age, parity, and HRT status by bivariate assessment and using Spearman and Pearson correlations. Trichrome staining of non-stretched vaginal tissue was also analyzed qualitatively.

Results: Median age was 70 (range 42-80; IQR 56-78). Median parity was 3 (range 0-9; IQR 2-5). 14/15 patients were postmenopausal; 10/14 had HRT. Older age (=median age) was significantly associated with an increase in max stress (p<0.01), rate 1 (p<0.05) and rate 2 (p<0.05). Moreover, HRT was significantly associated with an increase in Tr ½ (p<0.03) and a decrease in rate 1 (p<0.03). An increase in parity was significantly associated with an increase in rate 1 (p<0.03). Qualitatively, Trichrome staining of prolapsed vaginal tissue demonstrated disruption of connective tissue fibers and a paucity of well-organized smooth muscle fibers.

Conclusion: Alterations in vaginal biomechanical properties in women may contribute to the development and progression of POP. Aging is a significant risk factor for increased stiffness of tissue and slower time to return to a non-stressed state. Increased parity and lack of HRT also show a trend toward less elasticity and recovery after stress. More studies are needed to investigate the relationship of clinical risk factors with vaginal biomechanical properties.
**Poster# BS25**

**EFFECTS OF ELECTRICAL STIMULATION OF THE PUDENDAL NERVE ON EXPRESSION OF NEUROTROPHINS IN ONUF’S NUCLEUS FOLLOWING SIMULATED CHILDBIRTH INJURY**  
Hai-Hong Jiang, MD, PhD, Bradley Gill, BS, Levillester Salcedo, MD, Paul Zaszczurynski, BS, Brian Balog, BS, Dan Li Lin, MD and Margot Damaser, PhD  
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(Presented by: Hai-Hong Jiang)

**Introduction and Objectives:** During childbirth, a combinatorial injury occurs, involving both the urethra and pudendal nerve, which can result in stress urinary incontinence (SUI). We have previously demonstrated that dual simulated childbirth injury, consisting of pudendal nerve crush (PNC) and vaginal distension (VD), results in slowed recovery of both continence function & pudendal nerve function, as well as decreased expression of brain derived neurotrophic factor (BDNF). Electrical stimulation has been shown to upregulate BDNF in motoneurons and facilitate nerve regeneration after injury. In this study, we electrically stimulated the pudendal nerve proximal to the crush site to determine if this upregulates BDNF in Onuf’s nucleus (dorsolateral motoneurons) as a potential treatment to facilitate recovery after childbirth.

**Methods:** Sprague-Dawley female rats were assigned to 3 groups; dual injury (n=5), sham injury (n=5), and intact control (n=5), respectively. Rats in the dual injury group received 4 hours of VD immediately followed by bilateral PNC. Rats in the sham injury group underwent sham procedures. All rats received 1 hour of electrical stimulation (20 Hz, 0.3mA, 0.1 ms duration) of the left pudendal nerve and sham stimulation of the right pudendal nerve immediately after dual or sham injury. The lumbosacral spinal cord was harvested 2 days after stimulation and was flash frozen, sectioned at L6/S1, and laser dissected to isolate Onuf’s nucleus. BDNF mRNA expression in Onuf’s nucleus was determined by real-time RT-PCR and was normalized to expression of S-18.

**Results:** Two days after dual injury, BDNF expression in Onuf’s nucleus was significantly decreased in both stimulated and sham stimulated groups compared to that of intact or sham injury. BDNF expression was significantly increased on the stimulated side compared to the sham stimulated side, indicating that electrical stimulation upregulates BDNF expression.

**Conclusion:** BDNF expression appears to be deficient in Onuf’s nucleus after a dual childbirth simulation injury. Electrical stimulation of the pudendal nerve proximal to the crush immediately after dual injury upregulated BDNF expression in Onuf’s nucleus, suggesting that it will improve recovery after injury. Future work will be aimed at optimizing and developing electrical stimulation to facilitate recovery of the pudendal nerve after childbirth as a preventative paradigm for SUI.

**Funding:** Supported by NIH RO1 HD38679-08 and AUA Foundation

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**Poster# BS26**

**EFFECTS OF NEUROTROPHIN SUPPLEMENTATION ON FUNCTIONAL RECOVERY OF THE PUDENDAL NERVE FOLLOWING SIMULATED CHILDBIRTH INJURY: PRELIMINARY RESULTS**  
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Cleveland Clinic, Cleveland, OH  
(Presented by: Bradley C. Gill)
**Introduction and Objectives:** Pudendal nerve (PN) injury during childbirth is associated with the development of stress urinary incontinence (SUI). The external urethral sphincter (EUS) upregulates BDNF following pudendal nerve crush (PNC) to facilitate neuroregeneration and functional recovery, but downregulates expression after vaginal distension (VD). Expression following simulated childbirth consisting of VD+PNC is lower than after PNC alone. This study investigates the effects of BDNF supplementation on PN recovery following simulated childbirth. Here we report preliminary findings in an ongoing study.

**Methods:** Female, virgin, Sprague-Dawley rats weighing 200-225g underwent 2, 30-second, bilateral PNC. Two miniature osmotic pumps were implanted subcutaneously on the back, containing a saline and rat albumin solution, with or without BDNF (1ug/6ul), in 5 animals each. A catheter was run from the pump to the site of PNC and secured. Additional rats underwent identical PNC and treatment following 4 hours of VD. Lastly, 5 rats underwent sham PNC. Animals were analyzed 2 weeks after injury and treatment with leak point pressure (LPP), EUS electromyography (EMG), and PN electroneurography (ENG). Briefly, the bladder was filled and intravesical pressure recorded via a urethral catheter while electrodes recorded PN motor branch and EUS potentials at rest and while the exposed bladder was compressed with a cotton swab to induce leakage.

**Results:** Compared to sham, VD+PNC and PNC produced significantly decreased EMG amplitude and frequency both at baseline and within the guarding reflex induced during LPP. Magnitude of change in EMG amplitude and frequency from baseline to guarding was significantly greater in sham than VD+PNC. BDNF treatment following VD+PNC induced statistical trends toward significance showing increased LPP, increased baseline and guarding EMG amplitude, and increased baseline EMG frequency compared to animals given saline only. BDNF treatment following PNC alone induced statistical trends toward significance showing increased guarding EMG amplitude and increased upregulation of EMG frequency from baseline to guarding compared to animals receiving saline only.

**Conclusions:** Injury produced significantly decreased PN function. Treatment with BDNF potentially improved PN functional recovery 2 weeks after injury, suggesting this may be a method to prevent the development of SUI following childbirth. Future work will confirm these results.

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**Poster# BS27**

**MMP-1 PROMOTER VARIANT IS ASSOCIATED WITH STRESS URINARY INCONTINENCE AND PELVIC ORGAN PROLAPSE**

Patrick McKenzie, MD¹, Jan Rohozinski, PhD², Sonia Vishwajit³, Karl-Erik Andersson, MD, PhD² and Gopal Badlani, MD⁴

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(Presented by: Patrick McKenzie)

**Introduction and Objectives:** Stress Urinary Incontinence (SUI) affects nearly 9 million American women and 1.5 million men. Almost half of the women also suffer from pelvic organ prolapsed (POP). The connective tissue structures that support the pelvic floor are rich in extracellular matrix (ECM) proteins such as fibrillar collagen. Matrix metalloproteinases (MMPs) play a crucial role in the remodeling and maintenance of integrity of fibrillar collagen. It is believed that increase MMP-1 (collagenase-1) activity may lead to increased proteolysis of fibrillar collagen and decreased integrity of pelvic floor connective tissues. A well-known variant of MMP-1, -1607GG>G (or “2G”), has been tied to numerous disease processes and may be involved in SUI and POP. The aim of this study is to determine whether the 2G variant in the MMP-1 promoter positively associates with SUI and POP.
Methods: 41 adult female patients with surgically corrected SUI or POP were identified during their visit to department of Urology at Wake Forest University Baptist Medical Center. Also 30 control patients were identified during their visit to the Urology clinic for problems unrelated to SUI/POP. Patient blood samples (10ml) were obtained during routine clinical visits. The promoter region spanning the GG; G- alleles were sequenced and the genotypes were scored.

Results: We observed that the 2G allele was present in 38 of the 41 patients (frequency of 0.927) with SUI/POP. A \( \chi^2 \) test was used to assess the difference in the observed frequency and that expected within the general population (P value = .008, odds ratio = 4.9 with 95% CI = 1.4-17.0). A control sample of 30 patients without POP or any form of incontinence was also recruited to determine allele detection and frequency in the local population. The GG allele was present in 74% of these women, a percent similar to that seen in the general population (72.5%).

Conclusion: There is a compelling association between POP and SUI with the 2G allele of the MMP-1 promoter. We observed a frequency of 93% for the G insertion within the patient population versus an expected frequency of 72.5% in the general population (P=.008). This association suggests that enhanced MMP-1 transcription plays a significant role in the development of POP and SUI. Our data suggests that the presence of the 2G allele is a major contributing factor to development of SUI and POP (odds of condition ~5 times greater), although by itself it is not the determining factor.

Poster# BS28

IMPACT OF AGING ON DEGREE OF INJURY AND RECOVERY TO BLADDER FUNCTION, AND EXPRESSION OF STEM CELL HOMING CHEMOATRACTIVE IN RAT MODEL OF SIMULATED BIRTH TRAUMA

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Introduction and Objectives: The pathophysiology of stress urinary incontinence (SUI) is multifactorial. A growing body of evidence suggests that advanced maternal age (AMA) is an independent risk factor. We hypothesize that there is a balance between tissue injury and recovery during childbirth, which contributes to the development of SUI, and that risk factors like AMA alter balance by affecting either process. The vaginal distention (VD) model for simulating birth trauma and the correlation of monocyte chemotactic protein-3 (MCP-3) with tissue injury is established. This study aims to determine the effect of aging on the continence mechanism in rats and MCP-3 expression following VD.

Methods: 10 young and 14 aged virgin Fisher 344 rats were randomized to VD and matched controls. Following four hours of VD urethral tissues were harvested immediately for MCP-3 expression via RT-PCR. Relative expression of MCP-3 (VD/Control) between aged and young rats at each location was compared using the Wilcoxon rank sum test. A second group of 36 young and 39 aged rats were randomized to 4 groups: control, VD 4 days, VD 2 weeks, and VD 3 weeks. Rats underwent VD followed by leak point pressure (LPP) measurement at day 4 days, 2 weeks, and 3 weeks. LPP between aged and young rats per time point was compared using Wilcoxon rank sum test.

Results: Following VD, there was a significant increase in relative urethral expression of MCP-3 (RMCP-3) in the aged rats compared to young rats. RMCP-3 expression was 41.4±9.6 vs.8.9±10.3 (P=0.002). LPP decreased significantly and equally at 4 days following VD compared to controls in both young and aged rats. LPP recovered to baseline values in both groups at 2 weeks; however, 3 weeks after VD, a significant decline in LPP was observed in aged rats. (figure 1)
Conclusion: The extent of injury was equivalent in aged and young rats when measured functionally in LPP changes. Aging, had a decompensatory impact on continence recovery when measured at 3 weeks. MCP-3 signal is significantly over-expressed with aging following VD. Whether there is a causal relationship between this signal expression and decompensated recovery is the focus of our ongoing research. No financial disclosure.

Poster# BS29

OPPOSITE EFFECTS OF TYPE 1 DIABETES MELLITUS ON BLADDER AND URETHRAL SMOOTH MUSCLE STRIPS
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(Presented by: Matthew O. Fraser)

Introduction and Objectives: Long term and/or poorly controlled diabetes mellitus (DM) may result in lower urinary tract dysfunction characterized by detrusor hypomotility and impaired urethral relaxation and contraction, i.e. diabetic cystopathy and urethropathy, respectively. Such a condition may arise from autonomic nerve dysfunction, myopathy and/or biomechanical properties, and would further predispose patients to both urinary retention and stress urinary incontinence.

Methods: The current study investigated the contractility of both bladders and urethras from control and DM rats by using electrical field stimulation (EFS) to construct voltage (V) and frequency (Freq) stimulus-response relationships; 10-12 female SD rats (250-275g BW initially) were used for each group. DM was induced by i.p. injection of streptozotocin (65 mg/kg) and progressed to 5 or 10 wk; age-matched control rats (C) were given only vehicle. Equatorial cross-sectional bladder strips and spiral-cut whole urethral strips were mounted in organ baths containing physiological buffer solution gassed with 5% CO2/95% O2 at 37 C. Strips were equilibrated for 1 hr under a resting tension of 0.5 g before stimulation at 5-50 Hz at 50-150 V.

Results: All data were normalized to peak contractile force (60 mM KCl). All groups of strips demonstrated V- and Freq-dependent contractile responses (V:Freq interaction ranged P=0.0371 to <0.0001). For bladder strips, 10 wk DM were more responsive than 10 wk C and 5 wk DM (P=0.0056 and 0.0115, resp.). In striking contrast, DM blunted urethral responses relative to control values (state:duration interaction P=0.0183 urethras).

Conclusion: The opposing nature of these results is reminiscent of that seen from previous reports for biomechanical changes in these two organs, wherein bladders become more compliant and urethras become less compliant with DM. We interpret these results to indicate a primary afferent neuropathy of the bladder with a primary efferent neuropathy of the urethra, superimposed on their respective passive biomechanical property changes.

Funding: Supported by DK061391.
**EXPRESSION OF MONOCYTE CHEMOTACTIC PROTEIN-3 FOLLOWING SIMULATED BIRTH TRAUMA IN MOUSE MODEL OF OBESITY**

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Case Western Reserve University, Cleveland, OH  
(Presented by: Gino Vricella)

**Introduction and Objectives:** The vaginal distention (VD) model of stress urinary incontinence (SUI) and associations with monocyte chemoattractant protein (MCP-3) expression as a marker of tissue injury are well described. Obesity is a known risk factor for SUI. Leptin-deficient (ob/ob) mice represent an established animal model for obesity. We investigated the effect of obesity on VD injury as measured by MCP-3 expression.

**Methods:** Two groups of 30 mice including female obese (OB) (background C57BLK/6J) mice and wild type (WT) mice, age 9-10 weeks were studied. Ten mice per group were randomly assigned to have either VD with a 0.3 cc balloon for one hour (hr), sham (insertion of catheter only) or control. Urethra was harvested at 0 hr or 24 hr after VD or sham. RT-PCR for MCP-3 was performed on RNA extracted from harvested organs.

**Results:** Urethral MCP-3 levels in wild type mice had a trend toward elevation at 0 hr with return to baseline at 24 hr in both sham and VD groups. In OB mice, there was a statistically significant elevation of MCP-3 at 0 hr in sham mice to 6-fold versus control (p<0.05), which returned to baseline at 24 hr. In VD OB mice at 0 hr MCP-3 increased 6-fold (p=0.002). At 24 hr, these mice had further elevated MCP-3 levels to 15 times control (p=0.003). (figure 1)

**Conclusion:** MCP-3 is significantly over-expressed in the urethral tissues of OB mice immediately following any urethral manipulation (VD or sham). At 24 hours, the MCP-3 expression patterns become divergent between VD and sham. With a greater degree of trauma (VD versus sham), MCP-3 continued to rise at 24 hr, suggesting that underlying obesity resulted in alterations in response to tissue injury which parallels the degree of injury. This finding corroborates epidemiological evidence connecting obesity and increased risk of SUI. Such associations warrant further studies to investigate the role of MCP-3 as a chemokine for attraction of stem cell migration and resultant tissue repair following birth trauma. This mandates further functional evaluation of obese mice following VD trauma and will be the focus of future research.

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**Urethral MCP-3 Expression After VD or Sham**

![Urethral MCP-3 Expression After VD or Sham](image_url)
DIFFERENTIAL RESPONSE OF STEM CELL HOMING CHEMOKINE AMONG MODELS OF STRESS URINARY INCONTINENCE IN MICE

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(Presented by: Lauren N. Byrne)

Introduction and Objectives: Vaginal delivery has been described to have a key-inciting role in the development of stress urinary incontinence (SUI). Simulated maternal childbirth injury by vaginal distension (VD) has demonstrated increased expression of stem cell homing chemokine (MCP-3) in rats. The aim of this study is to investigate the differential expression of MCP-3 in mice models of simulated birth trauma utilizing VD and pudendal nerve transection (PNT).

Methods: A total of 36, 2-month old female C57B/6 mice were randomized into 4 groups: VD, sham VD, PNT, and anesthesia only. Four age-matched mice acted as negative controls. Half of the mice in each group underwent immediate harvesting of pelvic tissues and the other half were harvested 24 hours later. For each time point, the urethra, vagina and rectum were harvested and venous blood sampling was done for determination of MCP-3 by RT-PCR and ELISA, respectively. Wilcoxon rank sum test was used to compare the relative expression of MCP-3 in each group.

Results: Urethral expression of MCP-3 immediately following VD was 3 folds higher (P=0.02) whereas it was 13.3 folds higher (p=0.02) after 24 hour compared to control mice. In the PNT group, urethral expression of MCP-3 was 2.5 folds higher than control only 24 hours after PNT (P=0.03). There was no statistically significant difference in the MCP-3 expression in the urethral tissue of the sham-VD and anesthesia groups compared to controls. No statistically significant difference was noted in the vaginal and rectal expression of MCP-3 between any of the groups. Statistically significant differences noted in the serum MCP-3 expression in VD (p=0.02) and PNT (p=0.02) group after 24 hours compared to the control.

Conclusion: VD causes increased expression of MCP-3 immediately and 24 hours after injury. PNT only causes modest increase in MCP-3 only 24 hrs after injury. The observed differential response of MCP-3 in models of SUI highlights the differences between direct tissue vs. nerve injury in mechanisms of SUI development. Further, this study establishes the reproducibility of MCP-3 assessment in mice models of SUI as well as feasibility of serum assessment of this mechanism in studies of SUI.

Figure 1: Relative expression of MCP-3 in C57B6 mice at various time points (0 and 24 hrs) following injury of: VD: Vaginal Distension, PNT: Pudendal Nerve Transection and ShVD: Sham Vaginal Distension. P evaluates differences between each group and control. Values shown as mean ± SE.
Poster# BS32

LONG TERM DURABILITY OF POLYDIMETHYLSILOXANE INJECTABLE BULKING AGENT (MACROPLASTIQUE®) IN URETHRAL TISSUES: ANIMAL STUDY HISTOPATHOLOGY
William Wustenberg, DVM
AlterNetMD Consulting, Farmington, MN
(Presented by: William Wustenberg)

Introduction and Objectives: Urethral bulking agents function by forming a space-occupying bolus in the urethral wall thereby increasing urethral closure pressures. Most bulking agents demonstrate short term clinical benefits. However, urethral bulking agents that dissipate lose efficacy over time. Long-term efficacy is related to the persistence of the space-occupying bolus. Polymethylsiloxane (PDMS) implants (Macroplastique®) have an 18 year history of treatment for stress urinary incontinence. The long term histopathology and durability of PDMS implants at the implant site was investigated using the swine model, which provides nearly identical urethral mural structural characteristics compared to human anatomy.

Methods: A total of 18 female Sinclair Mini-swine, 6 groups of 3 each, were endoscopically implanted transurethrally with approximately 5 ml of PDMS at 3 circumferential positions to replicate typical treatment volumes and locations of use in humans. Animals were sacrificed at 7, 30, 90, 180 and 365 days post-implantation. Urethral tissues including implant site locations and visceral organs were submitted for histopathology by a board certified veterinary pathologist.

Results: The local implant sites demonstrated robust peri-implant fibrotic encapsulation and a typical foreign body reaction. Typical chronic cellular response was evidenced by the infiltration of macrophages, giant cells and fibroblasts. The implant bolus was fibrotically encapsulated within 7 days with progression to a mature capsule by 3 months. Little change was noted in the capsule from 3–months indicating long-term stability. By 30 days, fibrotic infiltration of the implant bolus developed, forming fibrotic interstices between and around each individual PDMS implant further anchoring the implants within the tissue space. The chronic foreign body response was not observed beyond the borders of the implant site, no PDMS implants were observed in any tissues outside of the injection sites, and there was no evidence of implant migration from the local implant site to visceral organs.

Conclusion: Histopathology demonstrates that PDMS implanted transurethrally forms a fibrotic space-occupying bolus with long-term anchoring and stability without migration nor dissipation and provides evidence supporting safety and effectiveness. These observations support the long term durability of the PDMS implants within urethral tissues.

Funding: Uroplasty, Inc.

Poster# BS33

EXTERNAL URETHRAL SPHINCTER ELECTROMYOGRAPHY AFTER SIMULATED CHILDBIRTH INJURY WITH RECOVERED LEAK POINT PRESSURE
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Cleveland Clinic Foundation and Louis Stokes VA Medical Center, Cleveland, OH
(Presented by: Hai-Hong Jiang)

Introduction and Objectives: We have previously demonstrated that leak point pressure (LPP) returns to normal 4-6 weeks after a simulated childbirth injury in rats consisting of both pudendal nerve crush (PNC) and vaginal distension (VD). However, the external urethral sphincter (EUS) electromyogram (EMG) remains significantly different from normal 6 weeks after injury. To determine if later recovery of the EUS occurs, we quantitatively analyzed EUS EMG 9 weeks after PNC+VD in rats.
Methods: Twelve Sprague-Dawley female rats underwent PNC+VD (n=6) or sham injury (n=6). Rats in the PNC+VD group received bilateral PNC immediately followed by 4 hours of VD. Rats in the sham injury group underwent the same procedures without actual crush or balloon distension. Under urethane anesthesia, simultaneous EUS EMG and bladder pressure were recorded 9 weeks after injury. During filling cystometry (5ml/h), LPP testing was determined by application of an external increase in bladder pressure, which induced an increase in EUS EMG activity indicating the presence of a bladder-to-EUS guarding reflex. Quantitative assessment of EUS EMG signals was performed by decomposing the EMG signals to obtain the individual motor unit potentials (MUPs).

Results: Compared to sham injury the LPP has no difference 9 weeks after PNC+VD. Nine weeks after either injury or sham injury, EUS EMG demonstrated a significant increase in MUPs during LPP compared to baseline filling; however, there was no increase in the firing frequency of MUPs, suggesting that more EUS motor units are activated during LPP without an increase in firing frequency. Both before and during LPP, the number of MUPs after PNC+VD were lower than that in sham group, although the difference was not statistically significant, suggesting that sufficient motor units had recovered to ensure normal LPP values. The duration of MUPs decreased during LPP after sham injury; whereas it increased during LPP after PNC+VD, suggestive of a regeneration pattern of reinnervation after PNC+VD.

Conclusion: Increased number of EUS MUPs during LPP represents a guarding reflex to prevent leakage which recovers by 9 weeks after PNC+VD. While, the reinnervation pattern after PNC+VD indicates recovery, it may also indicate vulnerability for later development of incontinence.

Funding: Supported by NIH RO1 HD38679-08

Poster# BS34

CAN MODELIZED ANALYSIS OF PRESSURE-FLOW STUDIES IMPROVE THE KNOWLEDGE OF THE NERVOUS CONTROL OF BOTH BLADDER AND URETHRA?
Françoise Valentini, MD, PhD¹ and Pierre Nelson, PhD²
¹ER6 - Université Pierre et Marie Curie (Paris 06) France; ²ER6 - Université Pierre et Marie Curie (Paris 06) - France
(Presented by: Françoise Valentini)

Introduction and Objectives: Our objective was to show that the modelled analysis of pressure-flow (PFs) allows to improve the understanding of the nervous control of both storage and voiding.

Methods: Mathematical model: In the VBN model [1], the excitation of the efferent neurons is quantified by the firing rate of the cell or/and the number of recruited parallel neurons. It governs with a delay the concentration of free calcium ions in the muscular cell which adjusts the regulatory proteins function and so the muscular forces exerted by the detrusor and the striated sphincter. Database: Urodynamic recordings 112 PFs from 71 men [24-86y] with benign prostatic enlargement and 147 PFs from 102 women [24-86y] with urinary incontinence. Exclusion criteria: neurological disease, diabetes mellitus, grade>2 pelvic organ prolapse.

Results: The time constant of the free calcium ions concentration vs efferent signal is Tdet=6s for the detrusor: and Tsph=3s for the sphincter. The main result is that the efferent firing rate is a sequence of constant values and the excitations of the detrusor Edet(t) and the striated sphincter Esph(t) a sequence of exponential functions of time.

1- Edet: a-Standard voiding: asymptotic value Emax=5. b-Early fading (tbreak= 2±1s after the onset of flow) of detrusor excitation is observed in 81 male (72%) and 62 female (61%) PFs. Before the break, excitation is standard. At tbreak, the slope of Edet(t) changes briskly; then Edet has the same Tdet and E’max=X.Emax [X: 0-1]. This property is characteristic of a switch between 2 governing reflexes acting through a linearly delayed transmission.

2- Esph: Standard Esph decreases briskly to zero just before the increase of the Edet [range 1-5 s]: exponential law.
3- End of voiding: a) Without significant post void residual (PVR): when the bladder volume is < 20 mL $\text{Esph}$ increases exponentially to the storage value with $\text{Tsp}h = 3$ s and $\text{Edet}$ exponentially decreases to zero. b) With significant PVR: $\text{Edet}$ decreases earlier than usually.

**Conclusion:** Animal studies have described some reflexes during the micturition course, but their relative physiological weights are still unknown. On the contrary of functional imagery of the brain [2], the analysis of PFs gives some light on the signal processing, but is not concerned by brain localizations. Thus, the method described in this study appears as a complement to the previous ones.


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**Poster# BS35**

**URINE STORAGE IN THE RAT IS AN ACTIVE RATHER THAN PASSIVE PROCESS**

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(Presented by: Matthew O. Fraser)

**Introduction and Objectives:** Low amplitude, nonvoiding bladder pressure waves are commonly observed during cystometry in many laboratory animal species. Various hypotheses relate these pressure waves to sensory function and they are used as a model for human urgency. Using an in vivo video urodynamics preparation in the rat, the origin of these pressure waves has been determined.

**Methods:** The urinary tracts of 8 urethane-anesthetized rats were exposed via a midline abdominal incision. The distal colons were gently evacuated manually and a loose ligature was placed at the splenic flexure to eliminate fecal migration. The right ureter was cannulated with a PE10 catheter connected to a trypan blue in normal saline filled syringe. The left ureter was tied. The pubourethral ligament was cut during pubic symphysis removal by ronguers and the urethral surface was gently cleared for easy visualization. The urachus was tied with 8-0 suture for suspension of the bladder body. The edges of the abdominal cavity were suspended from a rack and the abdomen was filled with mineral oil. The bladder was suspended by the urachus in order to maintain dorsal-ventral orientation and allow free rostral-caudal movement with filling and emptying. A static saline filled PE50 catheter attached to a pressure transducer was inserted into the bladder transurethrally. A video camera was positioned above the LUT to record LUT movements during urodynamics. Trypan blue solution was infused into the ureter at a rate of 0.02-0.04 ml/min.

**Results:** Based on these studies, the following sequence of events for normal bladder filling is reported. Following delivery of urine from the ureters into the bladder base, the bladder base contracts and propels its contents toward the apex of the detrusor, causing simultaneous low amplitude, nonvoiding bladder pressure waves. This is repeated throughout the filling phase, and the functional compartmentalization of the bladder into base and detrusor is readily visible by surface indentations creating a “waist” just caudal to the equator.

**Conclusion:** At threshold, the distinction between base and detrusor seems to disappear as the bladder contracts from the apex toward the urethra. Thus, urine storage by the bladder is a two-stage active process which represents the functional compartmentalization of the bladder rather than a passive filling of the bladder from the bottom up. Whether this process is myogenic or neurogenic in origin is currently under investigation.

**Funding:** Supported by DK061391.
**Poster# 1**

THE IMPACT OF CHRONIC NEUROMODULATION ON CO-MORBID BOWEL SYMPTOMS IN PATIENTS WITH VOIDING DYSFUNCTION

Kenneth M. Peters, MD, Kim A. Killinger, MSN, Jeffrey R. Kangas, BS and Judith A. Boura
William Beaumont Hospital, Royal Oak, MI
(Presented by: Kenneth M. Peters)

**Introduction and Objectives:** Dysfunctional bowel and bladder symptoms often coexist. This study evaluated changes in bowel function in patients having a staged neuromodulation procedure for voiding symptoms.

**Methods:** We analyzed pre- and post-treatment data from patients enrolled in our prospective neuromodulation database study with a history of irritable bowel syndrome (IBS), constipation, diarrhea, or fecal incontinence (FI). Pre-treatment bowel movement frequency and consistency were collected from 3-day diaries and voiding symptoms were assessed with the Interstitial Symptom and Problem Indices (ICSI-PI). Patients received a tined lead at either the sacral or pudendal nerve, followed by generator implantation. At 3, 6, and 12 months post-treatment, bowel diaries, ICSI-PI data, and changes in bowel function rated from “markedly improved” to “markedly worse” on scaled Global Response Assessments (GRA) were collected.

**Results:** Of 199 subjects in the database, 128 (64.3%; 89.1% female; mean age 56 ± 15.4 years) reported bowel problems: 35 had IBS without FI, 63 had constipation and/or diarrhea without IBS or FI, and 30 had FI. Urologic diagnoses included overactive bladder with or without urinary incontinence, interstitial cystitis/painful bladder syndrome, and “other” including urinary retention (n= 74, 43, and 11 respectively). A sacral lead was placed in 104/128 and 24 had a pudendal lead. Over time, ICSI-PI scores significantly improved (p<0.0001). On bowel diaries, no changes were seen in bowel movement frequency, constipation, or diarrhea. However, FI episodes increased slightly between baseline (0.09 ± 0.27) and 12 months (0.36 ± 1.16) (p=0.0207). On 3 month bowel function GRAs, 42.7% (35/82) had at least some improvement, 47.6% (39/82) were the same, and only 9.8% (8/82) reported worsening. At 6 and 12 months, improvements were seen in 30% (12/40) and 22.6% (7/31), no change in 47.5% and 58.1%, and worsening in 22.5% and 19.4% respectively. No statistically significant differences were seen in GRA responses or bowel diaries when grouped by urologic diagnosis or lead location (sacral or pudendal).

**Conclusion:** The majority of voiding dysfunction subjects also had bowel symptoms. Although voiding improved, changes in bowel function were less clear. Further research is needed to carefully examine how neuromodulation impacts co-morbid bowel symptoms in urology patients.

**Funding:** Ministrelli Program for Urology Research and Education (MPURE)

**Poster# 2**

PERCUTANEOUS TIBIAL NERVE STIMULATION DOUBLE-BLINDED, RANDOMIZED, SHAM-CONTROLLED TRIAL FOR OVERACTIVE BLADDER: EFFECT ON FECAL

Kenneth M. Peters, MD¹, Donna J. Carrico, NP, MS¹, Ramon Perez-Marrero, MD², Ansar U. Khan, MD³, Leslie S. Wooldridge, MSN, RNCS, GNP⁴, Gregory L. Davis, MD⁵ and Scott A. MacDiarmid, MD⁶
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(Presented by: Kenneth M. Peters)

**Introduction and Objectives:** Patients with overactive bladder (OAB) frequently have concomitant fecal incontinence (FI). The objective of this study was to compare the efficacy of percutaneous tibial nerve stimulation (PTNS) to validated sham treatment in the subset of OAB subjects diagnosed with FI.
**Methods:** This multi-center, double-blinded, IRB-approved trial enrolled 220 subjects with OAB of which 28 subjects (13%) were diagnosed with FI. Of these subjects, 15 were randomized to PTNS and 13 randomized to a validated sham intervention. Both subjects and study coordinators were blinded to the intervention. Voiding diaries and validated questionnaires were completed at baseline, and after 6 and 12 treatments. In the PTNS group, stimulation was delivered through a 34-gauge needle electrode inserted near the posterior tibial nerve using the Urgent PC device for 12 weekly 30-minute sessions. The validated sham therapy used a placebo needle and a TENS device. Sensory and auditory methods were used to mimic the PTNS treatment although no active treatment was delivered during the 12 weekly 30-minute sessions.

**Results:** Baseline characteristics were similar across both groups. In the PTNS group, mean age was 68.0 years with an average OAB duration of 13.5 years. Similarly, the mean age in the sham group was 67.2 years with an average OAB duration of 12.2 years. Average body mass index was 27.7 and 29.4 respectively. The Global Response Assessment (GRA) for FI symptoms found 30.8% were responders (moderately or markedly improved) in the PTNS group compared 18.2% in the sham group after 6 treatments and 45.5% and 18.2% after 12 treatments. In this same cohort of 28 subjects, OAB symptom improvement as measured by GRA was 26.7% and 15.4% after 6 treatments and 53.5% and 15.4% after 12 treatments for PTNS and sham subjects respectively. No serious adverse effects were noted.

**Conclusions:** GRA outcomes suggest that PTNS provides symptom relief for patients diagnosed with FI after receiving 12 weekly 30-minute treatments. Further research in larger study populations is needed.

**Funding:** Uroplasty, Inc.

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**Poster# 3**

**BILATERAL TINED LEAD PLACEMENT DURING STAGE I SACRAL NERVE ROOT TESTING IMPROVES CLINICAL OUTCOMES WITH SACRAL NEUROMODULATION**

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(Presented by: Taisha Williams)

**Introduction and Objectives:** Success rates of sacral neuromodulation vary with both percutaneous peripheral nerve evaluation (PNE) and staged implant techniques. The aforementioned holds true despite adequate sensory and motor responses during test stimulation (indicators of therapy success).

**Methods:** Bilateral tined lead placement in the staged implant technique was explored to assess differences in success rates within individual patients. This study questioned whether or not the lead that gives the most pronounced neuromuscular response always translates to the lead that gives the best clinical results.
Results: Thirty of 34 patients (27 women, 3 men) had successful outcomes after placement of two tined S3 nerve stimulation leads for refractory urinary frequency or urinary urge incontinence. This accounts for a global 88.2% responder rate to therapy. A 7-21 day testing period was used. Each lead was evaluated during the follow-up period by the patients themselves. A 50% symptomatic improvement was required for placement of pulse generator (Stage II). This was assessed via voiding diary and validated instruments (questionnaires). Five patients who were responding well became unable to tolerate Stage I and asked to be withdrawn. This left 25 of 30 patient responders (>50% symptom reduction) to move on to the implantation of the pulse generator (Stage II procedure). Twelve of the 30 initial responders (40%) reported the lead opposite to the lead with the best intra-operative sensory and motor responses yielded the best clinical results as defined by reductions in urinary urgency and frequency and urinary urge incontinence.

Conclusion: In spite of favorable intra-operative and screening parameters for lead placement, there is a variable clinical response to sacral nerve root testing among candidate sacral nerve sites. This may account for variation in therapy success among published reports. Placement of multiple test leads during staged implant enhances therapy success without significantly added morbidity.

Poster# 4

INDICATIONS, OUTCOMES, AND COMPLICATIONS OF SACRAL NERVE STIMULATION FOR THE TREATMENT OF MALE VOIDING DYSFUNCTION

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University of Tennessee Medical Center, Knoxville, TN, Division of Urology, Department of Surgery
(Presented by: Joe Mobley)

Introduction and Objectives: Men with refractory or complex voiding dysfunction can pose unique diagnostic and therapeutic challenges. Sacral nerve stimulation (SNS) is well documented to provide objective benefit to patients with urge incontinence, urgency/frequency, and non-obstructive urinary retention. However, exclusive reports of its efficacy and durability in men are lacking. Given this, we present long-term follow-up of men treated with SNS.

Methods: A prospective, longitudinal study was performed to characterize the indications and operative outcomes among men treated with SNS. Men with refractory urinary urgency/frequency or non-obstructive urinary retention were offered treatment of their symptoms with the InterStim® device. Accrued patients underwent history/physical examination, one week voiding log, cystoscopy, and urodynamics. Suitable candidates were treated with staged lead placement under general anesthesia. Patients with >50% improvement in symptoms on a one week follow-up voiding log underwent implantable pulse generator placement. Patients were followed post-operatively at 1 week, 1 month, and every 3 months for evidence of sustained efficacy, durability, and adverse events.

Results: Between July 2001 and July 2009, 52 men with a mean age of 56 years (range 28 –79 years) underwent first stage lead placement with a non-tined (11) or tined (41) lead. Indications for intervention included refractory urgency/frequency (30) or non-obstructive urinary retention (22). Forty-one patients (79%) reported >50% improvement in symptoms on follow-up voiding log and underwent IPG placement. Of note, 26 of 30 (86.7%) patients with urgency/frequency converted compared to 15 of 22 (68.2%) patients with non-obstructive urinary retention. Adverse events occurred in 7 patients (Lead migration –4, Trauma –1, Painful stimulation –1, Infection -1), 2 of which underwent successful revision. An additional 5 patients underwent device revision owing to a lack of efficacy (3), battery expiration (1), and chronic diarrhea (1). At a mean follow-up of 41.7 months, 36 patients (88%) have functional IPGs with >50% objective improvement over baseline.

Conclusions: SNS is an effective, well-tolerated treatment for men with refractory urinary urgency/frequency or non-obstructive urinary retention. Men with non-obstructive urinary retention demonstrate inferior conversion rates and future study is needed to clarify the nature and source of this finding.
SACRAL NEUROMODULATION DEVICE INFECTION: ANALYSIS OF RISK FACTORS
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(Presented by: Bader Almosaieed)

Introduction and Objectives: With the recent increase in the usage of sacral neuromodulation for voiding dysfunction, adverse events associated with the procedure such as infections have also risen. The purpose of this retrospective study is to compare the rate of infection in relation to the type of the procedure performed. We also aim to identify factors that may help lower the risk of infection and better salvage the device.

Methods: All patients who underwent sacral neuromodulation from 08/2001 to 07/2009 at our institution were identified. Their medical records were retrospectively reviewed. Information such as relevant history, indication for the procedure, performance of percutaneous evaluation (PNE), and type of the procedure was collected. Post-operative notes including patient’s symptomatic improvement and adverse events and their management were also reviewed.

Results: A total of 126 patients underwent sacral neuromodulation therapy at our institution, 93 patients (74%) were females and 33 patients (26%) were males. The mean age was 64.1. 61 underwent PNE followed by single stage full implant, 61 underwent staged procedure, and four revision of their pre-existing interstim. Five cases of infection (3.96%) were identified; all occurred after staged procedure. Four out of the five were after the first stage (6.6% of all staged procedure) and one after second stage. Only two cases out of 126 patients (1.6%) ended up by explantation of the device. In both patients, culture of the wound site grew Methicillin resistant Staphylococcus Aureus (MRSA). All cases of infection were detected early resulting in hospitalization for intravenous (IV) antibiotics. Salvage of the device was possible in 60% of the infection cases.

Conclusion: Overall infection rate is low and all cases occurred with staged procedure. No infection developed with full implant, which makes it advantageous. The long waiting time between first and second stage procedure seem to be responsible. Shortening the waiting time may help to decrease the infection rate. Careful preparation for the surgery may also contribute to our low infection rate. Early recognition and immediate administration of antibiotics lead to better salvage of the device.

COMPARATIVE EFFECTIVENESS: PERCUTANEOUS TIBIAL NERVE STIMULATION (PTNS) AND SACRAL NERVE STIMULATION (SNS) FOR OVERACTIVE BLADDER (OAB) TREATMENT
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(Presented by: Scott MacDiarmid)

Introduction and Objectives: Anticholinergic therapy is first line treatment for overactive bladder (OAB) but is limited by side effects or lack of therapeutic goal attainment. Neuromodulation is an effective treatment alternative and its efficacy has been well established. The objective of this study was to review the comparative effectiveness of PTNS and SNS using published clinical and cost data to determine the most cost effective treatment strategy.

Methods: A Markov model was constructed to compare costs, clinical effectiveness and the adverse events profiles of PTNS and SNS over a 6 yr. treatment period. Five strategies were compared: PTNS ONLY, SNS ONLY, PTNS FIRST (followed by SNS), SNS FIRST (followed by PTNS) or PATIENT CHOICE of PTNS or SNS. Cost data used average Medicare payments for CPT codes to report services and the associated physician, APC and DRG payments. Clinical effectiveness, defined as the percent of patients still receiving therapy was determined by a review of literature of patient response, adverse events and long term efficacy.
Results: Total cumulative 6 year costs were: PTNS ONLY: $9,000; SNS ONLY: $15,000; PTNS FIRST: $15,000; SNS FIRST: $20,000 and $18-$22,000 for PATIENT CHOICE (75%–% chose PTNS). The costs were substantially lower in strategies with PTNS ONLY, PTNS FIRST, or PATIENT CHOICE with PTNS chosen > 50% of the time. Clinical effectiveness for each of the treatment strategies varied from 34% to 79%. All patient choice models were the most effective (78% - 79%), PTNS FIRST and SNS FIRST were equally effective at 74%. Over six years, PTNS ONLY was 57% effective; SNS ONLY was least effective at 34%. Ranking them from least expensive/effective to most costly/most effective: PTNS ONLY, PTNS FIRST and PATIENT CHOICE with 75% PTNS.

Conclusion: The use of PTNS to treat overactive bladder over a six-year period proved to be both clinically and cost effective.

Poster# 7

DOES BOWEL FUNCTION CHANGE IN IRRITABLE BOWEL SYNDROME PATIENTS UNDERGOING NEUROMODULATION FOR VOIDING DYSFUNCTION?
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(Presented by: Kenneth M. Peters)

Introduction and Objectives: Bowel dysfunction can be associated with irritative voiding symptoms. This study examined changes in bowel function after a staged neuromodulation procedure for voiding symptoms in patients with self-reported irritable bowel syndrome (IBS) without fecal incontinence.

Methods: Patients reporting IBS without fecal incontinence prior to neuromodulation were selected from our longitudinal prospective observational neuromodulation database study. Those who had urinary symptom improvements after tined lead placement at the sacral or pudendal nerve and were implanted with a permanent generator were evaluated. Baseline measures included medical history, bowel movement frequency, constipation and diarrhea episodes recorded on three-day diaries, and validated Interstitial Cystitis Symptom Index and Problem Index (ICSI-PI) questionnaires. At three and six months post-treatment, diaries, Global Response Assessments (GRA) with scaled responses from “markedly improved” to “markedly worse” and ICSI-PI data were again collected.

Results: Of 199 subjects, 46 (23%) had IBS however 11 of these with fecal incontinence were excluded. In the remaining 35, all were female with a mean age of 52 ± 15 years. After neuromodulation, voiding symptoms on the ICSI-PI significantly improved over time (p<0.0001). Bowel movement frequency, constipation, and diarrhea episodes recorded on diaries did not change. On the GRA, at three months 34.8% (8/23) reported at least some improvement in bowel function, half (56.5%) had no change, and only two (8.8%) reported worsening. At six months, 37.5% (3/8) had improved, exactly half remained the same, and one (12.5%) reported mild worsening. Sacral (n=26) and pudendal (n=9) lead recipients were also compared on outcomes measures even though few pudendal subjects were available for evaluation at each time point. Bowel movement frequency, constipation, and GRA responses were not significantly different, however the average number of diarrhea episodes per day improved more in sacral than pudendal (p=0.028).
Conclusion: Our preliminary data suggest that although voiding symptoms improved changes in bowel function in IBS patients were less clear. Even though some improvements were seen, more research is needed to fully explore this potential benefit of neuromodulation.

Funding: Ministrelli Program for Urology Research and Education (MPURE)

Poster# 8

NATIONAL TRENDS IN THE USAGE AND SUCCESS OF SACRAL NEUROMODULATION IN THE MEDICARE POPULATION
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(Presented by: Anne P. Cameron)

Introduction and Objectives: There have been over 40,000 sacral neuromodulation (SNM) systems implanted worldwide, however little is known about patterns of use and outcomes of SNM in the general community. Published reports to date have been limited to case series or randomized controlled trials. Our goals in this analysis were to identify the rate of success of the SNM test phase with the percutaneous technique and the 2-stage technique in the Medicare population and to identify patient related factors associated with procedure success.

Methods: A 5% random sample of Medicare beneficiaries from 1997 to 2007 was used as the data source. CPT codes were used to identify all procedures performed, and ICD-9 diagnosis codes associated with the procedure were used to categorize patients into one of five groups. Success was defined as a procedure resulting in a battery implantation.

Results: In this 5% sample there were 358 percutaneous tests and 1132 two stage (permanent) lead placements performed from 1997 to 2007. The majority of tests were performed in women (73.6%) and in Caucasians (91.3%). Overall 45.8% of percutaneous and 35.4% of two stage tests were successful (p=0.0019). The most common indication for both procedures was overactive bladder (OAB) with incontinence (44.7% percutaneous, 38.4% two-staged). On multivariate analysis for overall success, women had 1.86 times the success compared to men (1.38-2.51 95% CI). In the two-staged procedure, persons age 65-75 had odds of success twice that of those over 75 years (1.49-2.79 95% CI).

Conclusion: Although claims-based data are limited by a lack of detailed clinical information, they identify real-world treatment patterns and outcomes of care for a large heterogeneous population. We found the success rate of sacral nerve stimulation test phase in the Medicare population to be inferior to that published in case series and randomized controlled trials. Although the Medicare population may represent an older and more disabled population of patients receiving SNM, these findings suggest the need to counsel patients realistically about their chances of success with such a procedure.

Funding: NIDDK (Urologic Diseases in America)
RISK FACTORS FOR THE DELAYED LEAD MIGRATION AFTER PLACEMENT OF SACRAL NEUROMODULATORS – DO OUTCOMES PARALLEL THE EXTENT OF LEAD MOVEMENT?
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(Presented by: Rashel Haverkorn)

Introduction and Objectives: Over time there appears to be a progressive loss of efficacy with sacroneuromodulation (SN). Lead migration (LM) has been reported after placement, which may impact efficacy; thus, tined leads have been introduced to minimize the risk of migration. Our aim was to investigate the incidence and extent of LM and to study the relationship between LM, body habitus, and symptoms/efficacy of SN.

Methods: All patients identified as receiving SN lead and generator placement between 01/2007 and 01/2009 for refractory overactive bladder (OAB) were followed prospectively using symptoms, questionnaires (UDI-6, IIQ-7, visual analog scale (VAS) and patient global impression of improvement scale (PGI-I)), and radiographically using plain film lateral view of the sacrum at placement and at follow-up. LM (change in mm from original placement and degree change in axis) was measured by a single trained radiologist. Minimum follow-up was six months.

Results: 50 patients received SN tined lead and generator placement, 45 of these patients for symptoms of OAB. Fourteen of these patients were willing to participate and had pre- and post-implantation films with complete questionnaire data. The median age was 59.6 years with median follow-up of 16.3 months. All patients except one were on, or had been using anti-cholinergics prior to placement with no significant improvement in OAB. Overall, 11/14 (78.6%) of patients had symptom improvement by PGI-I after SN placement. Tined lead migration was noted in 12 patients, with an average 1.6mm of retraction from original placement and change of 0.6 degrees in axis. There was minimal change in BMI between the groups and therefore no association could be made between change in BMI and LM. In patients with LM, mean UDI6/PGI-I/VAS scores were not significantly different from patients in which no LM was noted by Xray; symptom scores also did not vary by amount of retraction or advancement in the leads. Multivariate analysis demonstrated no significant correlations between demographic factors or patient symptoms and degree of LM.

Conclusion: Notable tined LM (3-20mm) was demonstrated in a majority of patients without significant effect on symptoms in this study. No demographic or clinical association could be made to determine which patients are at risk for LM. Still a valid concern, continued investigations are necessary to further explore correlations between LM and efficacy over time.

SUCCESS OF SACRAL NEUROMODULATION IN A PRIVATELY INSURED POPULATION
Anne P. Cameron, MD¹, Jennifer T Anger, MD, MPH², Rodger Madison ³, Christopher S. Saigal, MD, MPH², and J. Quentin Clemens, MD, MSCI¹
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(Presented by: Anne P. Cameron)

Introduction and Objectives: Sacral neuromodulation (SNM) is an increasingly popular treatment for bladder symptoms refractory to medical management. Clinical trials and single centre reports have yielded success rates in excess of 90%. However, our recent review of Medicare claims data yielded inferior results (39.9% overall success). We sought to examine success rates in a younger, privately insured patient population undergoing SNM.
**Methods:** The Ingenix database consists entirely of privately insured patients and was used to determine demographic, diagnosis, and procedure success information. ICD-9 codes were used to define the procedure’s associated diagnosis and CPT codes were used to identify the procedure. Success was defined as implantation of a permanent battery after test stimulation.

**Results:** There were 266 percutaneous and 794 two-staged SNM performed from 2002 to 2007. The sample was 81.3% female, 82.2% were under the age of 65 and 62.7% were Caucasian. Percutaneous procedures were only successful in 24.1% of cases, whereas 50.9% of all two stage procedures resulted in a battery implant (p<0.0001). Procedures in women overall were more successful than in males (51.5% vs. 38.5%, p<0.0001). On multivariate analysis of successful implantation those aged less than 55 compared to those >55 were not different. Women were 1.99 times more likely to be successful overall (95% CI 1.4-2.8) and those with a diagnosis of neurogenic bladder were 0.38 times less likely that OAB wet to succeed (95% CI 0.20-0.73). When comparing Medicare results to the privately insured population, overall success rates (39.9% vs. 49.1%) and success rates with the 2-staged procedure (35.4% vs. 50.9%) were superior in the younger, privately insured group (both p<0.0001). However, results of the percutaneous test procedures were superior in Medicare (45.8% success vs 24.1%; p<0.0001).

**Conclusion:** Claims-based data reveals lower success rates than that reported in the clinical literature. Males and those with neurogenic bladder fare poorly. Outcomes in the younger, privately insured patient were better overall than the outcomes observed in the Medicare population.

**Funding:** NIDDK as part of the Urologic Diseases in America Project

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**Poster# 11**

**SACRAL NEUROMODULATION AND PATIENT PREPAREDNESS: DOES THIS IMPROVE PERCEPTION OF SURGICAL OUTCOME?**

Farzeen Firoozi, MD, Michael S. Ingber, MD, Courtenay Moore, MD, Howard B. Goldman, MD, Raymond Rackley, MD, and Sandip Vasavada, MD

Cleveland Clinic-Glickman Urological and Kidney Institute, Cleveland, OH

(Submitted by: Farzeen Firoozi)
**Introduction and Objectives:** Readiness for pelvic surgery has been shown to be associated with patient-perceived outcomes. We present our pilot study of a group shared appointment (GSA) model to improve patient preparedness prior to sacral nerve stimulation (SNS) therapy for the management of refractory overactive bladder (OAB). In addition, we evaluated whether the GSA model improved patient-perceived outcomes after surgery.

**Methods:** After IRB approval, we prospectively entered patients interested in SNS therapy for management of refractory OAB into our GSA program. Patients received a 30-minute slide presentation of the background, technique, and clinical outcomes of SNS therapy. Patients were then able to ask questions regarding all aspects of the procedure. Following the GSA, patients completed a Preoperative Preparedness Questionnaire (PPQ), a validated questionnaire for pelvic surgery. Patients completed voiding diaries before and during the test stimulation period. In addition, the Patient Global Impression of Improvement (PGI-I) and Patient Global Impression of Severity (PGI-S) questionnaires were used to assess patient-perceived surgical outcome. The GSA group was compared to a cohort of patients (non-GSA group), who received standard counseling in the office and completed the same set of validated questionnaires and voiding diaries.

**Results:** Sixteen patients were entered into our study. Nine patients with refractory OAB participated in a GSA prior to SNS therapy. Seven patients with refractory OAB in the non-GSA group received standard counseling by urology providers in our clinic prior to SNS therapy. Mean age was 61.8 and 58.3 years in the GSA and non-GSA groups, respectively. The GSA group was significantly more prepared before surgery compared to the non-GSA group (p < .05). In addition, the GSA group had significantly higher subjective improvement as measured by PGI-I (p = .037) and significantly lower symptom severity after surgery as measured by PGI-S (p = .037). Objective measures of improvement, defined as >50% improvement in urgency/frequency or incontinence episodes recorded on voiding diaries, did not differ between the 2 groups.

**Conclusion:** The GSA model may better prepare patients prior to SNS therapy for refractory OAB. Preparedness appears to translate to improved patient-perceived outcomes. This pilot study suggests that a larger randomized trial should be done to support a change in clinical practice of patient preparedness for SNS therapy.

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**Poster# 12**

**BATTERY LONGEVITY AFTER SACRAL NEUROMODULATION**

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(Presented by: Anne P. Cameron)

**Introduction and Objectives:** Sacral neuromodulation is increasing in popularity for the treatment of medically refractory bladder symptoms. The manufacturer lists the battery life for the original model as 7 years (5.5-9.2) years. It is unknown, however, how well these batteries perform outside of manufacturer trials and how many of these devices are removed for poor function, damage or pain.

**Methods:** A 5% sample of Medicare from 1997-2007 was used to identify patients who had a sacral neuromodulation battery implantation using CPT code 64590. Any patient who had their battery explanted within thirty days was excluded since this was likely infection or early device malfunction. Any patient who did not have a battery explantation (64595) was considered to have a working implant. Multivariate analysis was carried out to determine those factors that increase the risk of battery removal.
**Results:** In total there were 561 battery implants with 81.5% of the population being female and 92.6% Caucasian. Three implants were removed within 30 days (4.8%) and were excluded. At 60.5 months 89.7% of implants were still in place (Figure 1) and mean time to explantation could not be calculated given the small number of explants in the group. On multivariate analysis (including the variables of provider volume, provider specialty, patient age, diagnosis, gender and race) none reached statistical significance except interstitial cystitis as a diagnosis. Fully 11 of 19 (57.9%) of batteries implanted for interstitial cystitis were removed and the odds of explantation were 10.5 (3.9-28.4 95% CI).

**Conclusion:** Very few sacral neuromodulation batteries once implanted are removed prematurely. Patients with interstitial cystitis however are at very high risk of requiring a battery removal likely due to pain or device non-efficacy.

**Funding:** NIDDK as part of the Urologic Diseases in America Project

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**Poster# 13**

**THE ROLE OF PROVIDER VARIABLES ON OUTCOMES OF SACRAL NEUROMODULATION**

Jennifer Anger, MD, MPH¹, Anne Cameron, MD², Roger Madison, PhD³, Christopher Saigal, MD, MPH³, J. Quentin Clemens, MD³, and The Urologic Diseases in America Project ¹UCLA Department of Urology, Los Angeles, CA; ²Ann Arbor, MI; ³Los Angeles, CA

(Presented by: Jennifer Anger)

**Introduction and Objectives:** Numerous studies have documented a relationship between provider variables, including surgeon volume and specialty, and outcomes for surgical procedures. In this study we analyzed claims data from two databases, Medicare and Ingenix, to analyze outcomes of sacral neuromodulation with respect to both provider and patient factors.

**Methods:** For Medicare claims, we used a 5% random sample of Medicare beneficiaries from 1997 to 2007. For privately insured patients, the Ingenix (I3) database was used to determine demographic, diagnosis, and procedure success information for years 2002-2007. CPT codes identified relevant procedures performed on each individual, and ICD-9 diagnosis codes identified the indication. Success was defined as a patient proceeding to battery implantation. Multivariate analysis was performed to identify predictors of outcome. High volume providers were defined at those who performed in the upper 25th percentile of procedures performed.
Results: In Medicare, there were 358 percutaneous tests and 1132 two stage (permanent) lead placements performed from 1997 to 2007. There were 266 percutaneous and 794 two-staged procedures in the Ingenix database. Urologists had better outcomes after 2-stage procedure than gynecologists in both datasets (I3: 54% vs. 47%, CMS: 49% vs. 43%, p < 0.0001), though gynecologists had better outcomes of percutaneous testing in Medicare (63% vs.44%, p = 0.005). In multivariate analysis, high volume providers had significantly better outcomes after permanent lead implantation (2-stage, vs. percutaneous trial) than low volume providers (CMS, Table 1). Women had better outcomes than men in both I3 and Medicare.

Conclusion: Success of sacral neuromodulation, as defined by implantation of a permanent battery, was greater among high volume providers in CMS. That outcomes were better among urologists may be due to that fact that there are more high volume providers among urologists than gynecologists. These differences in outcomes between specialties will likely diminish as sacral neuromodulation spreads throughout the gynecologic community.

Poster# 14
PERCUTANEOUS TIBIAL NERVE STIMULATION FOR THE TREATMENT OF OVERACTIVE BLADDER: TREATMENT INTERVAL FREQUENCY
Scott MacDiarmid, MD¹, Kenneth Peters, MD², and Leslie Wooldridge, GNP³
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(Presented by: Scott MacDiarmid)

Introduction and Objectives: The Overactive Bladder Innovative Therapy (OrBIT) Trial Phase 2 demonstrated the long-term effectiveness of Percutaneous Tibial Nerve Stimulation (PTNS) for the treatment of overactive bladder (OAB). Symptom improvements after 12-weekly PTNS treatments were sustained throughout 12 months of therapy. The objective of this study was to evaluate the treatment interval frequency necessary to maintain efficacy.

Methods: After 12 weeks, PTNS responders were treated for an additional nine months of therapy at tapered intervals. Frequency of PTNS was determined by subject OAB symptom control and symptom deterioration. Voiding diaries and Overactive Bladder Questionnaires (OAB-q) were completed at baseline, 12 weeks, and six and 12 months. Outcome measures included voiding frequency, urinary urge incontinence episodes, urgency episodes, and voids causing waking, volume per void, and quality of life indices. Subjects completed Global Response Assessments (GRA) at 12 weeks, six and 12 months.
Results: Thirty-five subjects continued PTNS therapy after an initial 12 weekly treatments. Thirty-two and 25 subjects completed voiding diaries at six and 12 months, respectively. All objective improvements in voiding diary variables demonstrated at 12 weeks were sustained at six and 12 months. Subject GRA similarly demonstrated sustained improvements with 94% reporting sustained GRA improvement from 12 weeks. The mean number of days between treatments was 21 days from 12-week visit through 12-month visit. For the 25 subjects who completed nine months follow-up, 24% (6/25) received ≤10 treatments, 72% (18/25) received 11-20 treatments, and 4% (1/25) received ≥21 treatments. The mean number of PTNS treatments per month were as follows: four per month during initial 12 weeks of therapy, 1.9 per month from months 3-6, 1.4 per month from months 6-9, and 1.2 per month from months 9-12.

Conclusion: PTNS sustained efficacy was demonstrated over 12 months following initial success at 12 weeks. Subjects only required an average of ≥1 treatment monthly to sustain therapeutic effects throughout 12 months. This demonstrates long-term efficacy of PTNS.

Funding: Uroplasty, Inc.

Poster# 15

A SHORT-TERM ANALYSIS OF PARAMETERS AFFECTING THE OUTCOME OF SACRAL NEUROMODULATION
Hana Yoon, MD, PhD
Ewha Womans University School of Medicine
(Presented by: Hana Yoon)

Introduction and Objectives: Sacral neuromodulation has become an effective option for controlling intractable symptoms of overactive bladder; urgency and urge incontinence. However, it has its limitations in that intermittent pulse generator (IPG) is insertable only in patients with at least 50% of symptom improvement. In this study, we aimed to investigate the predictive parameters that affect surgical outcomes.

Methods: Data from 31 candidates for sacral neuromodulation was retrospectively analyzed. Twenty patients out of 31 candidates had satisfactory symptom improvement after tinned lead test implantation, which resulted in IPG implantation. Data and neural stimulation parameters were compared and analyzed between successful IPG implants (group 1) and test failures (group 2).

Results: The percentage of female patients was higher in the IPG implant group (95% vs 64%). There was a significant difference in symptom duration, between the two groups (40.1 months for group 1, and 91 months for group 2). There was a significant difference in the number of episodes of urgency between the two groups (6.83/day vs 9.66/day, p=0.012), and severity of urgency showed significant difference between two groups (p=0.027).
Conclusion: In this study, severity and duration of symptoms are predicting poor outcomes deciding inserting neuromodulator. Although there is a need for further data analysis, this study suggests that the proper selection of surgical time is important in control patients’ lower urinary tract symptoms (LUTS) by neuromodulation.

Poster# 16

THE EFFECT OF SACRAL NEUROMODULATION ON ANTICHOLINERGIC EXPENDITURES IN A PRIVATELY INSURED POPULATION
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(Presented by: Jennifer Anger)

Introduction and Objectives: Sacral neuromodulation is FDA-approved for voiding dysfunction refractory to medical therapy. Goals of treatment often include the improvement in voiding or storage symptoms such that anticholinergic therapy may be stopped. With the goal of understanding the impact of sacral neuromodulation on anticholinergic use, we analyzed patterns of care using a national claims-based dataset.

Methods: The Ingenix database contains insurance claims, including utilization and cost data, for 75 large employers. De-identified patients who underwent sacral neuromodulation between 2002 and 2007 were identified by the unique CPT-4 procedure code for battery implantation, code 64590. The number and costs of anticholinergic prescriptions were compared before and after treatment.

Results: There were 266 percutaneous and 794 two-staged procedures performed from 2002 to 2007 in the Ingenix dataset. A total of 484 battery implantations were performed, representing 46% of the test procedures. During the year prior to undergoing sacral neuromodulation, each patient purchased an average of 2.1 prescriptions for an anticholinergic agent (SD 3.5). During the year after neuromodulation, each patient purchased an average of 1.0 prescription (SD 2.3, p<0.0001 by t-test). Anticholinergic prescription charges were $241.31 per patient before and $103.52 after neuromodulation, a statistically significant cost difference (p<0.0001 by t-test). During the year before the procedure, 50% of patients filled anticholinergic prescriptions. This decreased to 23% after the procedure (p<0.0001 by chi-square test). Of the 112 patients who were prescribed an anticholinergic agent after neuromodulation, forty percent had their last prescription less than 180 days after the implant, possibly indicating a gradual reduction in anticholinergic use over time.

Conclusion: Sacral neuromodulation resulted in a significant decrease in use of anticholinergic medication, as evidenced by fewer expenditures on anticholinergic agents and 50% fewer prescriptions filled. This reduction in anticholinergic utilization after sacral neuromodulation is less than that reported in the clinical literature. This savings is minor compared to the cost of the implantable neurostimulator. However, in order to determine the true cost-benefit ratio of sacral neuromodulation, a cost effectiveness analysis that takes into account patient quality-adjusted life years must be performed.

Poster# 17

USE OF COMBINED ANTICHOLINERGIC MEDICATION AND SACRAL NEUROMODULATION IN THE TREATMENT OF REFRACTORY OVERACTIVE BLADDER
Ene George, MD, Felicia Lane, MD and Karen Noblett, MD
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(Presented by: Ene George)
**Introduction and Objectives:** Overactive bladder (OAB) has been estimated to affect approximately 33 million adults in the United States, resulting in an $18 billion annual cost for treatment. These disorders lead to considerable limitations on social and personal activities and can lead to significant emotional distress and embarrassment. Behavioral therapy and anticholinergic (ACH) medications have long been a mainstay of management of OAB, however not all patients respond to, or tolerate treatment. Sacral neuromodulation (SNM) is an FDA approved therapy for refractory OAB. It is thought that ACH medications work primarily via the motor efferent pathway and that SNM works primarily through the sensory afferent system to control symptoms of OAB. It stands to reason that some patients may have a more robust response to combined therapy. The purpose of this study was to determine how many patients implanted with SNM were restarted on ACH to improve their response to therapy. We also sought to determine factors predictive of needing to supplement with ACH medication.

**Methods:** Retrospective chart review from 1999 to 2007, of 148 patients who underwent SNM test stimulation. Charts included those patients implanted for urgency, frequency or urge incontinence. Patients with urinary retention and patients who did not proceed with full implant were excluded. A step-wise regression analysis was performed to identify factors predictive for restarting ACH medication.

**Results:** A total of 88 subjects were included in the analysis. The majority of patients, 78%, were implanted for urge incontinence, while the remaining were implanted for urge-frequency. Most patients, 82%, had trialed one or more ACH medications pre-implant. Nine patients (10.2%) were on ACH therapy at time of implant 3 of which were able to stop following implant. Post-implant, 20 patients (22.7%) were restarted on ACH with an 84.2% response rate. We performed a step-wise multivariate analysis to determine if there were any factors predictive of the need for supplemental ACH therapy and found only a moderate association with BMI.

**Conclusion:** Of the 88 patients implanted for frequency-urgency and urge incontinence, 16 patients (18%) required supplemental ACH therapy for improved symptom control. A total of 22 patients (25%) either continued or were started on Ach therapy in addition SNM for improved outcomes. The only factor associated with supplemental ACH use was BMI.

**Poster# 18 – WITHDRAWN**
**Results:** A total of 78 patients fulfilled the International Continence Society (ICS) criteria for PBS/IC and showed cystoscopic evidence of glomerulation or ulcer as recommended by the European Society for the Study of IC/PBS (ESSIC). All the patients failed conservative management before considering the SNM. Permanent SNM implanted in 46 (59%) of patients who showed at least 50% improvement in their symptoms with temporarily peripheral nerve evaluation test (PNE). Both female gender and presence of urge incontinence were a good predictor for the PNE success. With a median follow up of 61.5 months (SD ±27.7), thirty three (72%) of the patients showed good long term success of the SNM with at least 80% improvement of their symptoms in the global response scale. Presence of urgency was a very good predictor of the long-term success. The explantation rate was 28%. The most common reason for the explantation was poor outcome (54% of the removed devices). The revision rate was 50%. The most common indication for revision was lack of stimulation sensation and worsening of the symptoms. The average durability of the pulse generator battery was 93 months.

**Conclusion:** Chronic sacral nerve modulation is an effective treatment to control the symptoms of PBS/IC. It should be considered before any major intervention if conservative measure has failed. It is minimal invasive, safe and has good long term durability. The revision rate is high and patients require lifelong follow-up.

**Poster# 20**

**Efficacy of Neuromodulation for Refractory Interstitial Cystitis/Painful Bladder Syndrome**

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(Presented by: Sara Lenherr)

**Introduction and Objectives:** Interstitial cystitis/painful bladder syndrome (IC/PBS) is frequently refractory to pharmacologic and endoscopic therapies. Our objective was to evaluate the efficacy of sacral neuromodulation for treatment of patients with refractory IC/PBS.

**Methods:** A retrospective review of IC/PBS patients that underwent Interstim (Metronic, Inc., Minneapolis, MN) placement was performed. Inclusion criteria for this study included patients meeting ICS IC/PBS definition who had refractory symptoms after pharmacologic and endoscopic therapy. Patients progressed from 1st to 2nd stage implantation if urinary/pain symptoms were improved 50% over a 2-week test period. Outcomes were assessed by comparing O’Leary-Sant IC questionnaires scores prior to first stage, <3 months after 2nd stage and at 3-12 month time points. Complications were assessed through chart review.

**Results:** Between 2003 and 2009, 25 patients (23 females) with refractory IC/PBS underwent first stage percutaneous implantation of an Interstim device. Mean age was 43.6 years (range 21.5-65.9). Twenty-three (92%) of these patients progressed to 2nd stage implantation. Mean follow-up time after 2nd stage was 25.4 months (range 1-141). Pre-implant baseline symptom and problem scores were 14.7 (SD 3.94) and 14.0 (SD 2.37). At the <3 month time point, symptom and problem scores decreased by 8.4 (p=0.0001, 95% CI 4.76-12.08) and 8.0 (p=0.0001, 95% CI 4.78-11.22) from baseline. At the 3-12 month time point, symptom scores increased by 5.4 from <3 month scores (p=0.0472, 95% CI 0.08-10.67) and had returned to near pre-implant baseline. At 3-12 months, problem scores increased by 2.5 (p=0.2643, 95% CI 2.11-7.11) but remained significantly below pre-implant baseline (p = 0.0011). Complications included IPG site pain (n=3), wound infections (n=4) or IPG (n=2).

**Conclusions:** In our series, neuromodulation for refractory IC/PBS demonstrated an initial statistical improvement in symptom and problem scores after second stage implantation. However, by 3-12 months, symptom scores returned close to pre-operative baseline while problem scores remained improved. These findings need to be validated in a large multi-institution study.
**Poster# 21**

**FORCE OF STREAM AFTER SLING THERAPY (FAST): MIDTERM ANALYSIS OF SAFETY AND EFFICACY OF RAPID DISCHARGE BASED ON SUBJECTIVE REPORT**

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(Presented by: Michael Ingber)

**Introduction and Objectives:** Currently there are no data to support recommendations on when to discharge patients after midurethral sling surgery (MUS). Many physicians continue to base discharge timing on post-void residual volumes (PVR) and some routinely leave catheters in overnight. Our objective was to evaluate the safety of a protocol using patient subjective reporting of force of stream (FOS) to minimize both length of stay (LOS) and need for catheter placement.

**Methods:** Fifty-six consecutive women undergoing MUS without concomitant pelvic surgery were prospectively enrolled. Within one hour of arrival to the recovery area, the bladder was filled with 300mL of saline and the catheter removed. Patients were prompted to void within 15 minutes of filling, and, if unable, were given one hour to try to void. Patients rated their post-operative FOS on a visual analog scale (VAS) compared to their baseline. If their subjective report of FOS was greater than 50% compared to their baseline FOS they were discharged immediately. Only women who were unable to void, or who rated FOS <50% and had a PVR>500mL had a catheter placed. Patients were telephoned within one week of surgery and all women completed follow-up at 4-6 weeks, where any visits to the emergency room (ER) or office for acute voiding dysfunction or UTI were noted. LOS was defined as the time from the completion of surgery to discharge.

**Results:** 56 women completed the study protocol. Three (5.4%) women were unable to void and had a catheter placed. These women all passed a subsequent voiding trial within 48-72 hours. Per protocol all other women were discharged without a catheter. PVRs ranged from 0-427 mL in these women and 11 (19.6%) voided less than half of what had been instilled. Despite our large number of women who were sent home without a catheter (94.6%), none returned to the ER or office for acute voiding dysfunction. Mean LOS was 152 minutes for the entire group.

**Conclusions:** All patients who report a post-op FOS of >50% can be safely and rapidly discharged after uncomplicated MUS. Scanned PVRs do not add much value in women who are able to void postoperatively, and excessive LOS due to multiple PVR checks after sling surgery may only delay discharge. Following our protocol, all patients can be discharged home within three hours after surgery.

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**Poster# 22**

**LONG-TERM OUTCOMES AND COMPLICATIONS OF THE TRANSOBTURATOR MIDURETHRAL SLING**

Paul W. Walker, MD, Joshua Holstead, MS, B. Jill Williams, PhD, and Alex Gomelsky, MD
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(Presented by: Paul W. Walker)

**Introduction and Objectives:** While several authors have recently reported long-term outcomes of the retropubic midurethral sling, long-term outcomes (>48 months) of women undergoing the transobturator (TO) sling have yet to emerge. We aim to report the first long-term outcomes and complications of the outside-in TO sling and to evaluate its durability by comparing outcomes with women completing medium-term follow-up (F/U; 12-48 months).
Methods: After IRB approval, we retrospectively identified 389 women who underwent TO sling for stress incontinence (SUI) since 2004, and were eligible for a minimum F/U of 12 months. Pre- and post-operative assessment included pelvic exam, cough-stress test (CST), SEAPI evaluation (stress incontinence, emptying, anatomy, protection, and inhibition), quality of life (QOL) questionnaires, and Visual Analog Score (VAS; 1-10) measuring overall satisfaction. “Global cure” was defined as subjective-SEAPI composite=0 and VAS≥8. “SUI cure” was defined as no subjective SUI (SEAPI(S)=0) and a negative CST. Demographics, perioperative details, and complications were abstracted from the clinic and hospital charts. Statistical evaluation was conducted.

Results: Sixty-three women (16%) were eligible but did not complete F/U≥12 months, leaving 326 women for reporting. Mean F/U for the entire cohort was 32.5 months. Group 1 (medium-term F/U) and Group 2 (long-term F/U) consisted of 285 and 41 women, respectively. There were no significant differences (NS) in demographic and preoperative variables, and incidence of previous pelvic surgery between the two groups. The “SUI cure” rate was 88.4% and 78% in Groups 1 and 2, respectively (NS). The “global cure” rate was 72.3% and 56.1% in Groups 1 and 2, respectively (p<0.05). A statistically significant improvement in SEAPI scores, QOL indices, and daily pad usage was observed in both groups. There were no statistically significant differences in short-term (<30 days) and long-term (>30 days) complications between the two groups. Reoperation rates were likewise similar.

Conclusion: At long-term follow-up, the TO sling provides durable results in resolving SUI in women; however, the “global cure” is significantly lower than in women with medium-term follow-up. This indicates that factors other than SUI may play a greater role in the long-term surgical outcomes in these women. The complication rates are low and, regardless of F/U length, women experience a significant improvement in their QOL.

Poster# 23

MANAGEMENT OF SHORT TERM COMPLICATIONS OF SYNTHETIC MIDURETHRAL SLINGS
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(Presented by: George R. Schade)

Introduction and Objectives: Since their introduction into clinical practice, synthetic midurethral slings (MUS) have gained widespread use in the surgical management of stress-urinary incontinence (SUI) in women. Despite their extensive use, data describing complications of MUS and their management are lacking. We describe our experience managing complications of synthetic MUS.

Methods: A retrospective review of patients who presented to the University of Michigan for management of complications of MUS was performed. Patients were identified using CPT billing codes and all patients who underwent surgical management of complications related to synthetic MUS were included.

Results: A total of 41 women presented to the University of Michigan with MUS complications who later underwent synthetic MUS removal or revision. Average age was 53.4 years and the group was comprised of 18 tension-free retropubic approach MUS and 21 trans-obturator approach MUS. With a mean interval of 14.3 months from initial implant procedure, 24 patients presented with pain/dyspareunia, 27 with urinary incontinence, 6 with urinary obstruction, and 20 with sequelae of erosion. Patients underwent an average of 1.9 surgical procedures at our institution for either revision of the MUS or total removal. Initial corrective procedure included urethrolysis in 40 with removal or transection of the tape in 26 and 6 patients respectively. One patient underwent repair of urethrovaginal fistula. With a mean follow-up of 12.4 months, 7 patients had persistent pain and 23 had urinary incontinence at most recent follow up. Interestingly, 5/11 patients who underwent pubovaginal sling for incontinence following removal of their synthetic MUS had persistent incontinence and 3/14 who were dry at initial presentation developed incontinence following MUS revision.
Conclusion: Although synthetic MUS are clinically effective for management of SUI in women, current data may underestimate the complication rate of synthetic MUS. Additionally, management of complications of synthetic MUS are clinically challenging with many patients requiring greater than one procedure, many remaining incontinent of urine, and complications persisting despite sling revision.

Poster# 24

URETHRAL DISTORTION AFTER PLACEMENT OF SYNTHETIC MID URETHRAL SLING
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(Presented by: Sunshine Murray)

Introduction and Objectives: According to Ulmsten’s integral theory, a mid-urethral angulation during straining is necessary to achieve continence after mid-urethral sling (MUS). The potential impact of this distortion on voiding function remains understudied. We retrospectively compare preoperative characteristics of symptomatic patients after MUS, with (group 1) and without (group 2) radiographically confirmed mid urethral distortion during voiding.

Methods: Following IRB approval, the charts of patients who underwent excision of suburethral MUS, for new onset lower urinary tract symptoms (LUTS), between 01/2003 and 07/2009 were reviewed. Demographic and questionnaire data [UDI6, IIQ7 and visual analogue scale (0-10) for quality of life (QOL)], preoperative urodynamics data [maximum flow (Qmax), detrusor pressure at Qmax (pdetQmax) and residual (PVR)] and standing lateral voiding cystogram (VCUG) were collected.

Results: Of 87 operable patients, 23 were excluded [lack of VCUG (16) or voiding phase on VCUG (7)]. Group 1 consisted of 51 patients and group 2, 13 patients. Age, time to sling takedown, UDI6, IIQ7 and QOL scores were not significantly different between the two groups. Preoperative urodynamic parameters in 44 patients (37 in group 1 and 7 in group 2) revealed median pdetQmax in groups 1 and 2 was 27 and 20.1 cmH2O respectively (p=0.25). Median preoperative Qmax was 10.6 and 11.4 ml/sec (p=0.59) with median PVR in the two groups being 45 and 8 ml respectively (p=0.01).

Conclusion: Despite similar baseline symptoms and uroflow characteristics, patients with urethral distortion had a trend toward higher detrusor pressures and residuals than those without. Flow rate alone may be insufficient to predict the possible deleterious impact of MUS on bladder function in patients with new onset LUTS.
OPTIMIZING MIDURETHRAL SLING OUTCOMES AND MINIMIZING COMPLICATIONS: CHOOSING APPROACH BASED ON RISK FACTOR ANALYSIS
Alex Gomelsky, MD, Mirian Boci, MD, and B. Jill Williams, PhD
LSUHSC - Shreveport, LA
(Presented by: Alex Gomelsky)

Introduction and Objectives: Several randomized studies have shown similar success rates for women after the retropubic (RP) and transobturator (TO) midurethral sling (MUS). However, the TO sling is often considered to provide inferior support, although fewer complications. In a previous analysis, we identified risk factors for postoperative stress incontinence (SUI) following TO sling (failure of previous anti-incontinence surgery, concomitant surgery for prolapse Grade ≥2). Our aim was to prospectively allocate women to a MUS approach based on risk factors, in an effort to improve outcomes and minimize complication rates.

Methods: After IRB approval, all women undergoing MUS were evaluated. Since 2007, all women at “high risk” for postoperative SUI underwent RP sling, while women at “low risk” underwent TO sling. Pre- and postoperative assessment included pelvic exam, cough-stress test (CST), SEAPI evaluation (stress incontinence, emptying, anatomy, protection, and inhibition), quality of life (QOL) questionnaires, and Visual Analog Score (VAS; 1-10) measuring overall satisfaction. “Global cure” was defined as subjective-SEAPI composite=0 and VAS≥8. “SUI cure” was defined as no subjective SUI (SEAPI(S)=0) and a negative CST. Demographics and perioperative complications were abstracted from clinic and hospital charts. Statistical evaluation was conducted.

Results: Minimum follow-up for all women was 12 months. In our initial, retrospective study, SUI was cured in 67.6% of “high-risk” women after TO sling (vs. 91% in “low-risk” women). After prospectively allocating 115 “high risk” women to undergo RP sling, the SUI-cure improved to 83.5% (p=0.0196). “Low risk” women prospectively allocated to TO sling achieved an SUI-cure rate of 85.7% (N=126; not statistically different). The “global cure” rate was significantly higher and complication rates were significantly lower in the prospective TO group. A statistically significant improvement in SEAPI scores, QOL indices, and daily pad usage was observed in both prospective groups.

Conclusion: Results of this pilot study suggest that allocating women to a MUS approach based on risk factors is an effective way to improve the “SUI cure” and decrease complications for the entire cohort. Not surprisingly, women with higher grades of concomitant prolapse and previously-failed SUI surgery had higher complication rates and lower rates of “global cure.” Regardless of approach, QOL indices improved significantly.

Poster# 26 – WITHDRAWN

Poster# 27

SINGLE CENTER INITIAL EXPERIENCE WITH NOVEL THERAPY FOR STRESS URINARY INCONTINENCE THAT REDUCES SUDDEN CHANGES IN INTRAVESICAL PRESSURE – THE FIRST THREE YEARS
Leslie Crescimano, MD
Oakland Park, FL
(Presented by: Leslie Crescimano)
Introduction and Objectives: A multi-center randomized single-blind placebo control study is underway to assess the efficacy and side effects associated with a novel new treatment for stress urinary incontinence. Per the protocol, the patients are followed for one year. At the end of this period, patients can choose to continue for up to three years. As the center with the longest experience in the study, we report data and observations on our patients who have chosen to continue beyond one year.

Methods: The therapy consists of a small, thin-walled, air-filled balloon that is inserted transurethrally into the bladder, and inflated. The balloon is intended to reduce sudden intravesical pressure changes that result in leakage. Adult females patients who have suffered from stress urinary incontinence for \( \geq 12 \) months, and who have failed previous non-surgical treatment were enrolled after informed consent. Other inclusion criteria included Stamey \( \geq 1 \), VLPP \( \geq 60 \) cm H2O, and absence of strictures or anatomical abnormalities. Assessments performed at visits every 3 months during the study included 24 hour pad weight tests, provocative pad weight tests, Stamey grade assessment, VLPP, IQOL surveys, multiple cystoscopic examinations, and voiding diaries. The balloon is removed and replaced during these 3 month visits. At 12 months, the study is complete. Patients may, at their discretion, choose to continue the therapy up to a maximum of 36 months. This abstract is focused on only those patients at our center who have opted to continue into this optional phase of the study.

Results: At our center 16 female patients were enrolled (age range 35-84 years; mean 64.2). Of these, 11 (69%) chose to continue in the optional phase of the study, 10 (63%) have reached 24 months, and 4 (25%) have reached 36 months. Compared to baseline, these 11 patients showed, on average, a 66% reduction in leakage in a 24 hour pad weight test; a 76% reduction in leakage in a provocative pad weight test; and a 49% improvement in IQOL score. Insertion and removal of the device was acceptable to both the investigator and patient.

Conclusion: Participation in this study placed a significant burden of time and effort upon the enrolled patients; despite this a significant percentage chose to continue their participation demonstrating the product’s compatibility with their lifestyle. Significant improvement in objective and subjective leakage measures was shown.

Poster# 28

REVIEW OF COMPLICATIONS OF SUBURETHRAL MESH SLINGS REFERRED FOR UROLOGIC INTERVENTION
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University of Calgary, Calgary, AB, Canada
(Presented by: Kevin Carlson)

Introduction and Objectives: While mid-urethral mesh slings (MUS) are an effective minimally invasive treatment for stress urinary incontinence (SUI), bothersome and sometimes devastating complications can occur. We describe our experience in managing patients referred to us for complications of these slings requiring surgical intervention.

Methods: Patients referred to us with MUS complications between June 2002 and March 2009 that ultimately required surgical intervention were retrospectively analyzed. None of the original slings had been placed by the authors. Interventions for recurrent/persistent SUI were not included, nor were tape releases performed within the first two weeks postoperatively.
Results: 42 patients were identified with a mean age 55.2 years (31 –89). Median follow-up was 12 weeks (8-260). Prior attempts at urethrolysis or other interventions had been performed by another surgeon in 6 cases (15%). The majority of slings were retropubic slings (TVT) (90%) and 10% were transobturator slings (TOT). 36 complications (86%) referred to us were considered minor and 6 (14%) major. The most common presenting complaints were retention/obstruction (71%), refractory overactive bladder (OAB) (40%) and recurrent urinary tract infection (15%). For uncomplicated cases of obstruction/retention, resolution or significant improvement was observed following urethrolysis in 78%, while refractory OAB resolved in 72%. Recurrent SUI developed in 16% of these uncomplicated cases. Ten urinary tract erosions and 2 vaginal extrusions were identified. Erosions were treated primarily with endoscopic lysis in 6 cases (60%); however, 5 of these (83%) ultimately required formal excision. Major complications included erosion with ureteric obstruction requiring reimplantation (2), erosion with invasive squamous cell carcinoma requiring exenteration and causing death, urethrovaginal fistula, and delayed bleed.

Conclusion: Complications requiring intervention are rare, but can be devastating. Improvement in voiding and refractory OAB occurs in the majority following urethrolysis, with a small risk of recurrent SUI. Simple erosions can be managed endoscopically and this may simplify formal excision; however, formal excision will be required in almost all cases. Complex erosions mandate aggressive resection with tissue interposition to aid in closure. In these cases upper tract imaging and subspecialty referral should be considered.

Poster# 29

ONE YEAR CLINICAL OUTCOMES FOLLOWING USE OF A SINGLE-INCISION SLING IN WOMEN WITH STRESS URINARY INCONTINENCE (SUI)
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(Presented by: Douglas Grier)

Introduction and Objectives: A paucity of long-term outcomes data exits for single-incision slings. To address this, a prospective, multicentre registry was established to gather long-term evidence for all GYNECARE midurethral systems, including a single-incision sling (GYNECARE TVT SECUR™). Interim results of the latter are reported here.

Methods: This Ethicon sponsored registry is ongoing in 29 IRB approved sites across 8 countries. Sling candidates were invited to participate and written informed consent was obtained. SUI was confirmed by a positive cough stress test (CST) and/or urodynamic assessment. Evaluations were at baseline, peri-operatively, and at 3, 6, 12 months. Effectiveness was evaluated by standing CST at 6 and 12 months, and the Incontinence Quality of Life (I-QOL). All adverse events were collected.
Results: TVT SECUR was placed in 676 women. 65% were placed in Hammock and 35% in U configurations. Mean age was 54 years (SD 11.6) Mean BMI was 28 (SD 6). 58% were postmenopausal. 39% had a prior hysterectomy and 9% previous incontinence surgery. 65.5% had SUI, while 34.5% had stress predominant mixed incontinence. Operative time was 17.9 minutes (SD 11.2) in the 81% having only a sling. Local anesthesia with sedation was used in 67.7%, 87.1% were discharged on day of procedure and 90.2% were voiding at discharge. Mean postoperative pain-score was 1.7 (SD 2.2, score 0 to 10). Complications included: bladder perforation 0.1%; bled>200cc 0.6%; urinary retention 0.3%; urinary tract infection 1.6%; voiding dysfunction 0.9%; de novo urgency 3.4%; mesh exposures 0.9%. Return to social life was 11.6 days (SD 14.2), to employment: 15.0 days (SD 20.3) and to sexual activity: 43.9 days (SD 34.8). I-QOL Improvements at 3 months were maintained throughout going from 48.4 at baseline to 83.5 and 85.3 at the 3 and 12 month follow-ups, respectively. At 1 year, TVT SECUR met patients’ expectations in 87.8%. 81.5% were satisfied with the outcome, 15.2% were not and 3.3% experienced no change. A negative CST was seen in 89.9% patients after 6 months and in 84.9% (95%CI: 81.1%, 88.8%) at 1 year.

Conclusion: This study reports on the largest series to date of TVT SECUR patients with a follow up of one year. Objective cure rate determined by a negative CST was 84.9%, accompanied by a significant improvement in the quality of life that does not seem to deteriorate over a period of one year. The device has an acceptable safety profile.

Poster# 30

PREVALENCE OF CARDIOVASCULAR RISK FACTORS AND COMORBIDITY IN OVERACTIVE BLADDER
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(Presented by: Michelle E. Koski)

Introduction and Objectives: Cardiovascular disease (CVD) is the leading cause of death for women in the United States, yet remains substantially underdiagnosed. Few prodromal syndromes are recognized that anticipate CVD risk such as that demonstrated for men with erectile dysfunction secondary to endothelial compromise. To investigate the potential relationship between OAB and CVD we sought to determine the prevalence of cardiovascular risk factors and disease in female OAB patients compared to both historical prevalence and a pure stress urinary incontinence (SUI) control group.

Methods: Retrospective analysis of demographics and CVD comorbidities was performed for females who presented with urgency and frequency (OAB) or SUI during 2008-2009. OAB patients with prior urologic or pelvic surgery, recurrent urinary infection, or neurologic disease were excluded. This data represents an interim analysis.

Results: 47 SUI and 86 OAB patients met inclusion criteria. Arms were well matched for mean age of presentation (51yr SUI; 53yr OAB). Mean follow-up was 6 months for SUI and 18 months for OAB. OAB patients displayed higher rates of family history of coronary artery disease (CAD) (55% OAB, 45% SUI), stroke (12% OAB, 9% SUI), diabetes (51% OAB, 45% SUI), and hypertension (HTN) (61% OAB, 57% SUI). Additionally, a higher percentage of OAB patients had a personal history of CAD (8% OAB, 2% SUI), stroke (4% OAB, 0% SUI), hypercholesterolemia (24% OAB, 19% SUI), and HTN (45% OAB, 34% SUI). SUI patients demonstrated slightly elevated rates of diabetes and peripheral vascular disease. 82% of SUI and 67% of OAB patients had BMI greater or equal to 25. When compared to general population prevalence data for women, OAB patients maintained a higher rate of concomitant CVD risk factors including HTN and stroke.
Conclusion: In this series of female patients with OAB we demonstrate a higher rate of CAD, HTN and stroke as compared to both age matched SUI controls and general population data despite the increased proportion of elevated BMI in the SUI group. Current therapies for OAB focus on symptom management and not disease etiology or progression. Data from this pilot study can facilitate a paradigm shift in our intervention strategies for both cardiovascular and urologic disease. We continue to accrue additional data for further delineation of this correlation and develop strategies for identification of urologic patients at risk for future adverse cardiovascular events.

Poster# 31

1, 2 AND 3 YEAR RESULTS OF THE ADJUSTABLE CONTINENCE THERAPY (ACT®)
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(Presented by: Suzette E. Sutherland)

Introduction and Objectives: Stress urinary incontinence (SUI) due to intrinsic sphincter deficiency (ISD) is challenging after prior failed therapies. The Uromedica ACT® system is a novel device under FDA investigation that provides bulk at the bladder neck with adjustable silicone balloons for urethral coaptation and bladder neck support to treat such recurrent SUI. Through a small incision near the labia, a trocar is passed to deliver the balloons at the bladder neck. Each balloon is attached to a titanium port that is placed in a subcutaneous pocket of the labia which allows for percutaneous size titration of the balloons for continued maximal efficacy. We present 1-, 2- and 3-yr results on the efficacy and safety of the ACT® device. Study funded by Uromedica, Inc.

Methods: Women with recurrent SUI with urethral hypermobility and/or ISD were recruited. Baseline and follow-up tests were performed at 6 wks, 3, 6, 9 and 12 months and annually, and included 3-day diary, physical exam, direct visual stress test (DVST), provocative pad weight test (PPWT), Stamey score, and validated questionnaires (UDI-6, IIQ-7 and IQoL).

Results: 162 patients were implanted, with 142, 84 and 57 patients completing 1, 2, and 3 yrs follow-up, respectively. Mean age is 67 yrs (31-94 yrs). 83% and 43% had at least 1 and 2 failed anti-incontinence procedure, respectively. Difficulty of implantation was mild-to-moderate in 91%. At 1, 2, 3 yrs respectively: mean PPWT decreased from 48.9, 44.3 and 44.5 grams to 11.8, 8.9 and 8.4 grams (p<0.001); > 50% improved rate was 79.7%, 88.7% and 83.3%; dry rate was 50.8%, 63.0% and 71.4%; and Stamey score improvement was >1 in 75.4%, 75.0% and 83.9%. Questionnaires also noted significant improvements at all 3 years (p<0.001). Mean number of balloon volume adjustments required was 2.9 (0-15). Device/procedure related complications (bladder perforation, port or balloon erosion, balloon migration, pain/discomfort, intermittent urinary retention) were reported in 25% (39/156) of subjects at the end of 12 months, 18.6% (21/113) through year 2, and 13.7% (10/73) through year 3. Of these, the majority (54%) were mild in severity.

Conclusion: Three-year data suggest the ACT® system is an effective, simple, safe treatment for recurrent SUI. The balloons are easily adjusted percutaneously to enhance efficacy. Complications are usually mild and easily managed. Additional follow-up will determine the longer-term durability of this device.
SAFETY AND EFFICACY OF SLING AFTER BULKING INJECTION FOR PERSISTENT STRESS URINARY INCONTINENCE (SUI)
Michelle Koski, MD, Priya Padmanabhan, MPH, MD, Melissa Kaufman, MD, PhD, Harriette Scarpero, MD, and Roger Dmochowski, MD
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(Presented by: Michelle Koski)

Introduction and Objectives: Periurethral bulking agents are a widely employed, minimally-invasive treatment option for SUI, but often lack durability necessitating further surgical intervention. This study aims to assess the impact of injectable agents on subsequent incontinence surgery outcomes to assess safety and efficacy of this treatment combination.

Methods: Retrospective review of medical records of 57 patients with SUI post-bulking agent who underwent sling between 11/2000 and 8/2009 were evaluated for demographics, voiding symptoms, urodynamics (UDS), bulking agent characteristics, concomitant procedures, pads per day (PPD), outcomes and complications.

Results: Mean patient age was 66.5 years (46 - 86) with mean follow-up of 23.5 months (0 - 80). 80% presented with mixed incontinence (MUI) with 100% demonstrating SUI on clinical exam or UDS. Mean valsalva leak point pressure was 70.9 cm H20 (15-150) and detrusor overactivity was seen in 30%. 55% had prior anti-incontinence procedures or injections. A mean of 3 injections (38.6% durasphere, 31.6% collagen, 22.8% coaptite, 7% > 1 type) was performed. Subsequent procedures included 39 autologous fascia pubovaginal slings (68%) and 18 midurethral slings (32%). 33% of patients underwent concomitant pelvic surgery. There was a significant clinical reduction in mean PPD, from 4.8 to 0.59 (p=0.2833). While 90% reported no pad use, only 62% subjectively described complete cure. 75% with MUI noted improvement or cure. No association was seen between number and type of injection or type of sling on outcomes. However, results were significantly related to concomitant surgery with only a 33% cure rate in patients undergoing simultaneous procedures, and 6% showing worsened incontinence (p=0.0016). 17.5% of patients had recurrent SUI, which was not associated with any injection, urodynamic, or concomitant surgery parameter. Complications included 11 episodes of urinary retention, ten (18%) de novo urgency and a 14% incidence of urinary tract infections.

Conclusion: Treatment algorithms for SUI are continually evolving with injectable agents increasingly utilized in clinical practice. We provide insight into this complex patient population and demonstrate the safety and efficacy of this adjunct modality for the management of SUI, which does not appear to alter outcomes for future anti-incontinence surgery.

SUCCESS OF BULKING INJECTIONS FOR PATIENTS WITH SUBOPTIMAL RESPONSE TO SURGERY FOR STRESS URINARY INCONTINENCE (SUI)
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(Presented by: Priya Padmanabhan)

Introduction and Objectives: There are a growing number of women with suboptimal results following anti-incontinence surgery that are reluctant to pursue further surgery. We discuss the efficacy of bulking agents in treating women after failed sling.

Methods: Retrospective review of 42 patients with persistent SUI post-surgery who received bulking agents between 6/1999 and 8/2009 were evaluated for demographics, voiding symptoms, urodynamics (UDS), concomitant procedures, pads per day (PPD), outcomes and complications.
**Results:** Mean patient age was 65 years (41-82 years) and mean follow-up was 9.9 months (0-58 months). 21% had isolated SUI and 69% had mixed incontinence (MUI). 100% had either UDS or clinically proven SUI. Prior anti-incontinence surgery included 26 (62%) pubovaginal slings (PVS) and 16 (38%) midurethral slings. 27 (64%) had concomitant pelvic surgery (45.2% POP repair and 19% urethrolysis). Mean valsalva leak point pressure was 62.6 cm H20(30-110). Detrusor overactivity was demonstrated in 10 (24%). A mean of 3 injections (17.8% collagen, 28.9% durasphere, 53.3% coaptite) at 23.6 months (1-79) was performed. There was a clinically significant reduction in mean PPD from 2.7 to 1 (p=0.0617). 59% wore no pads postoperatively. Twelve (31%) patients reported significant subjective improvement or cure, 21 (54%) partial subjective improvement, 1 (3%) no change and 4 (10%) worsened symptoms. Eleven (37.9%) of 29 patients with MUI noted improvement or cure (p=0.0001). Complications included 1 episode of transient urinary retention, 8 (19%) urinary tract infections and 3 (7%) patients with de novo urgency. Thirty (71%) patients had recurrent SUI, which was not associated with number or type of injections. Six of these patients subsequently underwent autologous pvs. Urinary status did statistically correlate with recurrent SUI. Twenty-four (83%) MUI vs. 6 (50%) SUI patients had recurrent SUI (p=0.0363). There was no association between number or type of injection and complication, surgical outcome, UDS or concomitant surgery parameter.

**Conclusion:** This is the first series evaluating the efficacy of bulking agents following surgical failure. Although many MUI patients had recurrent SUI, bulking agents provided over 85% of women symptom improvement. This study is essential for planning future prospective investigations to define the value of bulking agents in refractory SUI.

**Poster# 34**

**THE DARK SIDE OF PROPHYLACTIC SUBURETHRAL TAPE PLACEMENT**

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(Presented by: Sunshine Murray)

**Introduction and Objectives:** The ease of placement of sub-urethral tapes has encouraged their prophylactic placement at times of other pelvic repair procedures. But, this is not a “benign” decision and certainly a difficult one to defend when secondary complications occur. We review a series of complications that arose from prophylactic sub-urethral tape placement.

**Methods:** Following IRB approval, a retrospective review of patients who presented with complications after a prophylactically placed sub-urethral tape procedure and with minimal 6 months follow-up was performed. Pre-tape surgery clinician notes and confirmatory statement by the patient of no or very rare symptoms of stress urinary incontinence (SUI) at baseline were used to document the prophylactic nature of the tape. Pre and post-tape removal symptoms were collected as well as requirement for further surgery since the tape removal procedure.

**Results:** Ten patients, age=55 ± 14 and BMI=27 ± 6, were evaluated between 2/2007 and 4/2009. Primary procedures included cystocele repair (4), and vaginal (4) or laparoscopic assisted vaginal hysterectomy (2) with concomitant TOT (2), TVT (7) or SPARC (1). Presenting symptoms were de novo severe SUI (2), de novo dyspareunia (4) [including large extrusion (2) and urethral erosion (1)], voiding dysfunction and urge incontinence from kinked mid-urethra as confirmed by voiding cystogram (3) and chronic retention (residual at 900 ml)(1). Following sub-urethral tape excision, persistent pain (2), secondary mid-urethral stricture requiring dilations (1) and mixed urinary incontinence (2) [requiring anti-cholinergic medications (1) and collagen injection (1)] were recorded. Secondary cystocele repair was performed in 2, and removal of an infected paravesical retropubic tape was required in 1. Five patients (50%) had no residual complaints and have remained continent so far.

**Conclusion:** When placed “prophylactically,” sub-urethral tape procedures can result in life-changing complications. The attitude of prophylactic tape placement in SUI asymptomatic patient may need to be reconsidered.
EFFICACY AND SAFETY OF TRANSOBTURATOR ADJUSTABLE TAPE (TOA) FOR THE TREATMENT OF FEMALE STRESS URINARY INCONTINENCE

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(Presented by: Kyu-Sung Lee)

Introduction and Objectives: Despite of the proven efficacy of the midurethral sling (MUS) procedure for the treatment of female stress urinary incontinence (SUI), there remains concern about postoperative persistent incontinence or obstructive symptoms in women with severe incontinence or voiding dysfunction (VD). So we conducted this study to evaluate the efficacy and safety of the MUS using transobturator adjustable tape (TOA) for women with severe SUI, or combined SUI and VD.

Methods: Women with severe SUI (ALPP ≤ 60cmH2O, or Stamey symptom grade III), or combined SUI and VD (maximum flow rate (MFR) < 12ml/sec with void volume ≥ 100ml, or postvoid residuals (PVR) > 150ml) underwent MUS using TOA System (Agency for Medical Innovations, Im Letten 1, 6800 Feldkirch, Austria). At 1 day after surgery, tension might be reduced or increased according to the results of stress test and uroflowmetry (UFM). At 6 months after surgery, changes in the Sandvik questionnaire, ICIQ-Female Lower Urinary Tract Symptoms (ICIQ-FLUTS), Incontinence Impact Questionnaire-7 (IIQ-7), and UFM parameters were evaluated. Patients’ satisfaction and complication were also assessed. Cure was defined as “no leakage” on the Sandvik questionnaire.

Results: Mean age of the total of 65 women was 57.3±9.3 years, and mean ALPP was 63.3±28.7cmH2O. Forty-six (70.8%) women had severe SUI, 30 (46.1%) had VD, and 11 (16.9%) had both. Tension adjustment was needed in 27 (41.5%) women (reduction; 14, increase; 13). Cure rate of the SUI was 84.4%, and satisfaction rate was 85.5%. Domain scores of ICIQ-FLUTS (except voiding sum), IIQ-7, and Sandvik severity index were significantly improved. In women with preoperative VD, MFR and PVR were not significantly changed after surgery. (Table) A woman had mesh cut due to postoperative persistent obstructive voiding symptom, and a woman had mesh removal due to wound infection.

Conclusion: Considering 41% of women with severe SUI or combined SUI with VD needed tension adjustment after MUS procedure, TOA system can be an effective treatment modality for women with risks of postoperative persistent SUI or obstructive voiding symptoms.

Funding: Hanmimedicare Co. Ltd
CLINICAL OUTCOMES IN PATIENTS UNDERGOING TVT-SECURTM FOR STRESS URINARY INCONTINENCE: AN UPDATE
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(Presented by: Ekene Enemchukwu)

Introduction and Objectives: The TVT-SecurTM mid-urethral sling is a minimally invasive, single incision technique for stress urinary incontinence (SUI). Avoidance of the obturator or retropubic approach is postulated to reduce morbidity while attaining equal efficacy. Our 2008 interim analysis reported a 93% improvement rate. We now report on a larger series with longer follow-up.

Methods: Retrospective review of 125 women who underwent TVT-SecurTM between 6/2006 and 7/2009 was conducted to evaluate demographics, voiding symptoms, urodynamics (UDS), prior treatments, concomitant procedures, pads per day (PPD), outcomes and complications.

Results: Mean patient age was 59.1 years (29 –88) with a mean follow-up of 11.3 months (1 –39). SUI was documented on preoperative UDS in all patients. Mean valsalva leak point pressure was 85 cm H2O (9 - 220). Almost one-third (29%) of patients demonstrated detrusor overactivity preoperatively, however, by subjective appraisal 74% of patients reported mixed incontinence (MUI). 24.8% of patients had greater than 2 prior SUI surgeries and 47% underwent concomitant pelvic prolapse surgery. TVT-SecurTM placement continued to result in a significant reduction in mean PPD, from 2.76 to 0.34 (p=1.7e-13). 86% percent reported no pad use postoperatively. Despite the dramatic decrease in PPD, only 49% of patients conveyed complete cure with 44% indicating improvement of symptoms. 11 patients reported de novo urgency. 26.7% of women with pure SUI had denovo urgency, a decrease of 20% from 2008. The majority of women (62%) with MUI had significant improvement in urge component (p=.000015). Complications included 2 episodes of transient urinary retention, 6 urinary tract infections, and 6 (4.8%) mesh extrusions, of which one resolved with conservative management and 5 required mesh excision. 5 patients had subsequent bulking agent therapy and 3 women underwent autologous sling placement. 1 patient required urethrolysis. Anticholinergic refractory urgency required botox injections in 4 patients and interstim in 1 patient.

Conclusion: The TVT-SecurTM continues to be an effective option for treating SUI with an acceptable morbidity profile. The rate of de novo urgency decreased in the pure SUI group by 20% while a most MUI group continued to have improvement in their urgency. The TVT-SecurTM remains a safe and easy choice with comparable improvement and patient satisfaction rates to common mid-urethral sling technologies.

DURABILITY OF MACROPLASTIQUE® INJECTION FOR FEMALE STRESS URINARY INCONTINENCE: TWO YEARS EXPERIENCE
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(Presented by: Jacques Corcos)
Introduction and Objectives: This study evaluated the 24-month durability of the urethral bulking agent Macroplastique® for stress urinary incontinence (SUI) primarily due to intrinsic sphincter deficiency (ISD) in women with previously documented successful outcomes at 12 months from their last injection. 

Methods: In a multicenter study, females diagnosed with SUI primarily due to ISD successfully treated with Macroplastique (defined as ≥1 Stamey grade improvement at 12 months from baseline) were followed for 12 additional months to assess their sustained therapeutic response. Outcome measures at 24-months included Stamey grade, Patient Global Impression of Improvement, Physician Assessment of Improvement, 1-hour pad weight, Incontinence Quality of Life (I-QOL) scores, and safety assessment.

Results: At 24 months, 84% (56/67) of patients had sustained Stamey improvement from 12 months with 67% (45/67) dry (Stamey grade = 0). Of the dry patients at 12 months, 87% (33/38) maintained their cure at 24 months. Additionally, 41% (12/29) who were considered improved at 12 months were dry at 24 months. Overall I-QOL scores and all subscales showed improvements statistically significant (p <0.001) from baseline. Mean pad weight reduction was statistically significant (p<0.0001) at 24 months compared to baseline with 24 gm at baseline, 4gm at 12 and 24 months. Both patient and physician assessments rated 85% of patients dry or markedly improved at 24 months from last treatment.

Conclusion: Substantial and durable results were sustained over two years with 84% of patients maintaining significant Stamey’s grade improvement from their 12-month assessment. At two years, 67% of patients were dry. The durability of Macroplastique demonstrates its effectiveness as a viable long-term therapy for female stress urinary incontinence primarily due to ISD. Macroplastique should be considered a reasonable first choice for urethral bulking due to its sustained efficacy over two years.

Funding: Uroplasty

Poster# 38

IMPACT OF TRANSLABIAL ULTRASOUND ON DIAGNOSIS AND TREATMENT OF MESH RELATED COMPLICATIONS
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(Presented by: Andrea Staack)

Introduction and Objectives: The prevalence of patients presenting with mesh related complications at our tertiary center is increasing. Symptom assessment, clinical examination and cystoscopy help to elucidate mesh complications, however, there are diagnostic limits. Surgical reports on patient’s history of previous prolapse or incontinence repair utilizing mesh are often missing. The purpose of the study was to evaluate ultrasound (US) as a diagnostic method to locate the mesh, to evaluate underlying symptoms, and to guide surgical approach of removal.

Methods: Between 01/09 and 09/09 15 consecutive patients came to our tertiary referral center with mesh related complications. In a prospective observational study all patients were evaluated for clinical symptoms and findings on 2-D translabial US. Coronal, sagittal and axial views were obtained with a curved transducer and evaluated.
Results: Mean age was 56.2 years (range 38-82). Out of 15 patients of the total patient population seven had undergone a periurethral sling procedure only, two a sling and concomitant anterior vaginal wall prolapse (AVW) repair, one an isolated posterior wall (PVW) repair, two a sling and concomitant AVW and PVW repair, one an isolated AVW repair, and two an AVW and concomitant PVW repair. Patients main complains were dyspareunia (n=10), LUTS (n=13), pelvic pain (n=10), recurrent UTI (n=4), recurrent SUI (n=5), vaginal fullness (n=4), and autoimmune reaction requiring immunosuppressive therapy (n=1). All patients underwent translabial US. Mesh dislocation, folding, shrinkage, or disruptions were seen in 12 patients. Of 10 patients, who had undergone a suburethral sling procedure, 8 patients presented sonographically with misplaced or folded mesh and 2 with a cystic lesion or foreign body granuloma periurethrally. All patients after AVW repair (n=8) presented sonographically with mesh dislocation, folding, and shrinkages. A recurrent cystocele was found in 6 patients. Five patients had undergone a posterior repair. Translabial US detected mesh dislocation on all patients and a recurrent rectocele in 4 patients.

Conclusion: US is the only diagnostic method to evaluate mesh, to detect dislocation, folding, misplacement or shrinkage. Translabial US can differentiate between symptoms related or unrelated to mesh complications. It is a useful cost-efficient and non-invasive tool to localize misplacement and to determine the best surgical approach for mesh removal.

Poster# 39

SYMPTOMATIC IMPROVEMENT AND URODYNAMIC CHANGES ARE NOTED AFTER MID-URETHRAL SLING TAKEDOWN, BUT RETREATMENT RATES REMAIN HIGH
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(Presented by: Sunshine Murray)

Introduction and Objectives: De novo lower urinary tract symptoms (LUTS) and voiding dysfunction may occur in as many as 20% of patients after mid-urethral mesh sling (MUS) placement. Symptomatic improvement is difficult to predict following sling takedown/urethrolysis (ST). We reviewed LUT questionnaire and urodynamic (UD) data in patients with LUTS after MUS who underwent ST.

Methods: A retrospective analysis of patients undergoing ST from 2003-2009 was conducted following IRB approval. Demographic data, LUT questionnaire results [UDI-6 and a visual analogue scale (VAS), scored from 0-10, to assess LUT quality of life], and UD findings were assessed. Maximum flow rate (Qmax), detrusor pressure at maximum flow (pdetQmax) and post void residual (PVR) were among the UD parameters examined.

Results: 60 patients presented with LUTS after MUS (33 retropubic, 20 transobturator, 6 unknown), had subsequent ST and at least 6 months follow up [mean 17 months (6-51)]. Mean patient age was 62 (38-82). 5 patients required preoperative self catheterization. Additional findings included 5 with urethral erosion, 12 vaginal extrusion, 21 recurrent UTIs and 10 new onset dyspareunia. ST was done an average of 17 months (3-81) after MUS. 36 patients (60%) had concurrent surgery at the time of sling takedown with 16 patients undergoing an anti-incontinence procedure [1 Burch, 5 rectus slings (PVS) and 9 anterior vaginal wall suspensions (AVWS)] and 6 requiring urethral reconstruction. The majority of patients underwent preoperative urodynamics. Postoperative urodynamics were available in 13 with persistent LUTS after ST. In this symptomatic group, pdetQmax decreased from 22cm H2O to 15cm H2O (p=.037), while other UD parameters were unchanged. Median preoperative UD16 and VAS scores were 11 and 10 which improved dramatically after surgery to 4 (p=0.014) and 3 (p=0.0001). Still, 34 (57%) patients underwent subsequent procedures including periurethral bulking agent (18 times in 15 patients), PVS (2), AVWS (2) and Burch(1). 1 patient remains catheter dependent and 13 were on anticholinergic therapy at last follow up.

Conclusion: Patients with LUTS after MUS are a complicated group, though UD and symptomatic improvement appear to be noted in many after sling takedown. Ongoing care is required, with over 50% in our series requiring additional therapy.
SECONDARY AUTOLOGOUS FASCIA SLINGS FARE MORE POORLY THAN PRIMARY SLINGS
Bruce Schlomer, MD¹, Rachel Jerome², Sunshine Murray, MD¹, Rashel Haverkorn, MD¹, and Philippe Zimmern, MD¹
UT Southwestern Medical Center, Dallas, TX
(Presented by: Sunshine Murray)

Introduction and Objectives: Patients with persistent or recurrent urinary incontinence after primary anti-incontinence procedure are a difficult group to treat. We compared outcomes in our series of patients undergoing primary autologous fascial pubovaginal (PVS1) or secondary (PVS2) slings.

Methods: We retrospectively reviewed patients undergoing PVS between 1996 and 2008. Patients were included if they had at least six months of follow up. When patients had undergone prior vaginal or abdominal procedures for urinary incontinence, they were classified as secondary PVS. Demographic and urodynamic data along with need for subsequent surgical or medical therapy were reviewed.

Results: 84 patients met inclusion criteria, with median follow up of 32 months (6-101). Age, BMI, pad usage at presentation, parity, and number of previous vaginal deliveries were similar in both groups. The type of fascia used in the two groups was also similar (rectus 32PVS1, 35PVS2; fascia lata 4 PVS1, 13PVS2; p=0.072). 20 patients in PVS1 and 26 in PVS2 underwent pre and postoperative (performed per protocol at 1 year) urodynamics (all prior to any subsequent procedures). Postoperative detrusor pressure at max flow and max flow were not significantly changed from baseline, nor were they significantly different between the two groups. Three patients (PVS1) and 6 patients (PVS2) had stress incontinence on postoperative urodynamics. Eleven patients, 2 (5%) in PVS1 and 9 (19%) in PVS2 underwent subsequent procedures including periurethral bulking agent (2 PVS1, 5 PVS2) with prolapse repair (2), repeat sling (1), repeat mesh excision (1) and urethral dilation (1) also being performed in PVS2. Two patients in PVS2 are on intermittent catheterization (1 of whom is a diabetic with detrusor hypocontractility). Three patients in PVS1 and 7 in PVS2 were on anti-cholinergic therapy at last follow-up. Overall, 81% (29) of primary and 69% (33) of secondary PVS patients have required no further surgical or medical therapy and have no self-reported leakage at last follow-up.

Conclusion: When compared to primary PVS, patients undergoing secondary PVS have lower success rates with higher reoperation rates and need for anti-cholinergic therapy after surgery.

Poster# 41 – WITHDRAWN

Poster# 42

PATIENT SATISFACTION, CONTINENCE, AND IMPROVEMENT RATES FOR RETROUBIC MID-UREThRAL POLYPROPYLENE SLINGS AT AN AVERAGE TIME OF 45 MONTHS (RANGE 12-84)
Jason Kim, MD, Alvaro Lucioni, MD, Fred Govier, MD, and Kathleen Kobashi, MD
Virginia Mason Medical Center, Seattle, WA
(Presented by: Jason Kim)

Introduction and Objectives: We assessed our series of retropubic mid-urethral polypropylene slings (MUS) to determine outcomes. Since there is no universally agreed upon definition of success for this procedure, we assessed various post-operative subjective and objective parameters.
Methods: A retrospective review of prospectively collected data of all patients undergoing placement of MUS with minimum 1-year follow-up was performed. The Urogenital Distress Inventory and Incontinence Impact Questionnaire short-form surveys were mailed to the patients. Outcomes included patient-perceived improvement and satisfaction and degree of post-operative stress urinary incontinence. Although we present individual outcome measures, we have historically arbitrarily defined success as <1 incontinence episode/week or >70% improvement.

Results: A total of 237 of 346 patients who underwent placement of SPARC at our institution were at least one year post-op and had answered follow-up questionnaires. Our average and median time from surgery to questionnaire was 45 months and 42 months, respectively (range 12-84 months). The overall success rate was 83.0% based on the definition above. However, only 42.4% of the respondents were completely dry without any episodes on incontinence. 76.3% of the respondents were either dry or had <1 incontinent episodes/week. Satisfaction was graded on 0-10 point scale and 68% of the patients rated their satisfaction as 7 or better. 68% of the patients reported a 70 or greater percent improvement from baseline symptoms. 78% of the patients would have a repeat procedure performed, while 72% would recommend a MUS to a friend. There was a 5.7% complication rate, including 5 (2.1%) patients requiring blood transfusion, 7 (3.0%) cases of vaginal mesh extrusion, and 1 (0.4%) small bowel injury.

Conclusions: Our data show that placement of retropubic mid-urethral polypropylene slings are quite efficacious even with extended follow-up. However, we believe that proper counseling of our patients is imperative, in order to align the expectations of the patients with the true risks and benefits that are expected for this procedure. While our completely dry rates are only 42.4%, we found that 76.3% of patients had <1 incontinent episodes per week. We acknowledge that this is a case series from our institution. However, we feel that it is important to share our experience due to the large number of patients and long length of follow-up.

Poster# 43

EVALUATION, MANAGEMENT AND OUTCOMES OF FEMALE URETHRAL AND PERIURETHRAL MASSES

Kevin Carlson, MD, FRCSC¹, and Troy Schultz, MD²

¹University of Calgary, Calgary, AB, Canada; ²University of Alberta, Edmonton, AB, Canada

(Presented by: Kevin Carlson)

Introduction and Objectives: The presentation of female periurethral mass is rare in urological practice, with few series reported. We herein share our experience with their diagnosis and management.

Methods: A prospective case series was maintained from clinical diagnosis to complete follow-up by a single surgeon (KVC). All cystic and solid masses were included. Simple condylomata, caruncles and urethral prolapse were excluded.

Results: Forty-one women were evaluated over a seven-year period (2002-2009), and complete follow-up is available on 36 (88%). Mean age was 41 with a mean follow-up time of 9 months. No masses were discovered incidentally. Most patients (92%) presented with a bothersome introital mass, 45% each with dyspareunia and urethral discharge, 29% with obstructive voiding and 22% with dysuria. A history of urinary infections was elicited in 24% of women, and stress incontinence (SUI) in 22%. Symptoms did not correlate with final diagnosis. All women underwent clinical history, physical exam and flexible cystourethroscopy. Clinical evaluation was accurate in the majority of cases (89%). 19 patients (46%) underwent MRI, which includes all but 2 patients with a suspected or potential diverticulum or solid mass proximal to the meatus. MRI diagnosis correlated with final diagnosis in 15 cases (79%), added to the preoperative diagnosis in 2 (11%), and was considered useful overall for diagnosis or surgical planning in 10 (53%). 30 patients (83%) had cystic and 6 (17%) solid masses at final diagnosis. To date, no malignancies have been encountered. One Skene’s gland abscess has recurred, 1 patient following excision of Skene’s gland diverticulum has developed stenosis, requiring dilatation, and two cases of latent SUI have required further surgery. No other recurrences or complications have been observed.
Conclusion: After appropriate history, physical exam and cystourethroscopy most women can undergo successful surgical management of periurethral masses. Preoperative imaging should be used selectively: It is considered useful for surgical planning but should not be relied upon for definitive diagnosis. Our bias is toward surgical removal given the diagnostic uncertainty in some cases and the small but potential risk of malignancy reported by other authors. Careful dissection is critical to discern diverticula, and complete excision mandatory to avoid recurrence. Complications of surgery are minor and uncommon.

Poster# 44

URETHRAL EROSION OF SYNTHETIC MID URETHRAL SLINGS: REPAIR AND OUTCOMES
Sophie Fletcher, MD, Gary Lemack, MD, and Philippe Zimmern, MD
UT Southwestern Medical Center, Dallas, TX
(Presented by: Philippe Zimmern)

Introduction and Objectives: Erosion into the urethra of synthetic mid urethral sling (MUS) material is a known complication. The outcome of eroded MUS mesh, and repair of subsequent urethrotomy is not well characterized. The aim of this study was to describe our techniques for the removal of MUS material eroded into the urethra, and report the outcomes of patients undergoing these procedures.

Methods: IRB approval was obtained for this retrospective case series. Patients who had undergone surgery for urethral erosion of synthetic MUS mesh at a single academic department of urology from 2006-2009 were identified. Demographic, clinical history, physical exam, surgical removal procedure, and outcome data were recorded.

Results: 7 patients (age 46-81 years) were identified. Time to presentation was 2 months to 15 years. The most common combination of presenting symptoms was stress urinary incontinence (SUI) and irritative storage symptoms (4 patients). Urethral pain (2), difficulty emptying (1), dyspareunia (1), and UTI’s (1) were also seen. Four erosions were diagnosed by office cystourethroscopy, and 2 noted during operating room cystoscopy. Repairs consisted of an inverted U incision at the anterior vaginal wall for best exposure of the urethra, segmental resection of urethral wall with eroded mesh, primary closure of urethrotomy, and SP tube placement. Prevention of secondary fistula was achieved with tissue interposition (martius flap- 2 patients and rectus fascia sling- 5 patients). Catheter drainage for 4 weeks was followed by voiding cystogram which confirmed urethral patency and no leak. Follow up range was: 7-29 months. No urethral strictures or voiding difficulties were observed. Three patients are continent and without lower urinary tract symptoms. Two patients have mild persistent SUI despite collagen injections –one from the rectus sling group, one from the martius flap group.

Conclusion: This series demonstrates the variability of symptoms with which patients present with urethral erosion of MUS mesh. A high index of suspicion for erosion should be present in this setting, with subsequent cystourethroscopy as the diagnostic tool of choice. Due to limited published outcomes, it is difficult to advise patients regarding results after repair of eroded MUS mesh into the urethra. Primary repair with interposition of either a rectus sling or martius flap give satisfactory results, though continence status is variable.

Poster# 45

URETHRAL BULKING AGENTS USED IN THE UNITED STATES: HOW ARE THEY ANALYZED?
Gamal Ghoniem, MD, FACS¹, and Roger Dmochowski, MD²
¹Cleveland Clinic Florida; ²Vanderbilt, Nashville, TN
(Presented by: Gamal Ghoniem)
Introduction and Objectives: There are four urethral bulking agents (UBAs) in the United States approved for the treatment of adult female stress urinary incontinence. Contigen® was the first FDA approved UBA to which Coaptite®, Macroplastique® and Durasphere® have been compared. All three studies used different methods of analysis making it difficult to compare treatment outcomes. Intent-to-treat using last observation carried forward (ITT LOCF) was used for Coaptite, ITT for Macroplastique and as-followed for Durasphere. The objective of this review and methods analysis is to compare published FDA data by using the same intent-to-treat and as-followed analyses.

Methods: UBAs’ study inclusion criteria were homogenous including adult women with major complaint of stress urinary incontinence secondary to ISD. Techniques for injection were similar and used either periurethral or transurethral technique. The primary endpoint for all studies was improvement of \( \geq 1 \) Stamey grade from baseline to 12 months. Using the same ITT and as-followed methodology, a reanalysis of Stamey improvement was conducted in the 3 studies.

Results: Mean total volumes injected per patient were: 4.0, 6.8 and 7.6 cc for Coaptite, Macroplastique and Durasphere, respectively. Contigen volumes (controls) were 6.8, 7.2 and 9.6 cc, respectively. Mean number of treatments per patients were 1.9, 1.5, 1.7 for Coaptite, Macroplastique and Durasphere, compared to 2.0, 1.6 and 1.6 for Contigen. Only Macroplastique had significant treatment outcomes compared to Contigen using ITT analysis. None of the UBAs were inferior to Contigen. See table.

Conclusion: These results emphasize the importance of analytic method when critically comparing treatment outcomes. This study is limited by not being a head-to-head clinical study. However, similarities of design allows for a reasonable comparison of the efficacy of UBAs.

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<td>Macroplastique</td>
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<td>Contigen</td>
<td>60/125 (48.0%)</td>
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<td>Coaptite</td>
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<tr>
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<tr>
<td>Durasphere</td>
<td>76/178 (42.7%)</td>
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<tr>
<td>Contigen</td>
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Poster# 46

MODIFIED LATZKO PROCEDURE (PARTIAL COLPOCLESIS) FOR VESICOVAGINAL FISTULA: TECHNIQUE AND OUTCOMES

Denise Chow, MD\(^1\), Ahmet Bedestani, MD\(^2\), Ralph Chesson, MD\(^2\), and J. Christian Winters, MD\(^3\)

\(^1\)Louisiana State University/Ochsner Clinic Foundation, Departments of Urology, New Orleans, LA; \(^2\)Louisiana State University, Department of Obstetrics and Gynecology, New Orleans, LA; \(^3\)Louisiana State University, Department of Urology, New Orleans, LA

(Presented by: Denise Chow)

Introduction and Objectives: The Modified Latzko procedure historically has been a successful approach to transvaginal treatment for VVF. This procedure is reproducible, and can be performed for most fistulas. Our objective is to highlight the principles of the repair and summarize our experience.
Methods: 17 patients who presented with fistulas were repaired via the Latzko technique. The key components of the procedure include: 1) Adequate exposure of the apex of vagina 2) A circumferential, full thickness dissection of the vaginal wall to expose fistula 3) Isolation and closure of the fistula, 4) Imbricating sutures to complete the partial colpocleisis (serves as interposition) 5) Re-closure of the vaginal cuff. A retrospective chart review was completed to assess outcomes and operative experience. There was no financial funding for this retrospective study.

Results: Seventeen patients underwent repair with this technique. Age ranged from 28-80, and 1 patient had failed abdominal repair. 88% were discharged the following day and catheter drainage was maintained for 3-4 weeks. Sixteen (94%) had successful resolution after the primary repair. One had a recurrence 2 years following the primary procedure due to an inclusion cyst. No intraoperative complications occurred, including bowel, ureteral or bladder injury. A blood loss of 600 cc was encountered in 1 patient. No complaints of sexual dysfunction were recorded.

Conclusions: The Latzko procedure is a reproducible, efficacious alternative approach to the transvaginal correction of VVF. Results are excellent and complications are minimal. This procedure should be considered as the primary repair of VVF.

Poster# 47

OUTCOMES IN VAGINAL PROLAPSE SURGERY USING SURGEON CONSTRUCTED MESH FOR REPAIR AUGMENTATION
Rashel Haverkorn, MD, Alienor Gilchrist, MD, Sunshine Murray, MD, and Gary Lemack, MD
UT Southwestern, Dallas, TX
(Presented by: Rashel Haverkorn)

Introduction and Objectives: The optimal repair of vaginal prolapse remains elusive. Traditional vaginal repairs have high failure rates, while transvaginal mesh kits are proposed to have lower recurrence but higher vaginal extrusion rates. We sought to define the rate of recurrence and extrusion for prolapse surgery using a hand cut, site-specific, soft polypropylene (PP) mesh and to identify risk factors.

Materials: Following IRB approval, the charts of patients undergoing vaginal repair of pelvic organ prolapse using a site-specific soft PP mesh anchored into levator fascia from 01/2005 to 01/2009 were reviewed. Demographics, exam, and questionnaire data were queried to identify risk factors for recurrence and mesh extrusion.

Results: 63 patients underwent site-specific repair using PP mesh, 40 had greater than 6 month follow-up (median 16 months). Of these, mesh was placed anteriorly in 33 and posteriorly in 4. 17 had simultaneous vaginal vault fixation, 3 using mesh. Recurrence rate, defined as Stage 2 or greater prolapse was noted in 9.0% of cystocele repairs and not seen in posterior repair or vault suspension; none of the patients with recurrence were symptomatic and thus did not elect for additional surgical repair. 6/63 patients (9.5%) had mesh extrusion detected on exam at median of 4 months after surgery, all were asymptomatic. Three patients had a single procedure to remove exposed mesh (average size 4.4mm), 1 patient required 2 procedures (size 20mm). Due to social reasons, 2 patients elected to monitor mesh exposure (average size 20mm) with no infection or progression of exposure. No single demographic factor, presence of co-morbidities, exam finding, or questionnaire item was associated with recurrence or predicted mesh extrusion on multi-variate analysis. However, patients undergoing concomitant vaginal surgery trended towards higher likelihood of mesh extrusion.

Conclusion: Extrusion can occur regardless of the form of mesh utilized in treating pelvic prolapse, and patients need to be counseled appropriately. However, the subsequent treatment appears to be simplified using a hand-cut mesh without transobturator or peri-rectal arms. Given the cost advantages of a hand-cut mesh compared to mesh kits (kits are approximately 4 times the cost of a large sheet of PP mesh), and the preserved low recurrence rates compared to standard vaginal approaches, we recommend use of site-specific mesh when considering the use of an augmented repair.
INTRODUCTION AND OBJECTIVES: To our knowledge, studies evaluating patient-perceived outcomes and sexual function after urethral diverticulectomy (UD) have yet to be described. Prior studies have been retrospective in nature, and lack long-term subjective patient data. We evaluated patient-perceived improvement in symptoms and outcomes after UD, in addition to sexual function postoperatively.

METHODS: We identified patients who had UD performed at our institution between 1996 and 2008 by fellowship-trained female urologists. Patient demographics were recorded via chart review. Validated questionnaires including the Patient Global Impression of Improvement (PGI-I), Patient Global Impression of Severity (PGI-S), and Simple Sexual Function Questionnaire (SSFQ) were mailed to identified patients. Patients not responding to the mailed surveys were telephoned.

RESULTS: One hundred and twenty-three female patients underwent UD at our institution over the study period. Mean age at the time of surgery was 45.8 years. Mean follow-up was 50.4 months. Sixty-two (50%) patients responded to our mailed questionnaires. Participant’s self-reported improvement of symptoms on PGI-I was 75% “better”, 13% “no change”, and 12% “worse”. Participant’s impression of symptom severity after surgery on PGI-S was 53% “normal”, 22% “mild”, 13% “moderate”, and 12% “severe”. Of the participants, 60% reported being sexually active. Of these sexually active patients, 43% reported having dyspareunia after UD.

CONCLUSION: To our knowledge, this is the first study evaluating patient-perceived outcomes and sexual function after UD. Based on PGI-I, the majority of patient responders who underwent UD reported improvement in symptoms after surgery. In addition, most patient responders rated their symptom severity after surgery as “normal or mild”. Interestingly, 60% reported to be sexually active after surgery, with 43% of these patients complaining of dyspareunia.

INTRODUCTION AND OBJECTIVES: To better understand the correlation between non-instrumented uroflowmetry (NIF) and pressure-flow studies (PFS) in women with stress urinary incontinence (SUI), we conducted an ancillary analysis using the pre-operative urodynamic studies of women enrolled in the Trial of Mid-Urethral Sling (TOMUS).

METHODS: We enrolled 597 women with symptoms of SUI, i.e., SUI symptoms greater than urge UI symptoms as determined by the MESA questionnaire and demonstration of a positive cough-stress test at 300 ml bladder volume. Each subject underwent a non-instrumented uroflow (NIF) with a comfortably full bladder and then a PFS at maximum cystometric capacity using a catheter ≤ 8 French diameter. Subjects with voided volumes (VV) ≤ 150 mL on NIF were excluded from the analysis.
Results: There were 495 subjects that had NIF and PFS studies that met the inclusion criteria and had max flow rate (Qmax) for both NIF and PFS. The mean age was 53 (range 24.9 –86.6) with a median parity of 2 (0-7). Prolapse stages (POP-Q) for subjects were 45% stage 0/I, 47% stage II and 8% stage III/IV. Overall, higher voided volumes were observed during PFS compared to NIF (393 vs 311 mL, r = 0.40, p<0.0001), and subjects had higher Qmax with NIF compared to PFS (25 vs 23 mL/sec, r = 0.57, p<0.0001). The median time to Qmax (Qmtime) was longer for PFS than for NIF (13 vs. 9 seconds, r = 0.29, p < 0.0001). Since Qmax is dependent on VV, we plotted Qmax vs VV for NIF and PFS (Figure 1). The relationship between Qmax and VV was significantly different between NIF and PFS,

Conclusion: For a given voided volume, PFS Qmax is lower than NIF Qmax most likely due to the presence of a catheter. In addition, the time to reach Qmax is longer in the PFS study


Poster# 50

STANDARDIZED URETHRAL PRESSURE PROFILOMETRY IN WOMEN: REPRODUCIBILITY OF MAXIMUM URETHRAL CLOSURE PRESSURE
Françoise Valentini, MD, PhD and Gilberte Robain, MD, PhD
ER6 - Université Pierre et marie Curie (Paris 06) France
(Presented by: Françoise Valentini)

Introduction and Objectives: Controversies about the role of urethral pressure profilometry in clinical practice are mainly based on doubt about the reproducibility of the measurements. The aim of this retrospective study was to determine the reproducibility of same session repeated urethral pressure profile (UPP) measurements in women with lower urinary tract symptoms using the most common parameter, the maximum urethral closure pressure (MUCP).

Methods: Population: 123 consecutive women without neurological disease (mean age 58.5±14.8y [21-90y]) referred for evaluation of lower urinary tract dysfunction and was stratified in four groups: continent, stress incontinence, urge incontinence, mixed incontinence. Complete (standardized) urodynamic session: free uroflowmetry, UPP bladder empty (0) before filling cystometry and pressure flow study, UPP bladder filled at 250 mL with saline at room temperature; 7F triple lumen water perfusion catheter, puller speed of 1 mm/s. Sequence of measurements in supine position: (1)UPP at rest, (2)strong voluntary pelvic floor muscle contraction at MUCP, (3)UPP with 3 to 5 successive coughs, (4)VLPP, (5)UPP before 10 successive strong coughs and (5’)after, then (6)UPP was recorded in standing position. Recordings: reviewed independently by 2 investigators. Comparisons: in each group with the MUCP(1).
Results: No significant difference in age, percentage of menopausal or of previous pelvic surgery in the 4 groups. MUCP values (in cm H2O) are reported in the table (Wilcoxon *p<0.05, **p<0.001). In all groups, no significant difference between the MUCP values at rest: (1), and before coughs (5). In the continent group, only a significant difference between MUCP bladder filled (1) and during coughs (3). In the 3 incontinent groups, MUCP(0) higher than (1); MUCP decreased in standing position (6) in women with stress or mixed incontinence. MUCP tends to be lower in women with incontinence whatever the type of incontinence and the test.

Conclusion: When recorded in the same conditions during a urodynamic session, MUCP has a good reproducibility. Changes in MUCP value are clearly related with the type of incontinence.

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Poster# 51

NEAR INFRARED SPECTROSCOPY IN PATIENTS WITH OVERACTIVE BLADDER*

Tara Frenkl¹, Railkar Radha, PhD², Shore Neal, MD³, Balien James, MD⁴, Sutherlans Suzette, MD⁵, Burke Joanne², Beals Chan, MD², Ruddy Marcella, MD², Andrew Macnab, MD⁶ and Stothers Lynn, MD⁶
¹Merck Research Laboratories, Whitehouse Station, NJ; ²Merck and Co., Inc; ³Atlantic Urology Clinics, Myrtle Beach, SC; ⁴Metropolitan Urology, Jeffersonville, IN; ⁵Metropolitan Urologic Specialists, Plymouth, MN; ⁶Dept. of Urology, University of British Columbia, Vancouver, Canada
(Presented by: Tara Frenkl)

Introduction and Objectives: Near infrared spectroscopy (NIRS) is a non-invasive method of monitoring changes in oxygenation and blood volume in the anterior detrusor during voiding. Bladder pathology associated with alterations in hemodynamics and oxygen supply and demand results in patterns of change in chromophore concentration which are characteristic for certain disease states. The objective of this study was to investigate if characteristic NIRS signatures may be related to detrusor overactivity (DO) in patients with overactive bladder (OAB).

Methods: 20 women with OAB, participating in a randomized, double blind cross over study using tolterodine and placebo, who met voiding diary criteria (≥ 8 voids/day, ≥1 urge incontinent episode/day) each had urodynamics (UDS) with simultaneous NIRS performed on 6 occasions. Detrusor overactivity (DO) (an involuntary detrusor contraction during filling indicated by a rise in detrusor pressure, with or without leak and without a rise in abdominal pressure) were qualitatively assessed with NIRS-derived changes in concentration of oxygenated (O2Hb), deoxygenated (HHb), and total hemoglobin (tHb) [O2Hb + HHb]. NIRS analysts remained blinded to treatment allocation.

*Not CME Accredited
Results: On the 120 UDS tracings evaluated, there were 70 episodes of DO. A characteristic pattern of NIRS changes appeared to coincide with the majority of DO events. The most common pattern of chromophore change occurring contemporaneously with DO, is an increase of tHb made predominantly by an increase in O2Hb and lesser elevation in HHb.(Fig 1)

Conclusions: Simultaneous NIRS and UDS appear to provide additional insight into the physiology occurring within the detrusor during DO. The predominant NIRS changes observed are similar to those reported previously with detrusor contraction on initiation of voiding which suggests that the microcirculation “primes” the detrusor with an increased volume of oxygenated blood, presumably in anticipation of contraction. The accuracy of automatic noninvasive NIRS-detected DO can be further investigated in datasets like those collected in this clinical study.

Funding: Merck & Co., Inc

Poster# 52

URODYNAMIC “AREA UNDER THE CURVE” AS A POTENTIAL PROGNOSTIC FACTOR IN NEUROGENIC BLADDER DYSFUNCTION
Colin Goudelocke, MD and Eric Rovner, MD
Medical University of South Carolina, Charleston, SC
(Presented by: Colin Goudelocke)

Introduction and Objectives: Accurately predicting the potential for the development of hydroureretonephrosis (HUN) in neurogenic bladder (NGB) dysfunction is difficult. Presently utilized urodynamic (UDS) concepts such as detrusor leak point pressure or calculation of bladder compliance do not accurately prognosticate in all NGB groups. HUN due to lower urinary tract dysfunction is likely related to a combination of factors including vesical pressures and the time interval during the micturition cycle spent at these elevated pressures. We sought to determine if the corrected area under the curve (cAUC) of the detrusor pressure during UDS could be associated with upper tract deterioration in NGB.

Methods: We retrospectively reviewed a UDS database for contemporary patients undergoing UDS for NGB or complex non-NGB dysfunction with evidence of HUN on upper tract imaging (Group 1). We matched these patients to a similar group of patients without HUN (Group 2). Patients with reflux, or another known cause of HUN were excluded as were patients with a technically uninterpretable UDS tracing. Area under the curve (AUC) was calculated by a proprietary computer program for each patient over a single micturition cycle. Total filling and voiding pressure were integrated over time by calculating the AUC of the detrusor pressure limb (Pdet) and then correcting for the total time interval of the study thus producing the corrected area under the curve (cAUC). The cAUC was calculated from the fill volume corresponding to the patient’s catheterized post-void residual and continued to the conclusion of micturition. The corresponding results for each Group were then compared to assess for a relationship to the finding of HUN.
Results: Group 1 (n=8) and Group 2 (n=8) included patients with NGB and non-NGB due to a variety of conditions including spinal cord injury, multiple sclerosis, radiation and bladder outlet obstruction. The mean and median cAUC for Group 1 was 23.3 and 18.4 (CI 6.6-30.1, range 11.0-61.5) and for Group 2 was 3.5 and 2.1 (CI 0-4.4, range 0.5-10.4). Normal bladder compliance (>12.5 ml/cmH2O) did not predict for the absence of HUN in all patients.

Conclusion: cAUC is clearly different in NGB patients with HUN as compared to those without HUN. These retrospective preliminary data suggest that corrected AUC may permit identification of NGB patients at risk for HUN in the future. Prospective evaluation of this concept is planned.

Poster# 53

UTILITY OF FLUOROSCOPY DURING URODYNAMICS IN THE EVALUATION OF BLADDER OUTLET OBSTRUCTION IN WOMEN
Sagar Shah, MD, Sarah Mitcell, Eva Fong, MD, Nirit Rosenblum, MD, Christopher Kelly, MD and Victor Nitti, MD
New York University Department of Urology, New York, NY
(Presented by: Sagar Shah)

Introduction and Objectives: Due to differences in voiding dynamics relative to men the diagnosis of bladder outlet obstruction (BOO) can often be missed in women if strict pressure criteria are used. We have previously advocated using videourodynamic (VUD) criteria to evaluate for BOO in women (Nitti, et al 1999) which rely heavily on fluoroscopy. We sought to reevaluate the utility of fluoroscopy in the evaluation of BOO in women.

Methods: Retrospective review of all videourodynamic studies at a single institution from 03/2003-07/2009. Only patients diagnosed with BOO were selected out and included for analysis. Urodynamic parameters, fluoroscopy findings, and final diagnosis were collected. Rates of obstruction diagnosed by fluoroscopy and previously established pressure flow cutoffs of Cutpoint 1=qmax ≤ 15ml/s and pDetQmax ≥ 20 Cm H2O (Chassagne, et al 1998), Cutpoint 2= Qmax≤11 ml/s and pDetQmax≥21 Cm H2O (Lemack, et al 2000), and Cutpoint 3= Qmax≤12 ml/s and pDetQmax≥25Cm H2O (Defreitas, et al 2004) were determined and compared.

Results: Of 2666 total VUD studies, 157 studies with BOO in women were identified. Obstruction was identified by fluoroscopy in 152 (96.8%), by Cutpoint1 in 110 (70.1%), Cutpoint2 in 88(56.1%), and Cutpoint3 in 82(52.2%) patients. Obstruction could only diagnosed by fluoroscopy but not by pressure flow cutoffs in 29 (18.4%) patients.

See Attached Table for Additional Results:

Conclusion: A large proportion (18.4%) of BOO diagnoses would not have been made if pressure-flow criteria alone were used without fluoroscopy. Pressure-flow criteria were also not as sensitive as fluoroscopy plus pressure flow in diagnosing BOO when evaluated by source of obstruction. This combined with the ability of fluoroscopy to aid in localize the etiology of obstruction helps to demonstrate the importance of fluoroscopy in the urodynamic evaluation of BOO in women.

<table>
<thead>
<tr>
<th>#</th>
<th>Fluoroscopy</th>
<th>Cutpoint 1</th>
<th>Cutpoint 2</th>
<th>Cutpoint 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prolapse</td>
<td>21</td>
<td>19(90.5%)</td>
<td>14(66.7%)</td>
<td>13(61.9%)</td>
</tr>
<tr>
<td>Anti-incontinence</td>
<td>31</td>
<td>30(96.8%)</td>
<td>19(61.3%)</td>
<td>14(45.2%)</td>
</tr>
<tr>
<td>Stricture</td>
<td>26</td>
<td>25(96.1%)</td>
<td>21(80.8%)</td>
<td>19(73.1%)</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
<td>7(100%)</td>
<td>7(100%)</td>
<td>6(85.7%)</td>
</tr>
<tr>
<td>Detrusor Sphincter Dyssynergia</td>
<td>22</td>
<td>22(100%)</td>
<td>15(68.2%)</td>
<td>10(45.5%)</td>
</tr>
<tr>
<td>Dysfunctional Voiding</td>
<td>34</td>
<td>33(97.1%)</td>
<td>21(61.8%)</td>
<td>14(41.2%)</td>
</tr>
<tr>
<td>Primary Bladder Neck Obstruction</td>
<td>16</td>
<td>16(100%)</td>
<td>13(81.3%)</td>
<td>12(75%)</td>
</tr>
</tbody>
</table>
Poster# 54

RISK FACTORS FOR LOW BLADDER COMPLIANCE IN END STAGE RENAL DISEASE PATIENTS
John Stoffel, MD¹, Genevieve Kruger, MD², Hocine Tighiouart, MS³, James Pomposelli, MD, PhD², Rodney Taylor, MD⁴ and Andrea Sorcini, MD²
¹Lahey Clinic, Burlington MA; ²Lahey Clinic, Burlington, MA; ³Tufts Medical Center, Boston, MA; ⁴St. Elizabeth’s Hospital, Brighton, MA
(Presented by: John Stoffel)

Introduction and Objectives: Low bladder compliance, a potential contributor to renal function impairment, is defined as high storage pressure at low bladder volume. We evaluated risk factors for low bladder compliance in end stage renal disease patients awaiting renal transplantation.

Methods: Selected ESRD patients were screened for low bladder compliance with complex fluoroscopic urodynamic testing (UDS). Bladder compliance was calculated as maximum bladder capacity over change in bladder detrusor pressure (cc/cm H2O) and low compliance was defined as < 20 cc/cm H2O. Patient histories were reviewed for demographics, daily urine output (UOP), length of time on dialysis (LOD), and concomitant UDS/VCUG findings. Logistic regression models for bladder compliance as a binary variable (<20 cc/cm H2O or > 20 cc/cm H2O) and linear regression models with the log-transformed compliance as a continuous variable were performed to identify potential risk factors for low compliance.

Results: Thirty four UDS studies were performed (27 males, 7 females). Mean patient age was 57 years (Range 23 – 72) and diabetes mellitus was the most common cause of ESRD (44%) followed by glomerulonephritis (28%). Daily urine output was < 50cc, 50 –250cc, and > 250cc in 14, 5 and 13 patients, respectively and median time on dialysis was 26 months. Low bladder compliance was found in 21 (62%) patients. In univariate logistic regression, UOP was significantly associated with low compliance (global p = 0.01) and UOP < 50cc was associated with the greatest risk (OR and 95% CI = 13.5 (2.01, 90.7), p = 0.007) compared to UOP >250cc. LOD was also associated with low bladder compliance (p = 0.005) with a 34% increased risk for every 6 months on dialysis. In multivariable analysis of the log-transformed compliance, UOP and age (quadratic shape) were both associated with low compliance (p < 0.01 for both).

Conclusions: Length of time on dialysis, age, and daily urine output < 50cc were identified as risk factors for low bladder compliance on urodynamic testing in this ESRD population. A larger sample is needed to confirm these findings.

Poster# 55

COMBINATION OF TWO NON-INVASIVE EVALUATION OF BLADDER OUTLET OBSTRUCTION (BOO) CAN RUB OUT SOURCES OF VARIABILITY USING PENILE CUFF TEST (PCT).
Françoise Valentini, MD, PhD¹, Pierre Nelson, PhD² and Derek Turner, MD³
¹ER6 - Université Pierre et Marie Curie (Paris 06) - France; ²ER6 - Université Pierre et Marie Curie (Paris 06) - France; ³Pilgrim Hospital Boston UK
(Presented by: Françoise Valentini)

Introduction and Objectives: In men suspected of benign prostatic enlargement (BPE), the main problem is to evaluate BOO. ICS nomogram and the Abrams-Griffiths number (AG) [1] allow the analysis of invasive pressure-flow studies. The PCT [2] and its nomogram use non invasive recordings of the flow vs the penile cuff pressure (pcuff) and analyze a critical point: the maximum flow rate vs the cuff pressure at flow interruption (pcuff.int). That analysis suffers from the difficulty to accurately locate the coordinates of this point, mainly pcuff.int. The D index [3] derived from the VBN method gives from a free flow (FF) a relationship between the VBN parameters: urethral compression (pcucp) and detrusor contractility (k) and then allows going back to the A-G number. Our objective was to compare the results given by the 3 methods: PCT, VBN and AG.

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**Methods:** Retrospectively, 44 sessions (1 FF and 1 PCT the same day) of BPE patients were analyzed (16 pts 1 session, 14 pts 2 sessions at 1 month interval). The PCT obeys the general law of flow in an elastic pipe: flow governed by the prostatic compression at low pcuff (equivalent to a FF) and by the cuff at high pcuff. Parameters were evaluated following the sequence: 1-D from the FF and the first part of the flow during the first cuff inflation, 2-k and pucp from the 2 first cuff inflations, 3-AG number (theoretical voiding V=300 mL, k and pucp).

**Results:** 1-D index values not significantly different between FF and PCT (1 session) or between 2 sessions. 2-Evaluation of obstruction using the 3 methods was reached from 38 sessions; same evaluation only in 16 sessions (42.1%), under evaluation of obstruction by PCT in 22 others. For patients with 2 sessions, PCT evaluation was the same in 17/19 (89.4%) cases. 3-Good agreement between VBN and AG; high discrepancies between PCT and AG were observed when AG≥70. Evaluation of k and pucp was free of the effect of any catheter in that calculation.

**Conclusion:** Combination of two non-invasive methods VBN and PCT allows an evaluation of BOO in men suspected of BPE according with ICS criterion which avoids all causes of variability.


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**Poster# 56**

**FUNCTIONAL VS. ANATOMIC FEMALE BLADDER OUTLET OBSTRUCTION: ARE THEY DIFFERENT?**

Sagar Shah, MD, Sarah Mitchell, Eva Fong, MD, Nirit Rosenblum, MD, Christopher Kelly, MD and Victor Nitti, MD

New York University Department of Urology, New York, NY

(Presented by: Sagar Shah)

**Introduction and Objectives:** Bladder outlet obstruction (BOO) in women may be caused by a variety of conditions. Classically BOO is thought of in anatomical terms, but there are a number of functional conditions that may cause obstruction. Some studies even exclude these functional causes in their analysis of female BOO. We sought to compare the clinical presentation and urodynamic (UDS) characteristics of functional (FO) and anatomic obstruction (AO) in women.
Methods: Retrospective review of all female videourodynamic studies at a single institution from 03/03 to 08/09. Only patients with a final diagnosis of obstruction were included for analysis. The diagnosis of BOO was made using videourodynamic criteria of a sustained detrusor contraction of any magnitude with radiographic evidence of obstruction (Nitti, et al 1999). Demographic data, pre-study symptomatology, and urodynamic parameters were collected. Patients were categorized as anatomically obstructed if obstruction was due to: prolapse, anti-incontinence surgery (AIS), stricture, or extrinsic obstruction. Patients were categorized as functional obstruction if obstruction was due to: Dysfunctional voiding (DV), detrusor external sphincter dyssynergia (DESD), or primary bladder neck obstruction (PBNO). Categorical variables were compared using chi-squared tests and contingency tables. Continuous variable were evaluated using analysis of variance and t-tests. Median values were used as measures of central location due to non-normal distribution.

Results: 157 obstructed patients were identified after exclusion. 86(54.8%) were anatomically obstructed. 71(45.2%) were functionally obstructed. Cause of obstruction included: 22(14%) DESD, 34(21.7%) DV, 16(10.2%) PBNO, 21(13.4%) prolapse, 31(19.7%) AIS, 26(16.6%) stricture, 7(4.6%) other. See Table Below for Additional Results:

Conclusions: Patients with FO tend to present at a significantly younger age but with similar symptoms as those with AO. Urodynamically FO and AO presented with similar Pdet during voiding, but Qmax was significantly lower in AO. These UDS differences may reflect the fixed vs. dynamic nature of BOO in the two groups.

Poster# 57

CONCORDANCE OF NEAR INFRARED SPECTROSCOPY (NIRS) DATA WITH PRESSURE FLOW STUDIES IN MEN WITH LUTS
Doreen E. Chung, MD, Richard K. Lee, MD, Steven A. Kaplan, MD and Alexis E. Te, MD
Weill Cornell Medical College, New York, NY
(Presented by: Doreen E. Chung)

Introduction and Objectives: Near infrared spectroscopy (NIRS) is a non-invasive technique capable of monitoring concentration changes of oxygenated and deoxygenated hemoglobin. An instrument has been developed for urology, specifically for the interrogation of the bladder detrusor (Tetra NIRS, Laborie Medical Technologies Inc.). An algorithm was developed using data from NIRS (pattern of slope of changes in chromophore concentration) in combination with Qmax and post-void residual (PVR) to classify male patients with LUTS as obstructed or non-obstructed. In previous studies it had >80% concordance with pressure flow studies. Our objective was to assess whether data from NIRS correlates with obstruction, independent of Qmax and PVR. According to the NIRS algorithm a downward chromophore concentration slope correlates with higher probability of obstruction and an upward chromophore concentration slope correlates with higher probability of nonobstruction.
Methods: This was a post hoc analysis of a prospective study in men with LUTS, assessing concordance of the NIRS algorithm with pressure flow studies. Patients were classified as obstructed or non-obstructed based on Abrams-Griffiths nomogram. Men referred for urodynamic testing for evaluation of LUTS were simultaneously evaluated with NIRS. Means and proportions were calculated.

Results: 42 patients were enrolled and 36 (86%) had evaluable data. 5 subjects were excluded for: communication error with NIRS (2); patch could not adhere to subject (1); communication error with urodynamic instruments (1); and data saving error (2). Of 5 patients that were classified as being nonobstructed by pressure flow studies, 3 (60%) had a downwards NIRS pattern and 2 (40%) had an upwards pattern. Of 31 patients who were obstructed, 11 (35.5%) had a downwards NIRS pattern, 6 (19.4%) had a flat pattern, and 14 (45.2%) had an upwards pattern. Sensitivity of a downwards chromophore concentration for detecting obstruction was 35.5% and specificity was 40%. Mean Qmax for patients with an upwards (nonobstructed, n=14) pattern was 12.4 (min 2.9, max 24.0) mL/s and for those with a downwards (obstructed, n=16) pattern mean Qmax was 13.1 (min 3.6, max 23.8) mL/s.

Conclusions: Although the NIRS algorithm correlates well with pressure flow studies, in this small study there does not appear to be an association between NIRS pattern and obstruction. Another aspect of NIRS data, not yet elucidated, may correspond better with obstruction in men with LUTS.

Poster# 58

IS THERE A RELATIONSHIP BETWEEN VOIDED VOLUME AND THE URGE TO VOID?
Jeffrey P. Weiss, MD¹, Michael Amirian, BS¹, Jeffrey P. Weiss, MD¹, Georgia Panagopoulos, PhD², Lorraine Liang, BS¹ and Stanislav Belotserkovskiy
¹SUNY Downstate Medical School, Brooklyn, NY; ²Lenox Hill Hospital, New York, NY
(Presented by: Jeffrey P. Weiss)

Introduction and Objectives: The aim of this study is to quantitate the relationship between the severity of urgency, as measured by the validated urgency perception score (UPS), and voided volume (VV) in patients with & without overactive bladder (OAB).

Methods: This is a prospective observational study of consecutive patients with lower urinary tract symptoms (LUTS) categorized as OAB or non-OAB based on the overactive bladder symptom score. All subjects completed a 24 hour bladder diary. At each void, they completed the UPS which quantifies the intensity of the urge to void on a scale from 0 (no urge) to 4 (desperate urge). Uroflow (Q), VV and post void residual (PVR) were measured contemporaneously for one void. Other parameters - age, sex,& clinical diagnoses were collected. Spearman’s rank correlation coefficient was utilized because of the non-parametric nature of the data.

Results: 958 voids were analyzed (VV & corresponding UPS) in 62 subjects. The data is summarized in the table. Mean & median VV for the entire group = 182 ml (SD-130) & 150 ml (range 5-900) respectively. Mean & median UPS = 2 (SD-1.1 and range 0-4). There was a weak correlation between VV & UPS in both the OAB group (r = .24, p < .0001) and the non-OAB group (r = .3 p < .0001). With respect to individual subjects, there was a correlation between VV & UPS in 14/34 (41%) in the OAB & 14/28 (50%) in the non-OAB group.

Conclusion: Although there was a mild correlation between VV & UPS, we were surprised to see that the correlation wasn’t stronger and even more surprised that in 59% of OAB patients there was no correlation at all. A multivariate analysis of subjects, sufficiently powered, will be necessary to further elucidate these findings. More research is needed to determine whether there is a correlation between underlying diagnoses, type of treatment and treatment outcomes based on the individual relationships between VV & UPS.

Table 1: Data: OAB versus non-OAB
VV(Q) = voided volume of the uroflow; UPS(Q) = UPS for uroflow void;
a- Mean values

<table>
<thead>
<tr>
<th></th>
<th>age-a</th>
<th>male</th>
<th>fem</th>
<th>vv-a</th>
<th>upsa</th>
<th>VV(Q)-a</th>
<th>PVR-a</th>
<th>UPS(Q)-a</th>
</tr>
</thead>
<tbody>
<tr>
<td>OAB</td>
<td>34</td>
<td>69</td>
<td>11</td>
<td>23</td>
<td>198</td>
<td>2.2</td>
<td>186</td>
<td>57</td>
</tr>
<tr>
<td>Non-OAB</td>
<td>28</td>
<td>67</td>
<td>9</td>
<td>19</td>
<td>161</td>
<td>1.8</td>
<td>210</td>
<td>40</td>
</tr>
</tbody>
</table>

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DYSFUNCTIONALVOIDING VS. DETRUSOREXTERNAL SPHINCTER DYSSYNERGIA IN WOMEN: DO THEY DIFFER?
Sagar Shah, MD, Sarah Mitchell, Eva Fong, MD, Nirit Rosenblum, MD, Christopher Kelly, MD and Victor Nitti, MD
New York University Department of Urology, New York, NY
(Presented by: Sagar Shah)

Introduction and Objectives: Dysfunctional voiding (DV) and detrusor external sphincter dyssynergia (DESD) are both causes of bladder outlet obstruction in women related to improper coordination of the bladder and urinary sphincter. We sought to compare the clinical presentation and urodynamic characteristics of the non neurogenic DV and the neurogenic DESD in women.

Methods: Retrospective review of all urodynamic studies performed on women from 03/2003-07/2009. All cases diagnosed as DV or DESD based on videourodynamics criteria (Nitti, et al 1999) were selected out and included for analysis. The common characteristic is failure of the external sphincter to relax during voiding diagnosed by increased EMG activity and/or fluoroscopic evidence of sphincter contraction. Demographic data, preoperative symptoms, and videourodynamic parameters were collected. Patients were divided into two groups based on diagnosis and compared. Categorical variables were compared using chi-squared tests and contingency tables. Continuous variable were evaluated using analysis of variance and t-tests. Median values were used as distributions were non-normal.

Results: 58 patients were identified and included in analysis. 22 (37.9%) had DESD and 36 (62.1%) had DV. In patients with DESD the underlying neurologic diseases are as follows: 11(50%) Multiple Sclerosis, 3(13.6%) Spinal Surgery or Injury, 1(4.5%) Spina Bifida, and 7(31.8%) Other.

Conclusions: Patients with DV tend to present at a significantly younger age but with similar symptoms as those with DESD. Incidence of detrusor overactivity and % residual was significantly higher in the DESD group. These urodynamic differences may reflect a higher level of bladder and sphincter dysfunction due to underlying neurologic disorders.

<table>
<thead>
<tr>
<th>Median Age in yrs</th>
<th>DV</th>
<th>DESD</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td># with Preop Storage Sxs (%)</td>
<td>35 (20-75)</td>
<td>58 (20-82)</td>
<td>0.0002</td>
</tr>
<tr>
<td># with Preop Voiding Sxs (%)</td>
<td>20(55.6%)</td>
<td>12 (54.6%)</td>
<td>0.9402</td>
</tr>
<tr>
<td>Median Volume at First Desire (cc)</td>
<td>108.5 (26-665)</td>
<td>180 (47-720)</td>
<td>0.0518</td>
</tr>
<tr>
<td>Median Volume at Normal Desire (cc)</td>
<td>181 (56-1401)</td>
<td>232 (104-830)</td>
<td>0.9624</td>
</tr>
<tr>
<td>Median Maximal Capacity (cc)</td>
<td>344 (147-1459)</td>
<td>402.2 (176-1085)</td>
<td>0.5816</td>
</tr>
<tr>
<td>Median End Filling Pressure (cm H2O)</td>
<td>5.5 (0-10)</td>
<td>6 (1-20)</td>
<td>0.0269</td>
</tr>
<tr>
<td>Median Compliance (ml/cm H2O)</td>
<td>73.5 (21.11-470.5)</td>
<td>72.1 (10.35-311)</td>
<td>0.4722</td>
</tr>
<tr>
<td>Incidence of Detrusor Overactivity (%)</td>
<td>9 (25%)</td>
<td>12 (54.6%)</td>
<td>0.0231</td>
</tr>
<tr>
<td>Median Qmax (ml/s)</td>
<td>10.2 (1-35.7)</td>
<td>12 (3-24)</td>
<td>0.6755</td>
</tr>
<tr>
<td>Median PdetQmax (cm H2O)</td>
<td>38 (11-90)</td>
<td>31 (12-65)</td>
<td>0.3400</td>
</tr>
<tr>
<td>Median Pdetmax (cm h2O)</td>
<td>44 (9-102)</td>
<td>39.5 (15-156)</td>
<td>0.9509</td>
</tr>
<tr>
<td>Median % residual</td>
<td>9.93 (0-95.7)</td>
<td>44.5 (0-100)</td>
<td>0.0007</td>
</tr>
</tbody>
</table>
INTRODUCTION AND OBJECTIVES: Uroflowmetry is a noninvasive screening test used commonly in male and female patients with LUTS. The literature addressing uroflowmetry in men was reviewed. Historically and conceptually, the initial bladder volume would be thought to be the significant variable in the relationship between flow and volume. However, during the initial studies on uroflowmetry, the determination of bladder volume would have required catheterization. Most reports have thus substituted voided volume for bladder volume as an approximation. Prior publications have reported a correlation between voided volume and maximum flow rates (Qmax). We wished to evaluate the correlation between voided volume (VV) and Qmax, as well as bladder volume (BV = voided volume plus PVR) and Qmax.

METHODS: This is a retrospective analysis of 289 consecutive men who presented with LUTS (OAB, UTI, BOO, PPI) and underwent uroflow (Q) and post void residual urine (PVR). Patients with neurogenic bladder were excluded. Maximum uroflow rate (Qmax), VV, and shape of the curve were recorded. The correlation between VV and Qmax and between BV and Qmax were calculated using Spearman’s correlation coefficient.

RESULTS: The 289 male patients had a mean age of 61.7 years (range=16-92). Mean Qmax was 12.3 mL/s (median=9.7 mL/s). Mean VV was 143.5 mL (median 110 mL) and mean BV was 223.8 mL (median 161 mL). Qmax and VV were well correlated (Spearman’s correlation coefficient = 0.61, p<0.001). Qmax and BV were not as well correlated (Spearman’s correlation coefficient = 0.33, p<0.001).

CONCLUSIONS: There is a statistically significant correlation between VV (0.61) and flow rate, which is stronger than BV (0.33) and flow rate. This is surprising considering that it would be expected that the maximum flow rate would be most dependent on the initial bladder contents (due to the relationship between the force of muscle and length of muscle tissue) and not on voided volume. Although it is common practice based on prior inability to obtain BV without catheterization, this study demonstrates that the use of VV when interpreting flow rates is more valuable than BV.
Elizabeth Mueller, MD, MSME and Kimberly Kenton, MD, MS
Loyola University Medical Center
(Presented by: Elizabeth Mueller)

Introduction and Objectives: Total number of UDS performed by urologists applying for certification and recertification more than doubled from 2003 to 2007. Little data exists on the types and indications for urodynamic procedures (UDS) during this timeframe. We aimed to report the types of procedures and diagnosis codes most commonly associated with UDS.

Methods: We reviewed procedure logs submitted by applicants for part II ABU certification or ABU recertification during 2004-2007. The log lists all of the procedures by CPT code performed during 6 consecutive months. The number of procedures with UDS CPT codes (51725, 51726, 51741, 51772, 51784, 51785 and 51792) were abstracted along with the number of urologists performing the procedure. Patient data obtained included the patient gender and ICD-9 codes most frequently associated with a specific urodynamic test.

Results: Logs of 2650 urologists - 1072 (67%) recertifying and 878 (33%) first time applicants were analyzed representing ~ 31% of all board certified urologists. The number of UDS reported was 634,000. Complex uroflowmetry represented 47% of the UDS performed by 83% of the urologists. Three quarters of complex uroflowmetry was performed on men. The 3 most common ICD codes were associated with urinary obstruction and frequency. Over 65% of filling and voiding cystometry was performed on women by 70% of urologists. In women, ICD codes for UDS were most commonly for stress or unspecified urinary incontinence. Only 4% of UDS were video-urodynamics (VUDS); the majority of VUDS were performed on women (85%) with an ICD-9 code associated with unspecified or stress incontinence.

Conclusion: Most UDS done by urologists are performed in men with symptoms of urinary obstruction and in women with urinary incontinence. Video-urodynamics are done infrequently, but most often for urinary incontinence in women.
1. Mueller ER, Urodynamic procedures are on the rise. J Urol # 1669, pp 602, 2009
THE EFFECT OF TRANSURETHRAL CATHETERIZATION ON UROFLOW PARAMETERS
Anne Suskind, MD and Phillip Smith, MD
University of Connecticut, Farmington, CT
(Presented by: Anne Suskind)

Introduction and Objectives: The presence of a transurethral catheter has been shown to alter voiding flow characteristics in men and women when compared to uninstrumented flow patterns. Animal and limited human data suggest a functional obstructive effect on voiding. The objective of this study is to evaluate the effect of transient catheterization on uroflow parameters in patients undergoing indicated urodynamic procedures.

Methods: Consenting women (ages 18-90) who had no known neurological disease provided an uninstrumented uroflow prior to their indicated urodynamics (UD) procedure. After the urodynamics procedure was completed, the patient’s bladder was re-filled to a volume approximating the sum of the patient’s initial voided volume and post-void residual volume, catheters removed, and a post-instrumented uroflow obtained. Voided volume, Qmax, and Qave were recorded for both uninstrumented uroflows. Uroflow curves were classified as normal or abnormal. Quantitative data was compared using paired t-test, with and without correction for voided volume, and McNemar test for comparison of uroflow classification.

Results: A total of 20 patients had initial voided volumes >150 ml and complete uroflow data. No differences were observed in uncorrected flow rates, although post-UD voided volumes were larger than pre-UD volumes. Volume-corrected Qave was significantly lower in the post-catheterized uroflow group (p<0.001). Five of 14 initially normal uroflow patterns became abnormal, whereas no abnormal patterns normalized, not quite achieving statistical significance (p=0.074).

Conclusion: Our results demonstrate a degradative effect of transient catheterization on uroflow parameters. These results suggest that catheterization may cause more than simply a passive obstructive effect. Urethral stimulation due to catheterization may perturb detrusor or urethral function, altering voiding and possibly filling performance. The resultant artifact potentially misguides the interpretation of urodynamic study. Results are limited by a small sample size and by subjective interpretation of uroflow voiding patterns. These results do not clarify whether this functional catheterization effect is universally present or restricted to a particular subset of patients. Further investigation into this subject is ongoing.

IS THERE VALUE IN OBTAINING A URINALYSIS PRIOR TO URODYNAMICS TESTING?
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(Presented by: Denise Elser)

Introduction and Objectives: Women are screened for presence of urinary tract infection (UTI) just prior to urodynamics testing. Acute UTI is associated with transient Detrusor Over activity (DO), due to inflammation, and with transient stress incontinence (SUI), due to effect of alpha toxin excreted by E Coli bacteria. Between Jan 2008 and May 2009, women underwent (UA) 7-10 days prior to urodynamics (uro) in our urogynecology office. Our aim is to analyze if this pre screen affected the number of tests cancelled due to presence of UTI.

Methods: Uro’s done during the study period were identified through electronic medical record. Demographics, coexisting medical conditions, reason the test was ordered, post void residual (PVR) and interval since last catheterization, if any were abstracted. Analysis utilized chi square, either Pearson or Fisher exact test. This study received no outside funding.
Results: 184 women with mean age (26-89) underwent uro during the study period. 122 had a UA 1 week prior to testing and 62 did not. Five (4%) women were found to have a UTI on initial UA & received antibiotics. UA dipstick ( dip) for UTI was performed on the day of uro. Of these, 7/184 (3.8%) were Leukocytes (LE) & Nitrates (Nit) positive, & deemed to have a UTI. However, the UTI rate was 6/62 (9.7%) for those not tested prior and 2/122(1.6%) for those with a pre test UA. (p=.37) Uros were ordered based on the following diagnoses: Incontinence 56%, urgency 8%, nocturia 1%, prolapse 29%, voiding dysfunction 6%. The diagnosis was non predictive of UTI. (p=.767) The mean interval since catheterization was non predictive with a mean of 31 days for UTI –and 21 days for UTI +. (p=.949) Neither was PVR volume predictive, with a mean of 85ml for UTI –and 92 ml for UTI + patients. (p=.954) Of the following factors: oral or topical estrogen use, diabetes, smoking and use of systemic steroids; only steroid use was predictive of UTI at the time of urodynamics testing (p < 0.05).

Conclusion: The rate of UTI in women presenting for their urodynamics test in a urogynecology referral center is about 10% in an unscreened group of women and 2% in women who had undergone UA one week prior to the urodynamics appointment. Screening for UTI prior to the day of testing may not significantly prevent UTI on day of test.

Poster# 64

ROLE OF URETHRAL ULTRASOUND IN THE EVALUATION OF ANTERIOR URETHRAL STRICTURES

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(Presented by: Ayman Mahdy)

Introduction and Objectives: Retrograde contrast urethrography (RU) is the standard imaging for urethra. Because of the limitations of RU, Urethral Ultrasound (UUS) has been recommended for evaluating the anterior urethra. In this study, we evaluate the role of UUS in accurate detection of exact length and extent of the stricture and spongiofibrosis in comparison to RU with verification of the results with urethroplasty findings.

Methods: 19 men (age 16-60 yrs, mean 38 yrs) with anterior urethral strictures were included in the study. Urethral stricture length was measured from the radiogram. For pendulous UUS, 7.5 MHz linear array transducer was placed longitudinally on the ventral surface of the penis in the same line of the penile shaft, with attention not to compress the urethra. For penoscrotal junction and bulbous UUS, the transducer was placed over the scrotum between the testicles and in the perineum respectively. Finally, the patient was instructed to strain in order to delineate the proximal bulbar urethra. Urethral stricture was detected as a reduction in the urethral lumen and reduced distensibility on saline injection. Spongiofibrosis was detected by measuring the degree and extent of encroachment on the urethral lumen. All patients underwent open urethroplasty and the findings on the studies were compared to surgical findings.

Results: Strictures were post-inflammatory in 13 patients, post-traumatic in 4, and Balanitis Xerotica Obliterans (BXO) in 2. Stricture was in the bulbar urethra in 10 patients, pendulous urethra in 4, fossa navicularis in 3, and multiple levels in 2 patients. All patients underwent open urethroplasty. In 11 patients, UUS revealed same results as RU. In eight patients, RU underestimated the stricture length and the extent of spongiofibrosis compared to UUS. UUS was able to detect urethral stones in one patient, and this finding was missed on RU (radiolucent stone). Extravasation developed in two patients during retrograde contrast urethrography, and no complications were encountered during urethral ultrasound.

Conclusion: UUS is a simple procedure to perform, and avoids radiation hazard. In this study comparing these 2 modalities, we confirm that UUS is superior to RU in accurately detecting the exact length of stricture as well as the extent of spongiofibrosis. UUS may potentially be the initial study of choice in evaluating patients with urethral stricture disease.
DECELLULARIZED PORCINE-DERIVED BLOOD VESSEL MATRIX GRAFT FOR URETHRAL REPLACEMENT IN A RABBIT MODEL
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(Presented by: Sam Kuykendall)

Introduction and Objectives: To evaluate a xenographic urethral replacement model utilizing porcine derived, decellularized blood vessel matrices in rabbits.

Methods: In 17 male rabbits, a 1 cm tubular segment of porcine, acellular blood vessel matrix replaced a 1 cm urethral defect without a postoperative catheter. The animals were sacrificed at varying intervals (1, 3, and 6 months) and assessed for graft patency and integration properties.

Results: All but one animal survived. One animal died of unknown etiology one month after surgery. In all 17 rabbits, the urethra was patent without evidence of stricture formation as confirmed by gross inspection and passage of a 10Fr catheter at the time of euthanasia/tissue harvest. At one month, histological examination revealed epithelialization, host cell infiltration, angiogenesis and migration of smooth muscle. The smooth muscle bundles were more organized by 6 months. No significant fibrosis or stricture was observed in the anastomotic area. Photographs of the urethra are shown, below.

Conclusion: This successful experiment would support efforts for further investigation of a potentially off-the-shelf product using porcine derived acellular blood vessel matrix for single-stage urethral reconstruction without requiring stem cell technology. To our knowledge this is the first report of a xenograft blood vessel matrix for urethral substitution.

Funding: This project is funded by the Wigley Award for surgical research at Scott and White Hospital, Temple, TX.

Figure 1: Graft at one month                       Figure 2: Graft at six months
**Poster# 66**

**TRANS-VAGINAL BLADDER NECK CLOSURE WITH POSTERIOR URETHRAL FLAP**

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(Presented by: Colin Goudelocke)

**Introduction and Objectives:** Urethral and bladder neck destruction due to chronic indwelling urethral catheters in female neurogenic patients is a devastating complication. Transabdominal bladder neck closure carries significant morbidity, while traditional transvaginal bladder neck closure can be associated with ureteric injury and fistula formation. We present a variation on the traditional transvaginal bladder neck closure technique using a posterior urethral flap that minimizes the potential risk of ureteric injury and fistula formation.

**Methods:** A wide-based anterior vaginal wall flap is developed from the urethral meatus to beyond the bladder neck. A dorsal semi-lunar incision is made above the urethra and dissection is carried above the urethra beneath the symphysis pubis into the retropubic space, taking down the pubourethral and urethropelvic ligaments and mobilizing the urethra and anterior bladder neck. The dorsal urethra is bivalved and the incision is carried onto the anterior bladder for a distance of 2-3 cm. The opened ventral urethra is then rotated cephalad over the anterior bladder wall. The vaginal wall is closed as a 2nd layer.

**Results:** 8 consecutive female neurogenic patients underwent transvaginal bladder neck closure as described with placement of a suprapubic tube. Mean blood loss was 250cc. There were no intra-operative or acute post-operative complications, with a mean hospital stay of 1.7 days. Post-operative cystograms at 3 weeks were negative for leak but one patient developed wound breakdown at 1 month requiring a 2nd procedure. Mean follow up was 10.5 months (range 1 to 36). Serial ultrasound at the time of last follow-up revealed no new hydrourerteronephrosis or ureteral obstruction.

**Conclusion:** Transvaginal bladder neck closure with posterior urethral flap is a simplified technique of bladder neck closure with satisfactory early outcomes. We feel that the use of the urethra as a flap maintains the bladder neck closure safely away from the ureteric orifices minimizing the risk upper tract injury. The rotation of the posterior urethra onto the anterior bladder wall secures the suture line high into the retropubic space decreasing the risk of fistula formation.

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**Poster# 67**

**ANTERIOR ANAL SPHINCTEROPLASTY: AN ANALYSIS OF RESULTS, COMPLICATIONS, AND OUTCOMES**

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(Presented by: Shelby Morrisroe)

**Introduction and Objectives:** Anal sphincteroplasty (AS) is performed for involuntary loss of flatus or stool which is detrimental to quality of life. This study reviews the outcomes of the anterior approach to AS for fecal incontinence at our institution.

**Methods:** Twenty-nine consecutive patients from 2005-2009, mean age 57 (range 24-82), who underwent AS were studied by retrospective chart review. Data on preoperative patient factors, surgical history, operative data, complications, and outcomes were collected. Success of the operation was defined as no episodes of fecal incontinence. Improvement was defined as occasional episodes of fecal incontinence but greatly improved from before surgery. Failure was defined as no change in episodes of incontinence. The surgical technique includes an inverted U incision of the perineum, entering the ischial fossa, exposure and approximation of the posterior levator, internal and external anal sphincter with figure of 8 delayed absorbable sutures over 5 centimeters.
Results: Preoperatively, all patients took the Pelvic Floor Impact Questionnaire. Physical exam revealed poor anal sphincter tone and normal perianal sensation and normal sacral reflex arc in all patients. Pelvic MRIs were performed in all patients with the most common finding being disappearance of the supporting levator angulation. Six patients had previous AS and 3 patients had previous rectal prolapse repair. Twenty patients had concomitant pelvic organ prolapse requiring repair at the time of AS. These additional surgeries included 2 cystocele, 17 rectocele, and 3 enterocele repairs, 2 transvaginal hysterectomies and 3 rectal prolapse repairs. Postoperative complications included 7 wound infections. At an average followup of 18 months (range 2-48), 12 patients had successful outcomes (41%), 10 had improvement (34%) and 7 failed (24%). Of those who failed to improve, 5 had undergone AS or rectal prolapse repair in the past. Of this group, subsequent AS was performed in 5 and repair of recurrent rectal prolapse was performed in 2 in order to obtain improvement.

Conclusions: Our review suggests AS has good success. The most complex cases are when rectal prolapse presents together with fecal incontinence adding to the chronic dilation and incompetence of the anal canal. These are the most difficult patients to treat with the lowest success rates. We now perform a 2-stage approach, with rectal prolapse repair first followed by AS due to high risk of infection.

Poster# 68

THE URACHAL-PERIVESICAL PERITONEAL FLAP: A PREVIOUSLY UNREPORTED TISSUE FLAP IN VESICOVAGINAL FISTULA REPAIR

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( Presented by: Mary Henderson)

Introduction and Objectives: Tissue interposition is imperative for the successful repair of complex vesicovaginal fistulae (VVF). The most common flap used in a transabdominal VVF repair is the omental flap, which in many cases can not be used. The urachus is a well vascularized tissue that is easily mobilized for interposition. We describe our experience using a urachal-perivesical peritoneal flap as the interposed tissue in VVF repair.

Methods: Patients undergoing VVF repair at our center were examined. Retrospective chart review was performed for those that underwent transabdominal VVF closure with interposition of a urachal-perivesical peritoneal flap. Patients were left with a foley catheter and a drain. Cystogram was performed 2 weeks postop to confirm fistula resolution, prior to foley removal. No funding was provided for this research.

Results: 12 patients were identified. All were evaluated with a history, physical, upper and lower tract imaging and cystoscopy. Vaginal pad dye tests were occasionally employed. Urodynamics were performed in those with urinary incontinence. Median patient age was 49 years (31 to 88). Fistula etiology was hysterectomy in 10 and prolapse repair in 2. 3 patients were diabetic; none had pelvic radiation or local cancers. 5 patients had failed previous repair. Fulguration of the fistula tract had failed in 2 patients. Eleven of twelve patients had successful repairs with our described technique with no recurrence of fistula. 1 patient had a postoperative wound infection. Another patient had respiratory issues requiring short term ventilation. 2 patients had preoperative and postoperative complaints of stress urinary incontinence that was mild and did not require surgery.

Conclusion: VVF is a complex issue for reconstructive surgeons to address. The urachal-perivesical peritoneal flap is a well vascularized tissue flap that can be easily mobilized and interposed for VVF repair. 11 of 12 patients with VVF in this series were successfully repaired using this technique. We continue to employ this technique and feel that further evaluation and usage of this flap indicated.

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**COMPLEX RECTOURETHRAL FISTULA (CRUF): APPROACH FOR DEFINITIVE**

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(Presented by: Melanie Crites)

**Objective:** Definitive treatment of Complex Rectourethral fistula (cRUF) often requires sacrificing the continuity of one system (genitourinary or colorectal) to salvage the other. This non-funded study explored the methods of cRUF repair to attempt to establish a protocol for treatment success.

**Methods:** A retrospective chart review was conducted from 2002-present of 25 patients who had cRUF repair concomitantly by Urology and Colorectal surgery. cRUF is defined as a large fistula with compromised tissue viability. Data included etiology of cRUF, procedure(s) for defect correction, if treatment required sacrificing the continuity of one or both systems, and reason(s) for sacrifice.

**Results:** Seven patients of 25 reviewed cases (28%) had system continuity sacrifice. Genitourinary (GU) continuity was sacrificed in 2 patients (29%), Colorectal (CR) continuity was sacrificed in 1 patient (14%), and continuity of both systems was sacrificed in 4 patients (57%). The etiology for 6 of the 7 cases was prostatic carcinoma (PCa) treated with both External Beam Radiotherapy (EBR) and Brachytherapy and had comorbidities related to the sacrificed system. Of the 2 patients with GU diversion, both were secondary to involvement of the entire prostatic urethra and external urethral sphincter. The 1 patient with CR sacrifice had a history of prior rectal carcinoma. Of the 4 patients with sacrifice of both systems, 1 had significant comorbidities resulting in high surgical risk, 1 developed localized metastatic rectal carcinoma, 1 had a defect in excess of 4 cm, and 1 failed prior surgical correction and had too large of a recurring defect to attempt second repair.

**Conclusions:** This study attempted to identify risk factors for successful treatment of cRUF and what, if any, were the factors contributing to system continuity sacrifice. All patients requiring sacrifice of one or both systems had undergone both EBR and Brachytherapy to treat PCa. This study concluded that a patient with a cRUF diagnosis, who has any comorbid state of the GU or CR system, may undergo diversion of the respective system(s) as definitive treatment initially in an attempt to minimize recovery complications.

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**RECTOURETHRAL FISTULA STENTING FACILITATES IDENTIFICATION AND DISSECTION**

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(Presented by: Melanie Crites)

**Introduction and Objectives:** Identification of rectourethral fistula (RUF) can be challenging during surgical correction of the defect using a perineal approach. This non-funded study demonstrates a technique in our institution to identify RUF and facilitate dissection.
Methods: From November 2007-present, eight patients have been treated using the RUF localization technique devised at this institution. After the patient’s gracilis muscle is harvested by Colorectal Surgery, a urethroscopy is performed by Urology. The fistula is localized in the urethra visually and a 5F ureteral catheter is inserted into the fistula under direct visualization. The assistant retrieves the ureteral catheter by inserting a finger into the patient’s rectum and pulling the catheter through the fistulous opening. A coude-tip Foley catheter is then inserted urethrally into the bladder. The urethral portion of the fistula catheter is fixed to the coude-tip Foley catheter by silk sutures. Dissection to the RUF is carried out through a perineal approach until the fistula site is identified by palpation or visualization of the catheter in the fistula. Once the RUF is localized, dissection is carried out 2cm beyond the fistula to provide rectal and urethral mobilization. The fistulous tract is then excised around the fistula catheter and the urethral side closed. The fistula catheter is then cut between the rectum and urethra and removed via the urethral meatus. The defect remaining in the urethra is then closed. The remaining portion of the fistula catheter is retrieved through the incision and serves as a landmark for the colorectal team to repair the rectum.

Results: This technique has been employed on 8 patients without complication. The etiology of RUF for four patients (50%) was external beam radiotherapy (EBRT) + brachytherapy, 1 patient (20%) had brachytherapy alone, 1 patient (20%) had brachytherapy + rectal bleeding cautereization, and 1 patient (20%) had radical retropubic prostatectomy with rectal injury.

Conclusion: Stenting of RUF can not only facilitate efficient identification of the RUF but can also benefit in the dissection process to help prevent urethral shortening and/or rectal injury. This technique can be safely employed without direct adverse sequelae and can help facilitate dissection through visualization and palpation of the stent.

Poster# 71

A REVIEW OF INITIAL EXPERIENCE WITH THE TRANSOBTURATOR MALE SLING
Gwen Grimsby, MD and Christopher Wolter, MD
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(Presented by: Gwen Grimsby)

Introduction and Objectives: Post-prostatectomy incontinence is a feared complication of radical prostatectomy and commonly encountered in the urologic population. Traditionally, the artificial urinary sphincter (AUS) and bone-anchored male sling were the main treatment options. Since 2006, the transobturator male sling offered a new and minimally invasive treatment for post-prostatectomy and post-TURP urinary incontinence.

Methods: A retrospective chart review was performed of all transobturator male slings (Advance Sling, AMS, Minnetonka, MN) placed at one institution by a single provider from September 2008 to September 2009. All patients had pre-operative confirmation of stress incontinence by history and physical examination. Cystoscopy was performed for confirmation of coaptation of the external urinary sphincter. Urodymanics were performed at the discretion of the treating clinician. Success of the procedure was defined as resolution of leakage or great improvement of leakage by history and lack of stress urinary leakage on post operative physical exam. All other results were considered failures.

Results: Ten patients underwent placement of a male sling. Average age was 67 years old (55-77). Etiology of urinary incontinence was robotic radical prostatectomy in 8 patients, Holmium laser enucleation of the prostate in 1 patient, and open radical prostatectomy in 1 patient. Average pads per day were 4 (1-8). Successful surgical treatment of the incontinence was achieved in 7 of 10 patients (70%). Two of the failures elected to proceed with the procedure despite pre-operative counseling that an artificial urinary sphincter was a better option. Both patients ultimately went on to have placement of an AUS with successful treatment of their incontinence. Pre and post-operative uroflows were unchanged in all patients. No patients experienced peri-operative complications, urinary retention requiring catheterization, or mesh erosion or extrusion. In addition, unlike the bone anchored sling, none of our patients experienced post-operative perineal pain. Follow up was 1-11 months.
Conclusion: Our initial experience with the transobturator male sling displays that in the properly chosen patient suffering from post-prostatectomy or post-TURP incontinence, the male sling is a minimally invasive, low risk, and successful procedure. However, our experience has short follow up and a small sample size and thus further research into this area is warranted.

Poster# 72

DEVELOPMENT OF A CADAVERIC MODEL FOR MALE STRESS URINARY INCONTINENCE
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(Presented by: Jaspreet Sandhu)

Introduction and Objectives: Male stress urinary incontinence (SUI) is a common problem with multiple etiologies. The mainstay of treatment for SUI has been surgical implantation of devices intended to control incontinence during periods of abdominal stress. The artificial urinary sphincter (AUS) and male sling (MS) are the two most commonly used devices for control of male SUI. The mechanism of action of the AUS is well known, but data on performance impact of various cuff and balloon sizes is lacking. A reproducible model for male SUI is needed to better understand the mechanism of male SUI and mechanism of action of the devices that correct it. Our objective, therefore, was to develop a reproducible fresh cadaver model for male SUI.

Methods: Fresh cadavers with no known prostate surgery were obtained. A low midline incision was made. The bladder was identified and an 18 french catheter was placed through a cystotomy; two purse-string sutures were placed to ensure no leakage of fluid around the catheter. The bladder was filled with a total of about 200 mL of saline allowing it to be easily palpable just above the pubis. A manometer was attached to the catheter. Abdominal Leak Point Pressure (ALPP) was measured by recording bladder pressure at which urinary leakage occurred with increasing gradual manual pressure. After ALPP was measured, it was re-measured with a urethral cuff (sized in the typical fashion) placed around the bulbar urethra, and again with the urethral cuff pressurized to 55 cm of water (cmH2O). This was compared to ALPPs obtained on a pig urethra model with a properly sized unpressurized and pressurized urethral cuff.

Results: All three cadavers tested demonstrated native ALPPs with a mean of 8.5 cmH2O. With a properly sized deflated urethral cuff in place, the ALPP increased to a mean of 44.7 cmH2O. With a urethral cuff pressure of 55 cmH2O, the ALPP increased further to 77.8 cmH2O. When tested on a pig urethra model, ALPP with an unpressurized cuff was 18 cmH2O and with a cuff pressurized to 55 cmH2O was 71.5 cmH2O. The change between an unpressurized and pressurized urethral cuff was 33.1 cmH2O in the cadaver model and 53.5 cmH2O in the pig model.

Conclusion: A model using fresh cadavers is feasible and could be used to study interventions for male SUI. Further, this model appears to yield similar results for the AUS to currently used ex-vivo models.

Poster# 73

SELECTIVE MANAGEMENT OF THE URETHRA AT TIME OF PROLAPSE REPAIR: AN ASSESSMENT OF POSTOPERATIVE INCONTINENCE AND PATIENT SATISFACTION
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(Presented by: Ryan Krlin)
Introduction and Objectives: In women presenting with symptomatic pelvic organ prolapse (POP) in the absence of signs or symptoms of stress urinary incontinence (SUI), the literature supports the selective use of an anti-incontinence procedure. It has been our experience that the vast majority of women without symptomatic or occult SUI will not leak with prolapse surgery alone and no concomitant anti-incontinence procedure. We report our outcomes with patients who underwent selective management of the urethra at the time of POP repair. Our primary endpoints are patient satisfaction and self reported continence.

Methods: Patients who underwent surgery for advanced POP were selected from our database. All charts were reviewed to determine if a concomitant anti-incontinence procedure was performed. Patients were excluded if post operative follow-up was less than one year. Patients were contacted via telephone to obtain responses to 3 validated questionnaires: UDI-6, PGI-I, and MESA.

Results: A total of 29 patients met inclusion criteria. 18 patients completed responses to all questionnaires. Patients were separated into two groups - those who underwent prolapse repair alone (n=9) and those who underwent both prolapse repair and suburethral sling (n=9). The mean UDI-6 scores were 2.6 in the prolapse only group and 2.1 in the concomitant sling group (p=0.678). The MESA urge component was 0.667 in the prolapse only group and 2.55 in the concomitant sling group (p=0.143), and the MESA stress component was 2.66 in the prolapse only group and 2.11 in the concomitant sling group (p= 0.704). The PGI-I revealed 67% to be either much better or very much better in both groups. One patient with a prolapse only repair returned with incontinence and underwent a secondary sling procedure. Patients that underwent a concomitant sling had a higher urge component and a lower stress component compared to the patients that underwent prolapse only repair; however, these differences weren’t statistically significant.

Conclusions: Patients with advanced POP that don’t have a concomitant suburethral sling at the time of their prolapse repair have continence and satisfaction outcomes that are equivalent to those who do undergo concomitant suburethral sling and prolapse repair. The decision to perform a concomitant prophylactic anti-incontinence procedure at the time of advanced prolapse repair should be tailored to the individual patient.

Poster# 74

VESICOVAGINAL FISTULA IN THE DEVELOPING WORLD: A RESIDENT'S EXPERIENCE IN NIGERIA
Gjanje Smith, MD¹, Sunday Lengmang, MD², George Chima, MD², Mark Gyang, MD², Josh Wood, MA³ and Catherine deVries, MD³
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(Presented by: Gjanje Smith)

Introduction and Objectives: Vesicovaginal fistula (VVF) in the developing world are due to obstructed labor and practices like female genital mutilation, early marriage, and traditional treatments including instillation of caustic substances in the vagina for treatment of various ailments. The Evangel Hospital VVF Center in Jos, Nigeria treats approximately 600 women with VVF annually. IVUmed is a non-profit organization that strives to provide quality urologic training worldwide. The IVUmed Traveling Resident Scholar Program allows US residents to experience the practice of urology in the developing world. We present the experience of one resident on a 10-day mission to Evangel. This trip was funded by IVUmed and SUFU.

Methods: One US urology resident visited the Evangel VVF Center for 10 days in May 2009, where VVF repairs are performed by family medicine physicians with no formal training in urology or gynecology. Her experience included outpatient clinic ranging from new patient evaluation to follow-up appointments and the necessary/feasible diagnostic tests, hands-on operative experience, and management of post-operative patients.
Results: Nigeria is the 14th largest country in Africa with the largest population of any African country (120 million). Nigeria has a physician density of 3 per 10,000 population vs 26 in the US, and nursing and midwifery personnel density of 17 per 10,000 vs 94 in the US. Only 35% of births in Nigeria are attended by skilled health personnel vs 100% in the US. Of the 2 million women in the developing world with VVF, an estimated 800,000 reside in Nigeria. A total of 584 VVF were repaired at Evangel in 2008. The etiology of VVF was obstructed labor in 94%, with 84% of patients in labor for > 2 days, and 15% in labor for > 5 days. The remainder of the fistulas (6%) were due to other causes such as female genital mutilation and instillation of caustic substances into the vagina. Successful closure occurred in 88% of patients, and 70-75% of patients were continent of urine after repair.

Conclusion: VVF s in Nigeria are primarily due to obstructed labor. Lack of trained medical professionals and practices deeply seated in tradition make VVF an ongoing problem in this region and one that is difficult to eradicate. VVF were repaired by general practitioners in Nigeria with success rates comparable to published data. Further investigation is needed to determine if this is feasible in other countries in the developing world.

Poster #75

IMPROVED OUTCOMES IN PATIENTS WITH TRANSIENT URINARY RETENTION AFTER MACROPLASTIQUE URETHRAL BULKING PROCEDURE
Elizabeth Williams, MD and Steven Siegel, MD
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(Presented by: Elizabeth Williams)

Introduction and Objectives: In the largest published series studying the use of Macroplastique (MPQ) for female stress urinary incontinence (SUI), 36.9% of subjects were cured with 61.5% improved at 1 year, and a transient urinary retention (UR) rate of 6.9% was observed. In our series, we have found a higher rate of UR than previously reported and have noted higher global improvement scores in this subset. To compare overall improvement/cure rates between patients with and without UR after urethral injection of MPQ in a single-institution series.

Methods: A total of 29 female subjects were included, each of which had undergone an in-office urethral bulking procedure with MPQ from 8/2007 through 5/2009. All subjects had a peri-urethral block with 10cc of 1% lidocaine and were injected trans-urethrally with a total of 5cc MPQ at the mid-urethra. Data was collected from telephone questionnaires and chart review. One of the investigators (SWS) is an investigator/consultant for Uroplasty.

Results: Of the 29 subjects, 14 (48%) experienced UR requiring intermittent catheterization/indwelling catheter, while 15 (52%) were able to void spontaneously post-procedure. The mean length of UR was 4.7 days. Excluding 3 outliers, the mean UR length was 2.14 days. The average age for the subset was 67.1 years compared with 69 years for those without UR. Mean length of follow-up was 10.3 mos. and 8.6 mos., respectively, and percentage of subjects with prior stress and/or urge incontinence procedures was equal. Global improvement in stress incontinence was assessed for both subsets which included assessment of IIQ-7 and IQOL scores. See Table 1.

Conclusion: MPQ is an effective treatment for SUI. In our series, there was a high rate of UR, likely associated with the peri-urethral block and the distribution of the bulking agent. The UR subset reported higher global improvement scores, and many maintained benefit for greater than one year. This correlation impacts our patient counseling, and merits further investigation into cause and possible incorporation into technique to maximize global improvement scores.

<table>
<thead>
<tr>
<th>Subset</th>
<th>&lt;50% GI</th>
<th>50-75% GI</th>
<th>&gt;75% GI</th>
<th>100% GI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retention</td>
<td>4 (28.6%)</td>
<td>2 (14.3%)</td>
<td>8 (57.1%)</td>
<td>4 (28.6%)</td>
</tr>
<tr>
<td>No Retention</td>
<td>7 (46.7%)</td>
<td>2 (13.3%)</td>
<td>6 (40%)</td>
<td>2 (13.3%)</td>
</tr>
</tbody>
</table>
CLINICAL EVALUATION OF FEMALES WITH LOWER URINARY TRACT SYMPTOMS (LUTS): CORRELATION OF FLOW RATE WITH VOIDED VOLUMES: IS 150 ML VOIDED VOLUME NECESSARY?
Matthew Rutman, MD¹, Ava-Dawn Gabbidon, BA², Hiroshi Katsumi, MD³, Georgia Panagopoulos, PhD⁴, Jeffrey Weiss, MD⁵ and Jerry Blaivas, MD⁶
¹Columbia University, College of Physicians and Surgeons, New York, NY; ²New York, NY; ³Columbia University, New York, NY; ⁴Lenox Hill, New York, NY; ⁵SUNY Downstate Medical School, Brooklyn, NY; ⁶Weill Medical College of Cornell University, New York, NY
(Presented by: Matthew Rutman)

Introduction and Objectives: Uroflowmetry is a noninvasive screening test used commonly in male and female patients with LUTS. The literature addressing uroflowmetry was reviewed. It has been common practice based on arbitrary data to only interpret voided volumes >150 mL. Prior publications have reported a correlation between voided volume and maximum flow rates (Qmax). We wished to evaluate the correlation between voided volume (VV) and Qmax, and then look at the difference between the patients with VV of < 150 mL versus > 150 mL.

Methods: This is a retrospective analysis of 411 consecutive women who presented with LUTS (OAB, UTI, SUI, pelvic organ prolapse, BOO) and underwent uroflow (Q) and post void residual urine (PVR). Patients with neurogenic bladder were excluded. Maximum uroflow rate (Qmax), VV, and shape of the curve were recorded. The correlation between VV and Qmax was calculated using Spearman’s correlation coefficient. We then compared the correlation of VV and Q looking at volumes < 150 mL versus > 150 mL.

Results: The 411 female patients had a mean age of 58.2 years (range=20-92). Mean Qmax was 16.3 mL/s (median=14.0 mL/s). Mean overall VV was 165.2 mL (median 112.5 mL) and mean overall BV was 203.2 mL (median 144.5 mL). Qmax and VV were well correlated overall (Spearman’s correlation coefficient = 0.69, p<0.001). 266 patients had VV < 150 mL (mean = 79.1 mL and median =74.5 mL) with a mean Qmax of 12.3 mL/s. 145 patients had VV > 150 mL (mean = 324.4 mL, median =269.0 mL) with a mean Qmax of 23.9 mL/s. The correlation between voided volume and uroflow was similar for patients with voided volumes < 150 mL (Spearman’s correlation coefficient =0.55, p<0.001) and voided volumes > 150 mL (Spearman’s correlation coefficient = 0.49, p<0.001).

Conclusion: There is a statistically significant correlation between VV (0.69) and Qmax, which diminishes as expected with a smaller sample size, but is similar when stratifying patients with VV < 150 mL (0.55), and greater than 150 mL (0.49). Although it is common practice based on prior arbitrary selection, this study demonstrates that the use of VV < 150 mL when interpreting flow rates may have utility in the evaluation of women with voiding dysfunction.
EFFICACY OF A SUPERSATURATED CALCIUM PHOSPHATE ORAL RINSE (CAPHOSOL) IN THE TREATMENT OF XEROSTOMIA SECONDARY TO ANTIMUSCARINIC TREATMENT FOR THE BLADDER
Katherine Klos, MD and Tiffany Sotelo, MD
George Washington University, Washington, DC
(Presented by: Katherine Klos)

Introduction and Objectives: The objective was to evaluate the efficacy of a supersaturated calcium phosphate oral rinse (Caphosol, EUSAPharm USA, Princeton, NJ) on the subjective sensation of dry mouth in secondary to antimuscarinic treatment for the bladder.

Methods: Initial assessment of patients in this open label, prospective trial included history, physical, and 3 day voiding diary, with or without video urodynamics, followed by diagnosis with overactive bladder or mixed urinary incontinence. Behavioural modifications were discussed and each patient was started on Tolterodine 4mg ER or Solifenacin 5mg daily. Patients were evaluated 4-6 weeks after starting an antimuscarinic. Patients who felt improvement in urinary symptoms but complained of dry mouth were given the Dry Mouth Questionnaire (DMQ). Candidates were excluded from participation if they were unwilling or unable to comply, on concomitant use of anti-xerostomia medications, being treated with an investigational medication within 30 days, or presented with oropharyngeal pathology. Patients were given a supply of Caphosol and instructed to rinse with Caphosol up to 7 times a day as needed. Two weeks later each patient was contacted and asked questions 1-12 from the DMQ.

Results: After 2 weeks of Caphosol, patients stated a 45% improvement rate in overall sensation of dry mouth. The most dramatic changes were in the mealtime dry mouth and need for liquids for swallowing with 47% and 41% respective improvement. Average frequency of administration was once daily but ranged from four times a day to every other day. Onset of relief was reported in 70% of patients as immediate or soon after the rinse. Eighty-eight percent responded Caphosol relieved dry mouth symptoms. Frequency of use was less than anticipated and less than recommended for oral mucositis suggesting that this is a cost effective treatment of xerostomia.

Conclusion: In the majority of patients Caphosol was noted to be effective and expeditious in treatment. Our study was limited by small sample size, but the results justify expansion of this pilot study to determine the impact of this supersaturated calcium phosphate solution on pharmacologically-induced xerostomia.
BASELINE PREDICTORS OF PATIENT REPORTED LACK OF EFFICACY (LOE) TO ANTIMUSCARINICS IN OVERACTIVE BLADDER SYNDROME (OAB): A MULTIVARIATE ANALYSIS

David Staskin, MD¹, Michael Oefelein, MD, FACS² and Ray Rackley, MD³
¹Tufts University, Boston, MA; ²Allergan LLC, Irvine, CA; ³Cleveland Clinic Foundation, OH
(Presented by: David Staskin)

Introduction and Objectives: Characterizing baseline variables which predict LOE to antimuscarinics in OAB is valuable and may assist in treatment decision making.

Methods: Patient reported outcome LOE (n=264) to antimuscarinic agents at enrollment into 2 US Phase III randomized, placebo-controlled extended-release antimuscarinic studies was analyzed post hoc for correlative clinical variables. Using demographic and baseline data from these patients, univariate and multivariate logistic regression analysis were performed to identify variables that may be associated with patient-reported LOE. Covariates assessed included: race, sex, age, weight, height, ideal body weight (IBW), body mass index (BMI), multiple medication use, self-reported history of intolerance to prior antimuscarinic agents, baseline disease severity (toilet voids, urge urinary incontinence episodes, urgency, volume voided, nocturnal events).

Results: Univariate logistic regression analysis identified multiple medication use (≥7 medications/day, p<0.01) and a more severe OAB disease state (>3 UUI/day, p=0.02) as significantly associated with patient-reported LOE. In the multivariate logistic regression analysis (Table), IBW (but not BMI) and multiple medication use (3-6 and ≥7 medications/day) were significantly (p<0.05) associated with patient-reported LOE, while baseline mean UUI episodes/day was of borderline significance (p=0.05).

Conclusion: Patient reported LOE may be predicted by baseline variables, including: IBW, multiple medication use and baseline disease severity (UUI episodes/day). These variables, if confirmed, may assist physicians in selecting from the expanding armamentarium of OAB therapies.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Odds ratio (95% CI)</th>
<th>p-value</th>
<th>Overall p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBW (g)</td>
<td>&lt;58</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥56</td>
<td>0.60 (0.35-0.91)</td>
<td>0.02</td>
<td></td>
</tr>
<tr>
<td>Multiple medication use (meds/day)</td>
<td>1-2</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3-6</td>
<td>2.47 (1.33-4.59)</td>
<td>&lt;0.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥7</td>
<td>2.57 (1.31-4.82)</td>
<td>&lt;0.01</td>
<td></td>
</tr>
<tr>
<td>Baseline mean number of UUI episodes/day</td>
<td>&lt;3</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥3</td>
<td>2.09 (0.96-4.39)</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>IBW by baseline UUI interaction</td>
<td>Height ≥162.6 m, baseline UUI ≥3</td>
<td>1.81 (1.02-3.19)</td>
<td>0.04</td>
<td></td>
</tr>
<tr>
<td>Polypharmacy by baseline UUI interaction</td>
<td>Height ≥162.6 m, baseline UUI ≥3</td>
<td>0.36 (0.16-0.82)</td>
<td>0.13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Polypharmacy 3-6, baseline UUI ≥3</td>
<td>0.53 (0.23-1.20)</td>
<td>0.02</td>
<td></td>
</tr>
</tbody>
</table>

* Defined according to values above/below population median (55kg for IBW, 3/day for UUI episodes)
MENTAL DISTRESS PREDICTS PAIN SEVERITY, PHYSICAL IMPAIRMENT IN INTERSTITIAL CYSTITIS AND CHRONIC PELVIC PAIN
Chad Baxter, MD¹, Roger Bolus, PhD², Una Lee, MD³, Emeran Mayer¹, Deborah Ackerman, PhD⁴, and Larissa Rodriguez, MD³
¹UCLA Urology, Los Angeles, CA; ²Research Solutions Group; ³UCLA Urology; ⁴UCLA School of Public Health
(Presented by: Chad Baxter)

Introduction and Objectives: Catastrophic thoughts regarding pain and one's acceptance of that pain, may affect emotional functioning and pain perception among persons with chronic pain conditions. To evaluate correlations of mental distress with symptom severity in a selected group of IC/CPP patients using validated questionnaires.

Methods: Patients with IC/CPP were identified from the Patient Reported Outcomes of Complimentary, Alternative, and Integrative Medicine (PRO-CAIM) database. PRO-CAIM is a web-base database where patients reported their diagnoses and completed on-line validated questionnaires at enrollment and every 3 months for one year while undergoing their treatments of choice. Patients are recruited via complementary, alternative, or integrative medicine practitioners, various electronic advertising portals, outpatient clinics, and patient organizations throughout the United States. 223 patients were evaluated for degree of mental distress, pain, and degree of physical impairment. The Short Form-36 mental health component, Hospital Anxiety and Depression (HAD), Physical Health (PH) describing somatization and panic, and Coping Strategies (CS) describing catastrophizing were correlated to outcomes of Short Form-36 physical health domain and Brief Pain Inventory (BPI). Simple bivariate correlations were assessed for significant interaction. Multivariate linear regression incorporating significant variables was performed to eliminate confounding variables.

Results: All measures of mental distress correlated significantly with degree of physical impairment and pain (Pearson absolute range >/=0.283, p<0.000). Pain severity (BPI) was the dependent variable in a multivariate linear regression model (R=0.816, adj. R²=0.648, p<0.000), SF-36 Mental (p=0.001), anxiety (p=0.000), and catastrophizing (p=0.024) remained significant, while depression (p=0.119) and somatization/panic (p=0.120) lost significance. Assessing physical impairment (SF-36 Physical) as the dependent variable, the multivariate linear regression model (R=0.727, adj. R²=0.504, p<0.000) demonstrated SF-36 Mental (p=0.000) anxiety (p=0.008), and somatization/panic (p=0.001) remained significant, while depression (p=0.229) and catastrophizing (p=0.981) lost significance.

Conclusions: Mental distress is highly correlated with degree of physical symptoms. Not surprisingly, pain severity is highly correlated with coping strategy. Physical impairment is highly correlated to somatization and panic, but not catastrophizing. Unlike reports in similar patient populations of IC and CPP, neither pain severity nor physical impairment correlated with depression in the regression model.

THE OVERACTIVE BLADDER SYNDROME (OAB) AND OBESITY: EVIDENCE OF ANTIMUSCARINIC EFFICACY REGARDLESS OF BODY MASS INDEX AT BASELINE
Michael Chancellor, MD¹, Michael Oefelein, MD, FACS² and Sandip Vasavada, MD³
¹William Beaumont Hospital; ²Allergan LLC, Irvine, CA; ³Cleveland Clinic Foundation, OH
(Presented by: Michael Chancellor)

Introduction and Objectives: There is a positive correlation between increasing body mass index (BMI) and increasing OAB prevalence. The objective of this analysis was to undertake an exploratory evaluation of the efficacy of a once-daily (QD) extended release (ER) antimuscarinic drug in patients stratified according to their BMI.
**Methods:** A post hoc analysis was performed. Using the baseline BMI (n=1129) patients were stratified according to World Health Organization (WHO) criteria for obesity. Analysis of the co-primary efficacy variables (changes in daily TVs and UUI episodes) was then performed for each dichotomized WHO Level grouping.

**Results:** Baseline severity of OAB symptoms (TVs/day and UUIs/day) was significantly (p<0.05) greater for patients with higher vs lower BMI. Following 12 weeks of treatment, the antimuscarinic group demonstrated significantly greater improvements (than placebo) for each BMI stratum (Table) in each WHO Level grouping for both TVs/day and UUIs/day. Thus, while higher BMI subgroups had more severe OAB symptoms at baseline, the antimuscarinic effectively reduced symptoms in those patients as well as in the lower-BMI subgroup patients.

**Conclusion:** More obese OAB patients tend to have greater symptom severity. However, regardless of obesity status, QD trospium chloride ER demonstrates significant and consistent efficacy in the treatment of OAB symptoms.

<table>
<thead>
<tr>
<th>Efficacy parameters at baseline and Week 12 by WHO Obesity (BMI) Level stratifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHO Obesity Level I</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>TVs/day</td>
</tr>
<tr>
<td>Baseline mean</td>
</tr>
<tr>
<td>Week 12 mean % change</td>
</tr>
<tr>
<td>Placebo</td>
</tr>
<tr>
<td>Antimuscarinic</td>
</tr>
<tr>
<td>UUIs/day</td>
</tr>
<tr>
<td>Baseline mean</td>
</tr>
<tr>
<td>Week 12 mean % change</td>
</tr>
<tr>
<td>Placebo</td>
</tr>
<tr>
<td>Antimuscarinic</td>
</tr>
</tbody>
</table>

*p<0.05 vs lower BMI subgroup within WHO obesity level. **p<0.05 vs placebo. The obesity stratifications were performed independently, and thus a patient who was included in the WHO Obesity Level I <30 kg/m² subgroup was, by definition, also included in the WHO Obesity Level II ≥35 kg/m² subgroup.

**Poster# 81**

**PATIENTS’ EXPERIENCE WITH DARIFENACIN: RESULTS OF A COMMUNITY-BASED SURVEY IN OVERACTIVE BLADDER PATIENTS**

Diane Newman¹ and L. Green²

¹University of Pennsylvania, Philadelphia PA; ²Virginia Women’s Center, Richmond, VA

(Presented by: Diane Newman)

**Introduction and Objectives:** This community-based program collected symptom relief and satisfaction with treatment data from overactive bladder (OAB) patients receiving darifenacin for 3 weeks and aimed to evaluate patients’ experiences with darifenacin in a clinical practice setting.

**Methods:** Participating physicians (N=2117, 55% PCPs, 35% urologists, 10% OB/GYN, 5% other) were asked to introduce the program to OAB patients for whom they prescribed darifenacin. Patients received an Enrollment Kit that included a 30-day darifenacin voucher that was activated if patients registered for the program via telephone or online. Patients were ≥18 years of age and completed a brief automated survey to evaluate frequency of urge urinary incontinence episodes (UUIE) in past 3 days, micturitions/24 hours, urge severity/24 hours (10 point scale: 0=not at all severe, 10=very severe) and tolerability (10 point scale: 0=very poorly tolerated, 10=very well tolerated). Patients were required to complete a second survey 3 weeks after starting darifenacin in order to receive monetary compensation for participation. Reports based on individual patient responses to the surveys were generated and provided to patients and their physicians. No statistical analyses were performed.
Results: A total of 2165 patients completed both surveys. At baseline mean age of completers was 66 years, 78% were female, and 47% reported prior use of OAB medications. After 3 weeks of treatment, patients experienced reductions in UIUs (figure) and micturitions. Urge severity was reduced by >30% after 3 weeks (mean scores: 6.7 at baseline vs. 4.6 after 3 weeks’ treatment) and treatment was well tolerated (mean score=7.7). Overall, 85% of patients who participated in the program did so due to physician influences.

Conclusion: The results of this 3-week, self-reported community-based survey indicate that patients who elected to enroll in the survey and who took darifenacin were generally satisfied with treatment in a clinical setting and experienced a reduction in OAB symptoms. Darifenacin was generally well tolerated.

Poster# 82

A RANDOMIZED, PLACEBO CONTROLLED, CROSSOVER STUDY TO EVALUATE THE EFFECTS OF TOLTERODINE ON URODYNAMIC PARAMETERS IN PATIENTS WITH OVERACTIVE BLADDER*

Tara Frenkl¹, Radha A. Railkar¹, Neal Shore², James Bailen³, Suzette E. Sutherland⁴, Joanne Burke¹, Boyd B. Scott¹, Marcella Ruddy¹ and Chan Beals¹
¹Merck Research Laboratories, Whitehouse Station, NJ; ²Atlantic Urology Clinics, Myrtle Beach, SC; ³Metropolitan Urology, Jeffersonville, IN; ⁴Metropolitan Urologic Specialists, Plymouth, MN
(Presented by: Tara Frenkl)

Introduction and Objectives: The usefulness of UDS in early drug testing has been limited due to high variability. The objective of this study was to evaluate a urodynamic platform that could identify treatment effects in small numbers of patients after a relatively short duration of treatment.

Methods: 20 women with overactive bladder (OAB) symptoms were randomized in a cross-over study to receive 1 dose/day of either tolterodine 4mg LA or placebo for 7 days, followed by 7 days of single-blinded placebo washout, followed by 1-dose/day of the other treatment (placebo or tolterodine) for 7 days. Patients underwent UDS at baseline and 4-hours postdose (PD1) on Day 1, and 4 hours postdose Day 7 (PD7) in each treatment period. Sites were provided with the same high quality urodynamic equipment with mandatory guidelines to ensure similar UDS technique. The primary endpoint was the change from baseline in volume at maximum cystometric capacity (MCC) at PD7. As a result of dosing errors, 7 of the 9 patients allocated to tolterodine in Period 1 mistakenly received placebo on Day 7 but were dosed correctly on Days 1-6. The data from the time points at which patients were dosed incorrectly were excluded from the per protocol (PP) analysis.

*Not CME Accredited
**Results:** The PP and intent to treat (ITT) mean increase in volume at MCC on PD7 for tolterodine in comparison to placebo was 28.9% (p=0.038, 1-sided) and 23.2% (p=0.008) respectively. The PP and ITT PD7 mean increase in volume at first desire to void were 36.5% (p=0.054) and 40.3% (p=0.008) respectively. No volume endpoint at PD1 was statistically significant. The change from baseline in volume at MCC was the least variable endpoint. The interpatient variability was substantially smaller than anticipated and similar to the intrapatient variability.

**Conclusion:** This crossover study design is operationally feasible. We were able to detect a clinically meaningful and statistically significant treatment effect for MCC consistent with the previously reported treatment effect of tolterodine in the literature. The observed low interpatient variability suggests that efforts taken in the study design to reduce variability were successful. This model has potential as a screening methodology to assess future novel treatments for OAB.

**Funding:** Merck & Co., Inc.

**Poster# 83**

**CHRONIC PELVIC PAIN PATIENTS WITH NEUROPATHIC SYMPTOMS DEMONSTRATE POORER MENTAL HEALTH STATUS**

Sandeep S. Saluja, BS, Arvin George, MD¹, Mostafa Sadek, MD¹, Jennifer Fariello, MSN, CRNP², Kristene Whitmore, MD², Salim Wehbe, MD² and Robert Moldwin, MD¹

¹The Arthur Smith Institute for Urology, New Hyde Park, NY; ²Pelvic and Sexual Health Institute, Philadelphia, PA

(Presented by: Sandeep S. Saluja)

**Introduction and Objectives:** Visceral pelvic pain syndromes such as interstitial cystitis often present with neuropathic features. Our goal was to examine the physical and mental health scores of patients with chronic pelvic pain (CPP) and concomitant neuropathic symptoms.

**Methods:** Patients with CPP disorders were prospectively recruited from two pelvic pain centers. Patients completed the Self-Administered Leeds Assessment of Neuropathic Symptoms and Signs survey (S-LANSS) and the SF-12v2 health survey. Two tailed t-test was used to analyze the physical and mental component summaries (PCS, MCS) of SF-12 survey in CPP patients with and without neuropathic features.

**Results:** A total of 142 subjects with a mean age of 45 years (14-82) completed the survey. 44 (31%) patients exhibiting neuropathic pain symptoms based on a S-LANSS score ≥12. The mean PCS and MCS scores of patients without neuropathic pain were 44.79 and 46.75 respectively. Patients with neuropathic pain scored 4.28 points lower on the PCS (40.51, p = 0.053) and 5.45 points lower on the MCS (41.30, p = 0.008).

**Conclusion:** Correlating with previous studies, CPP is associated with diminished physical and mental health scores. Furthermore, our data suggests that mental health scores are more profoundly affected in patients with a neuropathic pain component. Future research on neuropathic pain should incorporate measures of quality of life (QOL), especially in chronic pelvic pain patients who already have poorer QOL outcomes.

**Poster# 84**

**LONG-TERM TOLERABILITY AND EFFICACY OF PENTOSAN POLYSULPHATE SODIUM IN THE TREATMENT OF PAINFUL BLADDER SYNDROME/ INTERSTITIAL CYSTITIS (PBS/IC)**

Ali AL-Zahrani and Jerzy Gajewski

(Presented by: Ali AL-Zahrani)

**Introduction and Objectives:** To evaluate the long-term efficacy and tolerability of Pentosan Polysulphate Sodium (PPS) in the treatment of PBS/IC.
**Methods:** This is a single institution, retrospective study to evaluate the clinical efficacy of PPS as treatment for the cases of PBS/IC for the period of 1994 till 2008. We have included all patients with bladder pain symptoms and either frequency, urgency or nocturia in the absence of urinary tract infection and any other pathology as per ICS definition. All patients had glomerulation with cystoscopic hydrodistention under general anesthesia. The primary end point of this study is the overall improvement on the global response scale.

**Results:** Based on the inclusion criteria, 271 patients were eligible for the study. Most of the patients were female (90%), and the mean age at presentation was 45.5 year (SD ± 13.9). The average duration of symptoms was 28.5 month (SD ± 25.4). The average maximum cystometric capacity was 251.3 ml (SD ± 134.4), while the average maximum cystoscopic bladder capacity under general anesthesia was 659.1 ml (SD ± 147.4). The cough leak test was positive in 30 patients (11.1%). Detrusor overactivity on filling cystometry study was found in additional 55 patients (20.2%). Ninety three patients (34.3%) decided to stop taking the medication for various reasons. The most common reason to stop the medication was poor response in 45 patients (16.6%). Others include drug side effect in 30 patients (11.1%), resolution of the PBS/IC symptoms in 11 patients (4.1%) and financial reason in patients (2.2%). The side effects include stomach upset in 23 patients (8.5%), headache in 6 patients (2.2%), hair loss in 3 patients (1.1%), hypersensitivity in 3 patients (1.1%), and increase in liver enzyme in patients (0.7%). Patients with history of detrusor overactivity or positive cough leak test during the urodynamic study were predictor of poor outcome of the PPS in the management of PBS/IC with p values of 0.037 and 0.035 respectively.

**Conclusion:** The PPS is an effective oral therapy to control the symptoms of the PBS/IC with good long term efficacy and tolerability. More than 63% of patients continued to take the PPS with a mean follow up of 22 months.

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**Poster# 85**

**EFFECTS OF OXYBUTYNN TOPICAL GEL ON GASTRIC EMPTYING***

Naomi Dahl, PharmD¹, Marilyn McIlwain, BS² and Weining Volinn, MS³

¹Watson Laboratories, Inc., Morristown, NJ; ²Watson Laboratories, Morristown, NJ; ³Watson Laboratories, Salt Lake City, UT

(Presented by: Naomi Dahl)

**Introduction and Objectives:** Class labeling for oxybutynin, used to treat overactive bladder, cautions use in patients with gastroesophageal reflux and/or who are concurrently taking drugs (such as bisphosphonates) that can cause or exacerbate esophagitis. This caution statement was based on the anticholinergic adverse effect profile of oral oxybutynin formulations, which can interfere with esophageal functioning and delay gastric emptying. Transdermal oxybutynin administration bypasses first-pass gastrointestinal (GI) and hepatic metabolism, reducing formation of the pharmacologically active metabolite. Clinical studies with transdermal delivery systems of oxybutynin have shown low rates of anticholinergic GI adverse events such as dry mouth or constipation. This study examined the effect of oxybutynin chloride topical gel (OTG) on gastric emptying.

**Methods:** This single-center, 2-period, double-blind, placebo-controlled, randomized, crossover study enrolled healthy postmenopausal women. One gram 10% OTG or placebo gel was given daily for 7 days. After a 7-day washout, they crossed over to the alternate treatment for another 7 days. Gastric emptying was measured with the acetaminophen (APAP) absorption test. APAP, 1.5 g as a liquid, was given orally on day 8 of each study period with a standardized liquid test meal. Blood samples for measurements of plasma concentrations of APAP were drawn at baseline (predose) and at intervals to 300 minutes postdose of APAP. APAP pharmacokinetic parameters, area under the time-concentration curve (AUC), and maximum concentration (Cmax) were calculated to evaluate bioequivalence following active and placebo OTG treatment.

*Not CME Accredited
**Results:** Twenty-three women (mean age 56.2y) completed the study. Comparing OTG with placebo, the postgel APAP AUC mean ratio was 1.02 (90% CI, 0.98 to 1.05); the postgel APAP Cmax mean ratio was 1.07 (90% CI, 1.0 to 1.15). The APAP mean Cmax was 20.9mcg/mL after OTG and 22.5mcg/mL after placebo. The 90% CIs of the ratios for AUC and Cmax were within boundaries of 0.80-1.25, meeting the criteria for bioequivalence after the 2 treatments.  

**Conclusion:** Treatment with OTG does not affect gastric emptying as measured by the acetaminophen absorption text.

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**Poster# 86**

**EARLY LIFETIME TRAUMA IMPACTS SYMPTOM SEVERITY OF INTERSTITIAL CYSTITIS AND CHRONIC PELVIC PAIN**

Chad Baxter, MD¹, Roger Bolus, PhD², Deborah Ackerman, PhD³ Emeran Mayer¹, and Larissa Rodriguez, MD⁴  
¹UCLA Urology, Los Angeles, CA; ²Research Solutions Group; ³UCLA School of Public Health; ⁴UCLA Urology  
(Presented by: Chad Baxter)

**Introduction and Objectives:** Interstitial cystitis (IC) and chronic pelvic pain (CPP) are complex, multifactorial conditions of uncertain etiology. The impact of early lifetime trauma on symptom severity and quality of life has not been fully elucidated. We examined the UCLA database of patient-reported, validated questionnaires to determine the impact of early (<18 years age) general, physical, sexual, emotional, and total trauma exposure on symptom severity and quality of life in adult patients with Interstitial Cystitis and Chronic Pelvic Pain.

**Methods:** 223 patients with diagnoses of IC and/or CPP completed the Early Trauma Inventory (ETI), Physical Health (somatization and panic), Short-Form-36, Hospital Anxiety and Depression, Coping Strategies (catastrophizing), and Brief Pain Inventory questionnaires. 97 patients (43%) recorded responses on ETI questionnaire and were further evaluated. Only one responding patient reported no trauma.

**Results:** Each ETI domain is scored from 0-100. Mean and SD for each domain were: general (37.3, 22.0); physical (43.7, 36); sexual (31.2, 36.0); emotional (53.2, 39.5); total (165.5, 102.2). IC and/or CPP patients differed only in more physical trauma in CPP-only patients (p=0.004). ETI Total among all patients correlates significantly with somatization (p<0.000), catastrophizing (p<0.000) of symptoms, increased anxiety (p=0.014) and depression (p=0.009), as well as poorer scores on physical and mental components of SF-36 (p=0.001, p=0.029). Early general, physical or sexual trauma does not correlate with higher pain score among any patients. Early emotional trauma, however, does correlate strongly with higher pain severity scores (p=0.025).

**Conclusion:** Early lifetime traumatic events, particularly emotional trauma, significantly impact patient perception of disease and disease severity in IC and/or CPP patients. Identifying and addressing these issues may significantly impact treatment outcome. Evaluation of treatment outcomes will further clarify the impact of early lifetime trauma.
A ONCE DAILY (QD) EXTENDED RELEASE (ER) ANTIMUSCARINIC REDUCES NOCTURNAL AS WELL AS DAYTIME TOILET VOIDS IN OVERACTIVE BLADDER SYNDROME (OAB)

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(Presented by: David Ginsberg)

Introduction and Objectives: Although antimuscarinics have been shown to be effective in the treatment of daytime OAB symptoms, their efficacy in nocturia is incompletely characterized. The objective of this study was to determine whether trospium ER reduces both daytime (arising to bedtime) and nocturnal (bedtime to arising) toilet voids (TVs) in patients with OAB, and whether this reduction correlates with improved health-related quality of life (QOL).

Methods: We examined post hoc Phase III data in patients (n=1165) with OAB symptoms received QD trospium 60 mg ER (n=578) or placebo (PBO; n=587) for 12 weeks. Patients were not required to have nocturnal TVs at study entry, but the majority (91%) did.

Results: Reductions in nocturnal TVs were seen with trospium as early as Week 1 and statistically significant decreases vs PBO were noted at Weeks 4 and 12 (p<0.05) (Table). The trospium vs PBO group also had significantly (p<0.05) greater mean reductions from baseline in overall TVs and daytime TVs from Week 1 through Week 12 (Table). While improvements in nocturnal TVs were noted, the trospium vs PBO group also had significantly (p<0.05) greater improvements from baseline in QOL measures relating to nocturnal voiding and sleep (the King’s Health Questionnaire Sleep/Energy domain, the OAB Questionnaire [OAB-q] Sleep domain, and the OAB-q Symptom Bother Scale Night Time Urination and Waking up at Night Because you had to Urinate domains).

Conclusion: Trospium 60 mg ER improved daytime and nocturnal TVs, and QOL domains associated with sleep and nocturnal voiding bother, indicating that it provides effective coverage of 24-hour OAB symptoms.
EFFECT OF OXYBUTYNIN CHLORIDE TOPICAL GEL ON QUALITY OF LIFE IN WOMEN WITH OVERACTIVE BLADDER

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(Presented by: Diane Newman)

Introduction and Objectives: Oxybutynin chloride topical gel (OTG), a new transdermal formulation recently approved by the FDA, was well tolerated and provided significant symptom improvement for patients with overactive bladder (OAB) in a multicenter, placebo-controlled phase 3 study. This subgroup analysis evaluated the effect of OTG on health-related quality of life (HRQoL) and its tolerability in women with OAB.

Methods: Women aged 18 years or older with urge or mixed urinary incontinence received OTG 1 g or placebo once daily for 12 weeks. HRQoL was assessed by the Incontinence Impact Questionnaire (IIQ) and the King’s Health Questionnaire (KHQ) at baseline and weeks 1, 4, 8, and 12. Treatments were compared by analysis of covariance with last observations carried forward. Adverse events were recorded throughout the study.

Results: Of 704 women (mean age 59 years), 352 received OTG and 352 received placebo. Compared with placebo, OTG provided significant decreases in IIQ total and all individual domain scores (Figure). KHQ scores decreased significantly with OTG vs placebo (mean decrease) in 6 of 10 domains: Incontinence Impact (-28.2 vs -19.9; P=.0002), Symptom Severity (-21.2 vs -15.3; P=.0003), Role Limitations (-28.2 vs -21.5; P=.0044), Personal Relationships (-11.3 vs -5.6; P=.0161), Sleep and Energy (-15.8 vs -10.6; P=.0088), and Severity (Coping) Measures (-15.5 vs -10.8; P=.0021). Dry mouth was the only treatment-related anticholinergic adverse event significantly more common with OTG (7.4%) than placebo (2.8%; P=.0062). OTG- and placebo-related application site skin reactions occurred in 5.4% and 0.9% of women, respectively. Discontinuation due to application site reactions was rare (OTG, 0.9%; placebo, 0.3%).

Conclusion: OTG treatment significantly improved HRQoL in women with OAB, as assessed by 2 validated questionnaires. OTG was well tolerated, with low incidences of anticholinergic adverse events and application site skin reactions.

Funding: Writing support provided by Scientific Connexions with funding from Watson Pharma, Inc.
LINEAR CORRELATION AND REGRESSION BETWEEN SEVERITY OF URGE SENSATION AND VOIDED VOLUME IN PATIENTS WITH OAB: A DIFFERENT APPROACH TO UNDERSTAND URGENCY
Zhonghong Guan, MD, PhD¹, Miriam Harel, MD², Jeffrey P. Weiss, MD², Joseph Wang, MS¹ and Jerry G. Blaivas, MD²
¹Pfizer Inc, New York, NY; ²SUNY Downstate Medical School, Brooklyn, NY
(Presented by: Miriam Harel)

Introduction and Objectives: Since urgency is the key symptom of OAB, we evaluated the relationship between severity of urge sensation (SUS) and voided volume (VV) per micturition among patients with OAB.

Methods: Baseline 7-d bladder diary data from 2 pooled tolterodine nighttime dosing studies were used. 1 1697 subjects with frequency, urgency, and nocturia, and a mean VV <200 mL were enrolled. The SUS per micturition was recorded using a 5-point urinary sensation scale (1=no urgency, 2=mild urgency, 3=moderate urgency, 4=severe urgency, 5=urge incontinence). Only days that subjects recorded all urine volumes were included. Average VV per SUS and subject at baseline were calculated. Pearson correlations between VV and SUS (1–) per micturition for all subjects were generated. Due to urine leakage associated with urinary incontinence (UI), VV associated with an SUS of 5 were excluded. Linear regression lines between baseline VV and SUS were generated for all subjects without missing data using intercept and coefficient of SUS from least square estimation of a linear regression model.

Results: Baseline SUS directly and linearly correlated with baseline VV (r=0.47). The intercept and slope of the linear VV-SUS regression line were 53.28 mL and 30.57 (R2=0.22, Figure). Linear VV-SUS regression lines were different between subjects without UI vs those with UI and between daytime vs nighttime micturitions. The slope was higher in subjects without UI (34.44 vs 26.11), and the intercept was higher in nighttime micturitions (62.56 mL vs 57.49 mL). The linear VV-SUS regression lines between men vs women and patients < 65 y vs >65 y were similar.

Conclusion: In this OAB study population, SUS correlated linearly with VV, suggesting that increased bladder volume during the filling phase may trigger urgency. If the slope of linear VV- SUS regression line is higher in non-OAB subjects,2 OAB patients could have a decreased urgency threshold indicated by VV-SUS regression line as a potential biomarker. The urgency threshold triggered by bladder volume appears to be higher in OAB patients without UI and for nighttime micturitions.

**Poster# 90**

**DO PATIENTS UNDERSTAND LOWER URINARY TRACT SYMPTOM TERMINOLOGY?**

Nadya Cinman, MD¹, Amin Herati, MS²-³ and Robert Moldwin MD²-³

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(Presented by: Nadya Cinman)

**Introduction and Objectives:** Urgency is a symptom that is associated with a variety of voiding disorders. The goal of our study was to evaluate whether patients with various voiding disorders understand urinary symptom terminology, and to see if various interpretation of urgency exists within these specific voiding disorders. Groups of patients included those with interstitial cystitis/ pelvic floor dysfunction, overactive bladder, and benign prostatic hyperplasia. A group of urology patients without voiding disorders were used as controls.

**Methods:** Women and men attending a urology office in New York were asked to complete a questionnaire assessing one’s understanding of the meaning of certain terms, and to specifically define urgency from a choice of five listed definitions. Additionally patients completed Oleary-Sans and AUA symptom score questionnaires. A total of 66 patients completed surveys. There were 35 men, and 31 women. Age, level of education, and duration of condition was queried.

**Results:** Of the 66 patients, 95.5% feels/he understands frequency, 68.2% hesitancy, 56% nocturia, 65.2% incontinence. 27 of 66 (40.9%) felt unclear about the definition of at least one of the aforementioned words. A significant number of patients did not choose the correct definition of urgency, as defined by the International Continence Society (p<0.005; Pearson 2-tailed Chi square test). 20 of 66 (30.3%) defined urgency correctly, reporting urgency as the “the complaint of a sudden compelling desire to pass urine, which is difficult to defer.” 21 of 66 patients defined urgency as the "compelling desire to pass urine," 12 chose “the need to urinate due to increasing bladder pain/ discomfort/ pressure,” 6 chose “the desire to urinate often,” 4 chose “strong need to urinate for fear of urinary leakage,” and 3 chose “persistent desire to pass urine.” There was no statistically significant difference between the correct definition of urgency and age, gender, and level of education, and duration of condition.

**Conclusion:** Our study shows that urology patients with various voiding disorders that contain a feature of urgency feel unclear about LUTS terminology, and interpret urgency differently. This holds clinical relevance as communication between practitioner and patient is limited by a common understanding of what the symptoms the patient is experiencing, potentially obscuring diagnosis.

**Poster# 91**

**INTRAVESICAL BUPIVACAINE FOR LIDOCAINE-REFRACTORY PATIENTS WITH PAINFUL BLADDER SYNDROME/INTERSTITIAL CYSTITIS**

Renee Quillin, MD, Gwen Hooper, ARNP and Deborah Erickson, MD

University of Kentucky, Lexington, KY

(Presented by: Renee Quillin)

**Introduction and Objectives:** Intravesical lidocaine is better than placebo for painful bladder syndrome/interstitial cystitis (PBS/IC),1 but some patients do not respond. Bupivacaine is more lipophilic and potent than lidocaine2 so it may be more effective. Some PBS/IC experts routinely use bupivacaine as the sole local anesthetic3 or mixed with lidocaine,4 but no formal comparisons are published. We reviewed our experience with intravesical bupivacaine in PBS/IC patients who had previously failed intravesical lidocaine. Our goals were (1) determine how many lidocaine failures would respond to bupivacaine, and (2) compare the clinical features of bupivacaine responders vs. nonresponders.

**Methods:** With IRB approval, charts were reviewed for PBS/IC patients who had failed lidocaine then had intravesical instillation in our office with 20 ml 0.5% bupivacaine. Patients were divided into three groups: complete resolution of pain (CR), partial relief (PR) or no relief (NR).
Results: Patients were 14 women and 1 man, all Caucasian. Four patients (27%) had CR (one went into urinary retention due to loss of sensation); eight (53%) had PR and three (20%) did not respond. Age ranges were CR 25-46 years, PR 31-76, NR 43-65. Of 15 patients, one had fibromyalgia, two had vulvodynia and two had diarrhea. Additional clinical features are shown below.

Conclusions: Bupivacaine should be tried before declaring a patient unresponsive to intravesical local anesthetic. Complete response was more likely in patients without pelvic floor dysfunction.

1. Nickel JC et al. BJU Int 2009; 103: 910

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THE EFFICACY OF VAGINAL DIAZEPAM USE FOR PELVIC FLOOR DYSFUNCTION PAIN, INTERSTITIAL CYSTITIS, AND/OR VULVAR PAIN: PRELIMINARY DATA
Donna J. Carrico, NP, MS, Frank Burks, MD and Kenneth M. Peters, MD
Beaumont, Royal Oak, MI
(Presented by: Donna J. Carrico)

Introduction and Objectives: Some clinicians are utilizing diazepam vaginally off-label to aid in pain symptoms related to pelvic floor dysfunction (PFD), interstitial cystitis (IC) and vulvar pain. The usual dose prescribed is 5-10 mg of diazepam tablets or compounded hypoallergenic suppositories or creams, used vaginally up to every 8 hours. Anecdotally, pain relief has been significant, without the adverse effects common with the oral diazepam. To our knowledge, the safety and efficacy of vaginal diazepam treatment for the pain experienced by these women has not been reported. The objective is to report preliminary data on the efficacy and safety of vaginal diazepam in women with PFD, IC and/or vulvar pain.

Methods: This IRB-approved database analysis included 11 women with an age range of 21-57 years (mean =38). Pain levels were assessed pre-and 1 month post-vaginal diazepam use by the same clinician. Right/left levator pain, 10-point visual analog scale for pain (VAS), vulvar q-tip 10-point pain scores were obtained and a patient global response assessment (GRA). Serum diazepam levels were performed 1 month after beginning daily vaginal diazepam. Data was analyzed by our statistician using SAS System v.9.2 and Minitab Release 14.

Results: On the global response assessment (GRA) 7/11 women (64%) were responders to treatment, noting they were moderately or markedly improved. Of note, 73% of women responded that they believed the vaginal diazepam was “helping.” 4/11 women reported “no change.” None reported worsening of pain. Overall mean VAS pain decreased from 4.4 to 3.1. Right levator mean VAS score decreased from 3.4 to 1.2. Left levator mean VAS score decreased from 3.9 to 2.3, while overall levator mean score decreased from 7.2 to 3.5. All levator pain scores were significantly improved in those with non-zero levator pain prior to vaginal diazepam treatment (p=0.02). The mean q-tip test vulvar pain score decreased from 3.1 to 1.9 with treatment. All six serum diazepam levels ordered (for daily users) were below or low normal (mean=0.29, norm=.2-1.0 µg/ml). 64% (7/11) women reported no side effects; 36% reported mild drowsiness.
Conclusion: Vaginal diazepam use may be helpful in treating pelvic floor pain-related conditions. Larger, randomized-controlled research trials are needed.

Funding: MPURE-Ministrelli Program for Urology Research and Education

Poster# 93

SLEEP DISRUPTION IN WOMEN WITH OVERACTIVE BLADDER (OAB): CHARACTERISTICS AND IMPACT
Diane Newman¹ and Patricia Koochaki²
¹University of Pennsylvania, Philadelphia, PA; ²Procter & Gamble Pharmaceuticals, Inc., Mason, OH
(Presented by: Diane Newman)

Introduction and Objectives: Patients with overactive bladder (OAB) are often sleep deprived (Urol Clin North Am 2006;33:433-8). Nocturia is prevalent, with symptom bother increasing and health-related quality of life decreasing as the number of awakenings increase (BJU Int 2003; 92:948-54). This study aimed to better understand the characteristics and impact of interrupted sleep in women with OAB.

Methods: Women (n=511), aged 40-70 years with OAB were asked to complete an internet survey which included the SF-12v2 Health Survey, the Overactive Bladder Questionnaire (OAB-q), and questions from the Profile of Mood States and the Pittsburgh Sleep Quality Index (PSQI). Based on findings from qualitative research with OAB patients, the study population was divided into three groups for analysis: OAB patients with sleep disruption ([SD] awakened by their bladders ≥3 times/night, n=206); OAB patients with no sleep disruption ([NSD] awakened by their bladders 0–times/night, n=104); and patients without OAB (control, n=101).

Results: Control patients and patients with NSD got significantly more sleep per night than those with SD (6.93 and 6.33, respectively vs 5.95 hours; p<0.05). Sleep efficiency (actual sleep time vs time spent in bed) was significantly lower in patients with SD compared with the control and NSD group (75% vs 83% and 88%). SD women were significantly more likely to rate their general health as poor/fair and reported positive mood states significantly less often and negative mood states more often during the past week compared to NSD women and controls. Compared to controls, SF-12v2 general health scores were significantly lower for SD women. Moreover, significantly more SD women also described their sleep during the previous 2 weeks as not very good or poor. Significantly more control women reported that their sleep in the previous 2 weeks was more restful and peaceful compared to those with OAB.

Conclusion: Women with OAB and nocturia are likely to experience poor sleep habits, decreased quality of life, negative mood states, and report greater symptom bother from OAB. This is particularly troublesome for women who wake up ≥3 times per night to urinate. Further research is needed to better understand the long term emotional/health consequences of sleep disruption in OAB.

Funding: Novartis Pharmaceuticals Corporation and Procter & Gamble Pharmaceuticals.

Poster# 94

MINIMUM IMPORTANT DIFFERENCE FOR VALIDATED INSTRUMENTS IN WOMEN WITH URGE INCONTINENCE
Keisha Dyer, MD, MPH¹, Linda Brubaker, MD, MS², Toby Chai, MD³, Emily Lukacz, MD, MAS⁴, Alayne Markland, DO, MSc⁵, Ingrid Nygaard, MD⁶, David Rahn, MD⁷, Anne Stoddard, ScD⁸ and Yan Xu, MS, for the Urinary Incontinence Treatment Network (UITN)
¹University of California-San Diego, La Jolla, CA; ²Loyola University, Chicago, IL; ³University of Maryland, Baltimore, MD; ⁴University of California-San Diego, La Jolla, CA; ⁵University of Alabama, Birmingham, AL; ⁶University of Utah, Salt Lake, UT; ⁷University of Texas, Southwestern, Dallas, TX; ⁸New England Research Institutes, Watertown, MA; New England Research Institute, Watertown, MA
(Presented by: Keisha Dyer)
Introduction and Objectives: Minimum important difference (MID) estimates the minimum degree of change in an instrument’s score that correlates with subjective sense of improvement in symptoms. The Urogenital Distress Inventory (UDI) has a MID range between -6.4 and -22.4 in women with stress urinary incontinence; however, it is unclear if these values apply to subjects with urge incontinence. The aim of this study was to estimate the MID for the UDI, Incontinence Impact Questionnaire (IIQ) and Overactive Bladder Questionnaire (OAB-q) using anchor-based and distribution-based approaches in patients with urge-predominant incontinence and whether MID changes over time.

Methods: Data for this sub-analysis came from a multi-center trial of 307 women with pure urge (10) or urge-predominant (297) incontinence who completed condition-specific instruments 10 weeks and 8 months after randomization. We applied 3 distribution-based methods to all instruments: effect sizes of ±0.2 SD (small) and ±0.5 SD (medium) and standard error of measurement of ±1 SEM. We applied anchor-based methods only when the Spearman’s correlations between the anchors (Global Perception of Improvement (GPI), Patient Satisfaction Questionnaire (PSQ) and incontinence episode frequency (IEF)) and the incontinence instruments (UDI, IIQ and OAB-q) were ≥0.3. Analyses were performed using both time points to assess changes in MID over time.

Results: Distribution-based methods MIDs for UDI and IIQ ranged between -10 to -25 and -19 to -49 respectively, reflective of a reduction in degree of bother and symptom severity. OAB-q MIDs ranged from +5 to +12, denoting an improvement in health related quality of life. IIQ and OAB-q failed to reach the threshold for anchor-based analysis; therefore, only the UDI was analyzed in this way. Baseline mean UDI scores were 120±49. Anchor-based MIDs for the UDI ranged from -35 to -43 (Table 1)

Conclusion: The UDI MID in women with urge-predominant UI ranges from -10 to -43. Distribution-based methods for calculation of MID yield lower values than anchor-based MID values. The MID did not change over the timepoints studied. MIDs differ in women with urge-predominant, rather than stress-predominant urinary incontinence.

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<th>Table 1: MID values for UDI</th>
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<tr>
<td><strong>Anchor Based</strong></td>
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<td>QPI (“better” vs. “about the same”)</td>
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<td>PSQ (“somewhat satisfied” vs. “not at all satisfied”)</td>
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<tr>
<td>IEF (≥25% reduction vs. no change)</td>
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<td><strong>Distribution Based</strong></td>
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<td>0.2SD`</td>
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* Uses baseline standard deviation (SD), Standard Error Measurement (SEM)

UDI score range (0-200)

Poster# 95

RELIABILITY AND VALIDITY OF THE OVERACTIVE BLADDER SYMPTOM SCORE IN SPANISH (OABSS-S)

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¹Boston University Medical Center, Boston MA; ²Downstate Medical Center, Brooklyn NY; ³Columbia Medical Center, New York, NY; ⁴Cornell Medical Center, New York, NY

(Presented by: Aaron Weinberg)

Introduction and Objectives: Clinicians working in urban healthcare centers require tools to evaluate patient’s symptoms in their native language. Recently a 7-item Symptom Score (OABSS) was validated in English that permits a graded response (severity score) for urgency; the OABSS was translated and validated in Spanish.
Methods: The OABSS was translated into Spanish (OABSS-S) for self-administration to subjects, following internal IRB and ISPOR Good Practices guidelines. Spanish speaking patients >18 yrs of age were recruited. The OABSS-S was completed twice within 10 days. Subjects were divided into 2 subgroups by the presence of OAB. Internal consistency, test-retest reliability and discriminant validity was assessed between each group.

Results: 117 subjects completed the study (mean age was 55 ± 17.7, 74 (63%) women and 47 (40%) had OAB). There was a significant correlation between OAB-pos subjects and their OABSS-S. High level of consistency was observed among the 7 items answered at visit 1 and 2, Cronbach’s raw alpha statistic of 0.92. No correlation of OABSS-S with gender or age; however subgroup analysis showed patients in the OAB group were significantly older and post test analysis showed they had higher scores for each question as well as total scores. Spearman’s rank order correlation coefficients showed that there was significant difference between the 7 items of the OABSS-S; a strong association was also observed between the total 7-item score at visits 1 and 2 for the total score of all subjects r=.84, OAB-pos: r=.81 and OAB-neg: r=.83. Comparison of average total scores obtained for all patients at visits 1 and 2 was not significant (10.47 ± 6.53 vs. 11.02 ± .66). Discriminant validity testing revealed that there were significant differences in the responses between all diagnostic groups at visits 1 and 2: OAB-pos vs. OAB-neg; Total vs. OAB-pos; Total vs. OAB-neg.

Conclusion: The OABSS-S was reliable (results were similar) and valid, in that it measured what was intended with regards to symptoms of overactive bladder. Therefore the OABSS-S will now allow health care providers with Hispanic patients to easily and quickly assess patient’s symptoms without the aid of interpreter services.

Poster# 96

THE SAFETY OF ONCE-DAILY EXTENDED RELEASE ANTIMUSCARINIC THERAPY IN MEN WITH OVERACTIVE BLADDER SYNDROME
Scott Macdiarmid, MD, FRCPSC¹, David Sussman, MD² and Michael Oefelein, MD³
¹Greensboro, NC; ²Sewell, NJ; ³Allergan LLC, Irvine, CA
(Presented by: Scott Macdiarmid)

Introduction and Objectives: Although the overall prevalence of overactive bladder syndrome (OAB) is similar in men and women, utilization of antimuscarinic agents in men has been limited due to safety concerns regarding urinary retention. The objective of this post-hoc analysis was to examine safety (risk of urinary retention) in male patients treated with a once-daily (QD) extended-release (ER) antimuscarinic for OAB.

Methods: Data for male patients were analyzed from 2 US randomized, double-blind studies in which a total of 1165 patients with urgency, and a mean of ≥10 toilet voids/day and ≥1 urge urinary incontinence (UUI) episode/day received the antimuscarinic trospium chloride 60 mg ER (n=578) or placebo (n=587) QD for 12 weeks. The co-primary efficacy variables were changes in daily toilet voids (TVs) and UUI episodes. Data on urinary retention were collected as part of routine adverse event (AE) recording at Weeks 1, 4 and 12.

Results: The pooled studies enrolled 176 men (active drug n=94, mean age 66 years; placebo n=82, mean age 63 years). Overall, 20% of the active drug group and 18% of the placebo group experienced ≥1 treatment-emergent AE that was considered at least possibly related to study treatment; most commonly dry mouth (active drug 7.4%, placebo 3.7%) and constipation (active drug 6.4%, placebo 3.7%). Acute urinary retention was noted in 2% (2/94; both ≥75 years, 1 with a history of prostate enlargement) in the active drug group (required short-term catheterization) compared to 0% in the placebo group. Although the male subgroup analysis was not powered to evaluate efficacy, significantly (p<0.05) greater mean reductions from baseline in number of daily TVs, number of nocturnal TVs, daily OAB-Symptom Composite Score (a sum urgency symptom score scoring a composite of UUI episodes and urgency severity associated with each TV), daily urge frequency associated with TVs, and mean increases in daily volume voided per TV at Week 12 were noted in the active drug group compared to placebo group.
Conclusions: QD trospium chloride 60 mg ER is safe in men with OAB and associated with a small risk of urinary retention. A significant improvement in a number of efficacy parameters was also demonstrated.

**FUNCTIONAL BLADDER CAPACITY AS AN OBJECTIVE MEASURE OF RESPONSE TO INTRAVESICAL DIMETHYL SULFOXIDE FOR THE TREATMENT OF NEWLY DIAGNOSED INTERSTITIAL CYSTITIS**

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¹Evanston Continence Center, NorthShore University HealthSystem, University of Chicago Pritzker School of Medicine, Chicago, IL; ²Center on Outcomes Research and Education, NorthShore University HealthSystem, Chicago, IL

(Presented by: Adam Gafni-Kane)

**Introduction and Objectives:** The course of therapy for interstitial cystitis (IC) is based primarily upon subjective assessments made by the patient. While the impact of intravesical dimethyl sulfoxide (DMSO) on the functional bladder capacities of women with IC has been explored, the extant literature is lacking an analysis of whether objective changes in functional bladder capacity are statistically significant. The objective of this study is to determine whether initial therapy with weekly intravesical DMSO instillations for newly diagnosed IC results in a statistically significant increase in functional bladder capacity.

**Methods:** This is a retrospective cohort study of 15 patients newly diagnosed with IC by cystoscopy. Inclusion criteria were intravesical DMSO as initial therapy, a complete medical record for the treatment period, and completion of the intended number of weekly instillations for the first DMSO series. Patients demonstrating detrusor overactivity were excluded, as were patients receiving concomitant medications for pain during their initial series of DMSO instillations. Use of DMSO as initial treatment was confirmed so as to eliminate the potential effect of prior therapies on bladder capacity. Functional bladder capacities were measured via retrograde bladder filling with sterile water prior to each DMSO instillation. The volumes were then analyzed using descriptive statistics. The normality assumption was met and a mixed model using logarithmic transformations was applied to assess for statistical significance regarding changes in functional bladder capacity.
Results: We identified 44 patients undergoing management of IC at the Evanston Continence Center in 2006. Of those, 15 patients met criteria for study inclusion. The difference in functional bladder capacity between the first and second instillations was not statistically significant (p=0.489). Increases in functional bladder capacity when comparing volumes measured prior to the first instillation with those measured prior to the 3rd, 4th, 5th, and 6th instillations were statistically significant (p=0.005, 0.001, 0.004 and 0.001 respectively).

Conclusion: Women with newly diagnosed IC exhibited a significant increase in functional bladder capacity following the second week of an initial series of intravesical DMSO instillations. Future work will focus on correlating these objective findings with reported subjective improvements in clinical symptoms.

Poster# 98

NOCTURIA: WHY DO PEOPLE VOID AT NIGHT?
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¹Weill Medical College of Cornell University, New York, NY; ²SUNY Downstate Medical School, Brooklyn, NY; ³SUNY Downstate Medical School, Brooklyn, NY; ⁴Lenox Hill Hospital, New York, NY
(Presented by: Jeffrey P. Weiss)

Introduction and Objectives: There are two reasons why patients have nocturia –they are awakened by an urge to void or they awaken for some other reason and then void before going back to sleep. The aim of this study is to determine the relative contribution of each to nocturia.

Methods: This is a prospective observational study of consecutive patients with lower urinary tract symptoms (LUTS) categorized as OAB or non-OAB based on the overactive bladder symptom score. All subjects completed a 24 hour bladder diary including the time they went to bed and they time they woke up in the morning. Each void that occurred between these hours was considered a nocturnal void. At each void, they completed the urgency perception score (UPS)¹ which quantifies the intensity of the urge to void on a scale from 0 (no urge) to 4 (desperate urge). The patients were further subdivided into two groups the - urge group (UPS = 0 –1) and the non-urge group (UPS = 2 –4) based on the assumption that the latter group was awakened by the urge to void, while the former was not.

Results: 62 subjects completed the study of whom 50 had nocturnal voids. 171 voids were analyzed (VV & corresponding UPS ). The data is summarized in the table.

Conclusion: In LUTS patients with nocturia, 78% percent of the voids were accompanied by a moderate or strong urge to void whereas in the remainder there was no urge or a mild urge. It is likely that in the latter group the patient is awakened for some other reason and then voids out of habit or convenience before going back to sleep. The etiology and treatment of these two groups is likely different, but requires further study for confirmation.
EFFECT OF FLEXIBLE DOSE ESCALATION IN A PLACEBO-CONTROLLED CLINICAL TRIAL OF FESOTERODINE

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(Presented by: David R. Staskin)

Introduction and Objectives: To understand the effect of flexible dose escalation on the efficacy of overactive bladder (OAB) treatment, data from a 12-week randomized clinical trial were stratified by whether subjects in the active and placebo (PBO) arms chose to escalate.

Methods: Subjects with a mean of ≥8 micturitions and ≥3 urgency episodes per 24h were randomized to fesoterodine (FESO) 4mg or PBO once daily. At week 2, subjects could maintain the dose at 4mg or increase to 8mg for the remaining 10 weeks (sham escalation for PBO subjects) based on discussion with the investigator. Subjects completed 3-day bladder diaries at baseline and weeks 2 and 12, and the Overactive Bladder Questionnaire (OAB-q) at baseline and week 12. The study was funded by Pfizer Inc.

Results: 63% of 438 subjects randomized to FESO and 73% of 445 subjects randomized to PBO opted for dose escalation at week 2. At week 12, improvements from baseline in bladder diary and OAB-q outcomes were significantly greater in FESO vs PBO escalators (except nocturnal micturitions), but not in FESO vs PBO nonescalators (Table). At baseline, escalators generally had a higher rate of OAB symptoms, more symptom bother, and lower HRQL on OAB-q vs nonescalators, particularly in the FESO group. Immediately before dose escalation at week 2, improvements in diary variables were generally greater in nonescalators vs escalators regardless of treatment. Following escalation, improvements in diary variables were generally larger in FESO escalators vs nonescalators, whereas improvements were generally larger in PBO nonescalators vs escalators.

Conclusion: Among escalators, active treatment significantly improved diary variables and OAB-q scores vs PBO; among nonescalators, the differences were not statistically significant. FESO escalators appeared to have greater severity at baseline and less response to treatment at week 2 than nonescalators. Of interest, the PBO effect appeared larger among nonescalators, which should be considered in flexible-dose study design. The study may have been underpowered to detect differences between FESO and PBO nonescalators, owing to baseline differences, the 2-week escalation design, and the large proportion of escalators.

| Table: Bladder Diary and OAB-q Scale Results in FESO and PBO Nonescalators and Escalators |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                                | Baseline Mean (SD) | LS Mean (SE) Change at Wk 2 | Baseline Mean (SD) | LS Mean (SE) Change at Wk 12 |
|                                | PBO   | FESO   | PBO   | FESO   | PBO   | FESO   | PBO   | FESO   |
| Floralised                      | n     |       |       |       |       |       |       |       |       |
| Micturitions                    | 120   | 164   | 325   | 274   | 120   | 164   | 325   | 274   |
| Urinary Incontinence episodes   | 2.0   | 1.9   | 2.3   | 2.1   | 2.0   | 1.9   | 2.3   | 2.1   |
| Urgency episodes                | 9.2   | 9.7   | 9.4   | 11.8  | 9.2   | 9.7   | 9.4   | 11.8  |
| Nocturnal micturitions          | 1.5   | 1.5   | 1.5   | 1.5   | 1.5   | 1.5   | 1.5   | 1.5   |
| Severe urgency episodes         | 4.3   | 4.8   | 4.7   | 4.6   | 4.3   | 4.8   | 4.7   | 4.6   |
| Frequency-urgency scored        | 5.6   | 5.6   | 5.6   | 5.6   | 5.6   | 5.6   | 5.6   | 5.6   |
| OAB-q Symptom Bother           | 57.4  | 56.4  | 53.5  | 21.5  | 57.4  | 56.4  | 53.5  | 21.5  |
| OAB-q HRQL                      | 27.2  | 27.7  | 16.3  | 1.3   | 27.2  | 27.7  | 16.3  | 1.3   |

Note: Diary variables presented as outcome per 24 h. ND = not determined.

*P<0.05 vs PBO. †Includes only subjects reporting this symptom at baseline. ‡Defined by rating of 2 or more on the Urinary Sensation Scale. §Defined as the sum of Urinary Sensation Scale ratings for all micturitions. ††Lower Symptom Bother scores indicate less symptom bother; higher HRQL scores indicate better HRQL.
FAVORABLE ROLE OF TRIGONE FULGURATION IN THE MANAGEMENT OF RECURRENT URINARY TRACT INFECTIONS
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(Presented by: Mierzwiak Jesse)

Introduction and Objectives: Patients with longstanding history of recurrent urinary tract infections (UTI’s), recalcitrant to antibiotic treatment, represent a challenging population. We report our short-term experience with trigone fulguration, with or without concomitant urethral dilation.

Methods: Following IRB approval, charts of patients who underwent cystoscopy with fulguration of trigonitis (CFT) under general anesthesia from 2004-08 with at least 12 months follow-up were reviewed. Trigonitis was diagnosed on office cystoscopy performed during workup for recurrent urinary tract infections by the appearance of inflammation of the trigone that includes pustules, bullous lesions, and/or submucosal calcifications. Urethral dilation (UD) was performed when indicated, based on a constellation of: lower urinary tract symptoms, abnormal flow pattern, urethral narrowing on voiding cystogram, and/or urodynamic pressure-flow data suggesting obstruction. Primary outcome was complete resolution of trigonitis based on follow-up office cystoscopy at 6 months. Secondary outcome was number of antibiotic courses prescribed for urinary symptoms (AC) subsequent to the CFT.

Results: Of 70 female patients reviewed, 54 had 6 months follow-up cystoscopy and one year minimum follow-up (30 CFT, 24 CFT + UD). The majority were Caucasian, with mean age 61.9 ± 14.9 years, BMI 26.4 ± 6.9, parity 1.9 ± 1.4. Six patients were diabetic, 1 required intermittent catheterization, and 1 was on chronic corticosteroids secondary to lupus. No peri-operative complications occurred. Resolution of trigonitis was noted in 39 (72%) patients. In this group, at one year follow-up, 16 (41%) patients had 0 AC, 21 (54%) had 1-3, and 2 (5%) had four or more. Among the 15 (28%) patients with persistent trigonitis, one year followup revealed 2 (13%) had 0 AC, 9 (60%) had 1-3, and 4 (27%) had four or more.

Conclusion: A majority of patients undergoing fulguration of trigonitis for recurrent UTI’s can expect cystoscopic resolution of the trigonal inflammation at six months. There is a trend for decreased need for antibiotic treatment in patients who have resolution of trigonitis after CFT.
**Poster# 101**

TRENDS IN FEMALE PELVIC MEDICINE AND RECONSTRUCTIVE SURGERY EXPOSURE DURING UROLOGY RESIDENCY
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(Presented by: Farzeen Firoozi)

**Introduction and Objectives:** Since 2002, our institution’s center for Female Pelvic Medicine and Reconstructive Surgery (FPMRS) has offered the National Urology Resident Preceptorship Program (NURPP). We evaluated the current resident perceived level of FPMRS exposure during the 2008-2009 courses compared to those of residents who attended the course in 2004.

**Methods:** In 2002-2004, 113 residents and in 2008-2009, 63 residents from urology residency programs in the United States participated in the program. The course included live surgical cases, didactic lectures, and discussions of research opportunities and career options. Participants in the 2004 and 2008-2009 courses were asked to complete program evaluations gauging, among other things, the reason for attending the program, what percentage of the clinical material was new, what percentage of the research material was new, and whether the participant had an interest pursuing career opportunities in FPMRS. Responses of the latter group were compared to those of the earlier one.

**Results:** Of the 32 of 40 participants in 2004 who completed the program evaluation 43% stated the primary reason for attending the program was lack of exposure and 35% stated that greater than 50% of the clinical material was new to them. In the same group, 79% stated that greater than 50% of the material on FPMRS research was new to them and 90% of the participants stated that their interest in FPMRS was “much higher to somewhat higher” as a result of the program. Of the 51 of 63 participants in 2008-2009 who completed the program evaluation 42% stated the primary reason for attending the program was lack of exposure and 30% stated that greater than 50% of the clinical material was new to them. In the same group, 57% stated that greater than 50% of the material on FPMRS research was new to them and 87% of the participants stated that their interest in FPMRS was “much higher to somewhat higher” after the program.

**Conclusion:** In the 5-year period between participants queried at the NURPP, current trends in exposure of FPMRS to urology residents appear to be unchanged. One of the most common reasons for attending the course remains to be lack of exposure. Interestingly, FPMRS research exposure is greater for current urology residents compared to 5 years ago. We believe the NURPP remains to be a valuable curriculum adjunct of urology residency, especially as the need is increasingly recognized for FPMRS specialists by urology departments nationwide.

**Poster# 102**

PURELY TRANSVAGINAL TECHNIQUE AND MANAGEMENT OF ALL FORMS OF MESH-RELATED COMPLICATIONS FROM COMMERCIAL PROPLAPSE KITS
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(Presented by: Farzeen Firoozi)

**Introduction and Objectives:** Commercial prolapse mesh kits have become very prevalent in the management of pelvic organ prolapse. We present our experience with a purely transvaginal approach to the management of all forms of mesh-related complications from prolapse kits.
Methods: Retrospective chart review of all patients who underwent surgical removal of mesh for mesh-related complications after prolapse kit use from 2006 to 2009 at our institution was performed. Pain, degree of improvement and presence of continued symptoms were reported by patients at last follow-up.

Results: Eighteen patients underwent removal of mesh during the study period. Mean age was 60 years. Median period of latency to mesh-related complication was 10 months (range 1 to 27 months). All mesh kit brands were able to be verified (Prolift™ n=13, Avaulta™ n=3, Apogee™ n=1, Perogee™ n=1). Indications for removal of mesh included vaginal/pelvic pain (44%), dyspareunia (44%), vaginal mesh erosion (39%), urinary incontinence (39%), recurrent prolapse (28%), bladder mesh erosion with recurrent UTI (11%), rectal mesh erosion (6%), ureteral injury (6%), retained foreign body (surgical sponge) in the bladder (6%), and vesicovaginal fistula (6%), with most patients citing more than one reason. All patients, including mesh erosion involving pelvic structures other than the vaginal wall, were able to be managed purely transvaginally. One patient with rectal mesh erosion was able to be managed transvaginally/transperineally. One patient with vaginal mesh erosion and concomitant ureteral injury was managed with a combined transvaginal and endoscopic approach. Regardless of degree of reconstruction required, no patient required a transabdominal approach for management of complex mesh-related complications. There were no complications. Two patients had persistence of symptoms post-operatively - one had urge incontinence treated successfully with anticholinergics and a second patient with stress incontinence was treated successfully with collagen injection.

Conclusion: To our knowledge, this is the first case series reporting a purely transvaginal technique of mesh excision, regardless of extent and complexity of mesh complication involving pelvic structures other than the vaginal wall, including the bladder, ureter and rectum. This growing evidence supports the potential for managing most mesh-related complications using a transvaginal approach, which appears to be safe, with relief of symptoms in most cases.

Poster# 103 – WITHDRAWN

Poster# 104

SHORT TERM SAFETY OUTCOMES OF CYSTOCELE REPAIR USING THE PERIGEE® POLYPROPYLENE MESH KIT
Matthew McIntyre, MD¹, Bret Lebed, MD², Walker Nichols, BS¹ and Eric Rovner, MD¹
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(Presented by: Matthew McIntyre)

Introduction and Objectives: Vaginal mesh kit procedures have become increasingly popular for the treatment of pelvic organ prolapse (POP). Complications in trans-vaginal prolapse surgery using mesh are not often reported. We present our short-term safety using the Perigee® (AMS, Minnetonka, MN) polypropylene mesh kit.

Methods: We performed a retrospective analysis of 65 patients undergoing anterior repair utilizing the Perigee® kit. Prior pelvic surgery, presence of symptomatic or urodynamic stress urinary incontinence (SUI), urgency, urge incontinence(UUI), dyspareunia, and ordinal POP-Q stage were recorded. Post-operatively, patients were evaluated for recurrence of POP, persistent or de-novo pain or dyspareunia, mesh related complications, and voiding dysfunction until the time of last follow-up.
**Results:** Mean follow up was 6 months (range 1 to 28). Of the 43 patients with prior pelvic surgery there were 13 cystocele repairs among the 89 prior surgeries. Preoperatively, symptomatic SUI was present in 28(43%) patients; urgency was noted in 43 (66%) and UUI in 18(27%). 7 patients (10%) had dyspareunia prior to repair. The mean stage of anterior prolapse was 2.6. Concomitant transvaginal surgery in this cohort included midurethral slings (64%), posterior (21%) or apical prolapse repair (4%) including 12 (18%) posterior mesh repairs. Mean blood loss was 171cc. There were no intra-operative complications. Of the 5 (8%) patients with recurrent anterior prolapse, 4 were stage I and asymptomatic. Post-operative enterocele was found in 3(5%) patients. One (2%) patient had new onset dyspareunia. There were no urinary tract erosions and only one (2%) vaginal mesh extrusion. Four (6%) patients had persistent post-operative pain in the vagina (non-sexually active patient) and one (2%) patient had mesh explantation for pain relief. Resolution of SUI was noted in 85% of patients, four (6%) had persistent SUI, and 3(5%) developed SUI. UUI resolved in 88%. De novo UUI occurred in 2 patients. Postoperative urinary retention occurred in 4(6%).

**Conclusion:** The use of the Perigee® polypropylene mesh kit provides good short term results for the repair of cystocele and associated voiding dysfunction. The incidence of intraoperative and postoperative complications is sufficiently low such that in appropriately selected patients the Perigee® mesh kit can be considered safe and effective in the short term.
PODIUM ABSTRACTS
**Introduction and Objectives:** The average American adult reads at a 5th-to-8th grade level. In order to determine whether self-reported health-related quality of life (HRQOL) questionnaires used for pelvic floor disorders are appropriate for American women, we measured the reading levels of the most commonly used questionnaires for urinary incontinence, pelvic organ prolapse and fecal incontinence.

**Methods:** An extensive online literature search identified HRQOL questionnaires addressing urinary incontinence, pelvic organ prolapse, and fecal incontinence. Readability was then assessed by two formulas incorporating the total number of words, sentences and syllables per question. First, the Flesch-Kincaid grade level indicates the average grade one is expected to complete to lucidly comprehend the written text. Second, the Flesch Reading Ease score, from 0-100, indicates how easy the written text is to read. Scores ≥60 indicate material readily understandable to a 13 year-old student.

**Results:** HRQOL Questionnaires were categorized as those assessing urinary incontinence, pelvic prolapse, and fecal incontinence. Questionnaires assessing more than one pelvic floor disorder were categorized separately (Table 1). Reading levels varied greatly between questionnaires. In addition, the reading level of many short forms of questionnaires differed greatly from that of the original long forms. Reading levels also varied between different subscales of larger questionnaires.

**Conclusions:** We identified significant variation in reading levels among QOL questionnaires addressing pelvic floor disorders. Many of the most frequently used questionnaires have high reading levels, and may not be ideal for most patients. As specialty societies focus on standardizing questionnaires for research, the reading levels of these instruments should be considered. Questionnaires at or below an 8th grade reading levels are more generalizable to larger populations of women with pelvic floor disorders.

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GENETIC DETERMINANTS OF STRESS URINARY INCONTINENCE IN WOMEN
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(Presented by: Peggy Norton)

Introduction and Objectives: The etiology of female stress urinary incontinence (SUI) is poorly understood but probably multifactorial. Twin studies suggest that both genetic and environmental factors contribute to SUI. Our objective was to use linkage analysis to identify possible genetic contributions to SUI.

Methods: We performed a genome-wide linkage analysis in 40 kindreds with 2 or more female family members treated for SUI. The subjects were collected as part of a large study of pelvic floor disorders: affected cases were defined as having undergone at least one surgery for SUI, and surgical records were obtained to confirm the phenotype. Genotyping was performed using the Illumina 610Q SNP market set, and linkage analysis was tested by the log10 of the odds for linkage, or LOD score, calculated using the MCLINK analysis package. Results are reported as heterogeneity LOD scores (HLOD); suggestive peaks are HLOD scores of 1.86 or greater and significant peaks are HLOD scores of 3.3 or greater.

Results: Of the 100 women studied, 78 had undergone one surgery and 22 had undergone two or more major surgeries for SUI. Mean parity was 3.9 ± 2.4 children (n=90), mean BMI was 27.7 ± 5.8 kg/m2 (n=85), and mean age at diagnosis was 47.1 ± 13.7 years (n=62.) The 40 kindreds included two or more sisters (24 families), mother-daughter (5 families), aunt-niece (3 families), 2 cousins (1 family), and extended pedigrees with multiple affected female relatives (6 families). We observed linkage peaks on five chromosomes: Chr 2q37.3 (HLOD 2.58), Chr 4q25-q28.1 (HLOD 2.98), Chr 8p22 (2.58), Chr 10q26.2-q26.3 (HLOD 2.36) and Chr 11p15.5 (HLOD 2.15), most under a recessive model (see Figure).

Conclusion: Using linkage analysis, we found suggestive evidence for a predisposition gene(s) for female SUI on five chromosomes. As we increase our sample of related SUI cases with strict diagnosis (i.e., surgically treated), we may have increased power to detect significant SUI predisposition genes.
Podium #3

AUTOLOGOUS MUSCLE-DERIVED CELLS AS THERAPY FOR STRESS URINARY INCONTINENCE: A RANDOMIZED, BLINDED TRIAL

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(Presented by: Sender Herschorn)

Introduction and Objectives: This two-part, randomized dose-ranging study was designed to evaluate the 12-month safety and preliminary effectiveness of autologous muscle-derived cell (AMDC) injection for the treatment of stress urinary incontinence (SUI).

Methods: This study was sponsored by Cook Medical Incorporated and was approved by Health Canada and the institutional ethics committees. All patients signed informed consents. This study enrolled 29 women whose SUI had not improved with standard therapy for at least 12 months. The AMDCs were derived from biopsies taken from the quadriceps femoris muscle. In the first, double-blind phase, 20 patients were randomized into 5 groups to receive 1, 2, 4, 8, or 16 million AMDCs. The second, single-blind phase sequentially enrolled 9 patients, 3 per group, to receive 32, 64, or 128 million AMDCs. All patients received cystoscope-assisted periurethral cell injections and could elect a second injection of the same dose after 3-month follow-up. Follow-up occurred at 1, 3, 6 and 12 months after the last injection.

Results: Mean patient age was 49.5 years (range 36-73). Of 29 patients, 25 (86.2%) elected a second injection. To date, 26 patients have reached 12-month follow-up since their last injections (3 with 1 injection; 23 with 2 injections). No serious adverse events were encountered. Minor events included pain and bruising at the muscle biopsy site, mild local reactions to cell injection, mild self-limited urinary retention and urinary tract infection; 1 patient reported worsened incontinence after the second injection. Of the 23 patients who had 2 injections, 10 patients (43%) reported no stress leaks at 12 months after the second injection; 14 patients (61%) had ≥50% reduction in the number of stress leaks over a 3-day period. In addition, at 12 months after the second injection, 35% and 39% of the patients experienced ≥50% improvement in quality of life as measured by IIQ-7 and UDI-6, respectively. Of the 3 patients who received a single injection and completed 12 months of follow-up, all reported ≥50% reduction in stress leak numbers. Overall, a trend toward greater improvement in quality of life and stress leaks was observed for patients receiving higher doses.

Conclusions: Injection of AMDCs in a wide range of doses is safe for treating patients with SUI. Twelve-month results suggest acceptable effectiveness of this therapy in relieving SUI symptoms and improving quality of life.

Podium #4

MEASUREMENT OF TRANSURETHRAL BLADDER NECK DISTRACTION DURING TENSION-FREE VAGINAL TAPE (TVT) PROCEDURE

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(Presented by: Shameem Abbasy)

Introduction and Objectives: The manufacturer’s instructions recommend that surgeons use a rigid catheter guide (Mandarin) to move the bladder neck and urethra away from the planned trocar passage path during TVT placement. The purpose of this study was to use transperineal 2-D ultrasound to quantify the amount of bladder neck distraction that occurs using the Mandarin.

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Methods: We enrolled patients who planned to undergo a TVT procedure. The Mandarin was placed into the Foley catheter and both were inserted into the urethra until the tip of the catheter was visualized 1 cm proximal to the bladder neck. Using a transperineal ultrasound (BK Ultrasound Profocus CX-series Ultrasound System (HC MDL 70586 CL3) with a Convex Array Probe (MFI 3.75-6.0 MHz, HC MDL 70586 CL3) the distance of the bladder neck distraction from mid-line was measured using standardized techniques and landmarks bilaterally. The distance between the medial borders of the inferior pubic rami at the level of the urethral meatus was also measured. SPSS Statistics version 17.0 was used for descriptive analysis and Spearman’s correlation.

Results: The 28 participants in this study had a median age of 51 years (30 to 84), most (86%) were vaginally parous with a median vaginal parity of 2 (0 to 5). Twenty-five percent of patients had a prior hysterectomy. The median POPQ stage was 2 (range 0 to 3) and 32% underwent concomitant prolapse surgery. The median right-sided bladder neck distraction distance was 1.36cm (0.65 to 2.00) and median left-sided bladder neck distraction distance was 1.42 (0.8 to 1.96). The median distance between the inferior pubic rami at the level of the urethral meatus was 3.6cm (2.5-5.0). The distance between the pubic rami and the total distraction distance (left + right) were poorly correlated (r= -.259, p=0.233). The figure below depicts the left bladder neck maximally distracted to the right side.

Conclusion: The bladder neck is distracted laterally approximately 1.4 cm during manipulation with the Mandarin guide. The distraction distance is surgically significant and may be essential to preventing perforations, though further studies are needed to demonstrate this.

Podium #5

INCONTINENCE AND PELVIC RECONSTRUCTIVE SURGERY: DOES ABU CERTIFICATION LOG DATA DEMONSTRATE DIFFERENCES IN PRACTICE PATTERNS BY GENERATION OF TRAINING?
Priya Padmanabhan, MD, MPH, Melissa Kaufman, MD, PhD, Roger Dmochowski, MD and Harriette Scarpero, MD
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(Presented by: Priya Padmanabhan)

Introduction and Objectives: The prevalence of female pelvic floor dysfunction (PFD), including incontinence and pelvic organ prolapse (POP) increases with age and has significant effects on quality of life. With increasing resident training in female urology and rapidly evolving treatments, our hypothesis was that recently graduates would be performing more reconstructive surgery than older urologists.
**Methods:** Certification candidate log data was obtained between 2005 and 2007 for newly certified, and first-time and second-time recertified urologists in: SUI, POP, UDS, refractory OAB, and complex pelvic reconstruction (CPR).

**Results:** 1046 newly certified, 1122 first-time recertified and 849 second-time recertified case logs were reviewed. Demographic data, training and competency of practitioners are unavailable. UDS are utilized by each group, although more are performing cystometry (74.1%, 71.6%, 67.1%) and uroflow (79.7%, 75.3%, 75%) than pressure flow studies (55%, 52%, 41%). A high percentage are performing slings (71%, 69.3%, 58.7%), yet fewer are managing the anterior compartment for POP (29.3%, 29.2%, 19.4%). The rates are lower for: posterior (6%, 6.1%, 5.3%), enterocele (1.2%, 2.8%, 2.1%), combined anterior and posterior (7.3%, 8.5%, 5.2%), and abdominal colpopexy (5.5%, 5.6%, 3.9%). Few are performing CPR: vesicovaginal fistula repairs (0.76%, 0.6%, 0.4%) and urethral diverticulectomies (10.1%, 10.3%, 7.2%). The use of initial (23.9%, 36.6%, 41.5%) and subsequent (14.1%, 25.8%, 28.7%) female urethral dilation is high.

**Conclusion:** Basic UDS methods are utilized, but limited use of pressure flow studies may relate to a lack of understanding of its application. Urologists commonly manage SUI, but not POP. This is unrelated to the time of their urology training, yet may relate to lack of diagnosis or skill, or management by local urogynecologists. The limited proportion of CPR performed is likely due to only a subset of fellowship trained urologists in PFD. There is no evidence to support the alarmingly high use of urethral dilation. It may relate to miscoding, reimbursement, and lack of knowledge of disease process. This observational study highlights the areas of PFD which are highly served and disproportionately utilized. Structured and comprehensive training during residency and fellowship continues to be necessary. Further research will elucidate the distribution of PFD in practice, type and quantity of advanced PFD training and urogynecology involvement.

**Podium #6**

**OUTCOMES OF PREGNANCY FOLLOWING SURGERY FOR STRESS URINARY INCONTINENCE: A SYSTEMATIC REVIEW**

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(Presented by: Shelby Morrisroe)

**Introduction and Objectives:** Although there is little data published on the safety of pregnancy after surgery for stress urinary incontinence, many physicians recommend that women wait until they complete childbearing. We systematically reviewed the literature to examine the safety of pregnancy after incontinence surgery, as well as the effect of pregnancy on recurrent stress incontinence.

**Methods:** A systematic literature review through PubMed, EMBASE, and Cochrane Review identified articles published between 1985 and 2009 on pregnancy after SUI surgery. Two independent reviewers (JA and MP) reviewed each study title and abstract. Data were tabulated from case reports, physician surveys, and physician questionnaire-based studies that included medical record reviews. Data from each type of study were tabulated where appropriate.

**Results:** Our literature search identified 592 titles, of which 15 articles were included in the review. The incidence of recurrent stress urinary incontinence (SUI) after Cesarean delivery in patients with prior surgery was similar in the three types of studies included; case reports 14%, physician surveys 5%, and medical record compilation studies 16%. This incidence is comparable to the reported incidence of SUI after Cesarean delivery in cohort studies. The incidence of recurrent SUI after vaginal delivery was also similar in the three study types (21%, 26%, and 25%, respectively), and is also comparable to the reported incidence of SUI after vaginal delivery in cohort studies. Further, case study data showed a similar continence rate after TVT between women who had later pregnancies and those who did not. Complications during pregnancy, such as bladder outlet obstruction, were rare.
Conclusion: In patients with a history of prior surgery for SUI, the risk of recurrent SUI post-partum may be lower with cesarean section delivery than with vaginal delivery. The rate of TVT failure is similar between those who later become pregnant and those who do not, suggesting that pregnancy may not pose an increased risk of TVT failure. These findings, coupled with the rarity of reported complications in pregnancy after SUI surgery, suggest that delaying surgery in women of child-bearing age may not be necessary.

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Podium #7

HEALTH LITERACY AND DISEASE UNDERSTANDING AMONG AGING WOMEN WITH PELVIC FLOOR DISORDERS

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(Presented by: Una Lee)

Introduction and Objectives: Health literacy is defined as the “degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.” Studies have shown that inadequate health literacy is associated with poor health outcomes and disease understanding, and that older adults are more likely than young women to have low health literacy. However, little research exists regarding health literacy and disease understanding among patients with pelvic floor disorders. We sought to correlate pelvic floor diagnosis understanding following an office visit with patient’s health literacy and age among women presenting for care for their pelvic floor disorders.

Methods: Study subjects were recruited from urology and urogynecology specialty clinics based on chief complaints suggestive of urinary incontinence or pelvic prolapse. Subjects completed questionnaires to assess symptom severity, and health literacy was measured using the validated Test of Functional Health Literacy in Adults (TOFHLA). Patient-physician interactions were audio-taped during their office visit. Immediately afterwards, patients were asked to describe their diagnoses and treatments discussed by the physician and record them on a checklist, with follow-up 2-3 days later.

Results: A total of 36 women with pelvic floor disorders, aged 40-94 (mean age 62), were enrolled. Overall the women had high educational status (26/36 had above a high school education) and high health literacy (29/36 had a score of 90 or greater on a scale of 100 on the TOFHLA). Patient recall varied by diagnosis; patients with pelvic prolapse had the lowest percentage recall and disease understanding (70%), followed by women with incontinence and prolapse (82%). Women with incontinence alone had the highest recall of diagnosis (94%).

Conclusion: High health literacy as assessed by the TOFHLA may not correlate with patients’ ability to comprehend complex conditions such as pelvic prolapse. Despite high health literacy and high educational status, 30% of patients with pelvic organ prolapse had poor recall of their diagnoses and poor understanding of their disease and treatment plan. Lack of understanding may lead to unrealistic treatment expectations and disappointment; the use of age-appropriate educational materials may help improve patients’ disease understanding.

Funding: The NIDDK (1 K23 DK080227-01, JTA)

Podium #8

ADJUSTABLE CONTINENCE THERAPY (ACT®) FOR SEVERE ISD AND RECURRENT FEMALE STRESS URINARY INCONTINENCE – LONG TERM EXPERIENCE

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(Presented by: Ervin Kocjancic)
**Introduction and Objectives:** This study aimed to assess long-term outcomes of patients who had failed a prior incontinence surgery and had a significant amount of Intrinsic Sphincter Deficiency (ISD).

**Methods:** Following Ethical approval (Number 3359), 57 females were enrolled in our single centre prospective open study to assess the potential safety and efficacy merits of this post operatively adjustable device in women who had undergone prior pelvic surgery and had urodynamic proven severe degree of ISD (VLPP ≤ 60 cm H2O MUCP < 30 cm H2O, and a fixed urethra. All women had previously undergone one or more incontinence procedures. Subjective outcome measures included daily pad count; Incontinence Quality of Life (IQOL) questionnaire, Visual Analogue Score (VAS) and a Patient Impression Index (PGI) at baseline and at 1, 3, 6, 12, 24, 36, 48, 60 and 72 months. The ACT® device consists of two post operatively adjustable silicone balloons placed at either side of the bladder neck through a small incision of the Sulcus at the level of vaginal introitus below the urethral meatus.

**Results:** At last follow-up, mean pad usage improved from 5.6 to 0.41. IQOL improved from 27.2 to 78, with 62% of patients considering them self dry at VAS questioning. On PGI 64% patients were extremely improved, (>50%) 23% were improved (<50%), while 13% were only slightly improved or unchanged. The results were maintained over time. Complications necessitating device removal occurred in 22.1% of patients. Postoperative adjustments were performed if incontinence persisted, recurrent, or until optimum continence had been achieved. Eighteen patients (31.6%) did not require any postoperative adjustments. The remainder (68.4%) required singular or multiple adjustments range (1 -11) during the course of 6 years, demonstrating the ability to titrate the ACT balloons long term.

**Conclusion:** Dealing with recurrent stress urinary incontinence has enormous social implications for the patient and represents a big surgical challenge for the physician. The ACT is an attractive treatment option for the challenging treatment of recurrent stress urinary incontinence. Whilst our findings were encouraging particularly in terms of patients’ subjective outcomes, our study was limited in terms of the numbers of patients treated and other studies needs to confirm our results.

**Podium #9**

**LONG-TERM FOLLOW UP OF VOIDING PARAMETERS AND SURGICAL RECURRENCE AFTER URETHRAL DIVERTICULECTOMY**

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(Presented by: Michael Ingber)

**Introduction and Objectives:** Studies evaluating outcomes after urethral diverticulectomy are limited by small numbers and short-term follow-up. We present the largest reported cohort of women with urethral diverticula (UD) and evaluate both surgical outcome and long-term voiding parameters after this surgery.

**Methods:** All women who underwent surgery for UD at our institution over a 12-year period (1996-2008) were mailed surveys. These included a one-page health questionnaire detailing any further surgeries on their urethra or bladder, as well as number of urinary tract infections (UTI), and dysuria. Additionally, these women were sent the Urogenital Distress Inventory (UDI-6). Women not responding to the mailed survey were telephoned. For purposes of determining surgical recurrence, charts of women not responding to the mailing or telephone survey were reviewed. Women having an eventual diagnosis of carcinoma associated with the UD were excluded.
Results: 123 women were identified as having a urethral diverticulectomy during the study period. Of these, 13 (10.5%) had an eventual recurrence requiring repeat surgical excision. On univariate analysis, patients with a proximal UD, multiple UD, or prior pelvic or vaginal surgery (excluding prior urethral diverticulectomy) were more likely to have a failure (p=0.02, 0.03, <0.001, respectively). On multivariate analysis, only prior pelvic or vaginal surgery predicted surgical failure (Odds Ratio 9.54, p<0.001).

Sixty-two women (50.4%) responded to our survey. Mean follow-up in this group was 50.4 months. Twenty-five (40.3%) had a UTI within the last year, with 15 (24.2%) women having 3 or more UTIs over the past year. 17 (27.4%) had persistent pain or discomfort with urination. Mean (standard deviation) total UDI-6 was 5.2 (4.5) in patients with a surgical success, vs. 8.5 (5.2) in failures, p<0.05.

Conclusion: To our knowledge this represents the largest study with the longest follow-up after surgery for UD. Patients with prior pelvic surgery must be counseled appropriately with regards to recurrence risk. Additionally, over the long-term, many of these women have persistent voiding dysfunction and persistent symptoms, including UTI and dysuria.

Podium #10

PATIENT-CENTERED GOALS FOR EVALUATION OF FEMALE SEXUAL DYSFUNCTION IN MULTIPLE SCLEROSIS
Alienor Gilchrist, MD¹, Rashel Haverkorn, MD¹, Sunshine Murray, MD¹, Gina Remington, RN¹, Sophie Fletcher, MD², Elliot M. Frohman, MD, PhD¹ and Gary Lemack, MD¹
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(Presented by: Alienor Gilchrist)

Introduction and Objectives: Female sexual dysfunction (FSD) is prevalent in patients with MS. The exact relationship between FSD symptoms and other neurologic sequelae of MS is poorly understood. By evaluating patient goals regarding FSD symptoms, the aim of this study was to determine the subjective effect of these sequelae on sexuality.

Methods: In this IRB approved study, females with MS were recruited using a single question identifying symptoms of FSD. Subjects completed 4 validated questionnaires: Multiple Sclerosis Intimacy and Sexuality Questionnaire (MSISQ-19), Modified Fatigue Impact Scale (MFIS), Female Sexual Function Index (FSFI) and Female Sexual Distress Scale (FSDS-R). Patients then designated which 3 MSISQ-19 items they would like treated and ranked them in order of importance.

Results: 27 women were enrolled, 8 were excluded. On average, patients were age 45 with MS diagnosed 16 yrs previously. 9 patients (47%) reported FSD, 10 (53%) did not. On the FSDS-R, 7/10 patients denying symptoms of FSD actually had scores indicative of FSD. Overall FSFI scores were significantly lower in each domain in the FSD group (meaning greater FSD), and although lower in each domain, statistical significance was not reached. MSISQ-19 includes items for primary (direct physical- desire, arousal, orgasm), secondary (indirect physical- neurologic symptoms, spasticity, pain, fatigue) and tertiary causes (psychosocial) causes of FSD impacting sexuality specifically in the setting of MS. Patients with self-reported FSD had significantly more dysfunction in the primary domain, and were more affected by MS symptoms in all 3 domains. Primary subscale items were most often identified by patients (63%) as the area they wished to modify regardless of perceived sexual function; most cited items were taking too long to orgasm (25%) and inadequate lubrication (10%). No association was noted between fatigue (MFIS scale) and severity of FSD.

Conclusion: Even among patients not reporting symptoms of FSD, the majority met criteria for diagnosis by FSFI. In all patients, the bulk of complaints were those of primary sexual dysfunction (sensation and lubrication) rather than secondary sexual dysfunction due to other neurologic sequelae of the disease. A goal-directed evaluation can identify when specific FSD intervention, rather than further treatment of neurologic symptoms, is indicated for these complex patients.
THE PREVALENCE OF OVERACTIVE BLADDER SYMPTOMS IN PATIENTS WITH MULTIPLE SCLEROSIS: CORRELATIONS WITH INCREASED DISABILITY AS WELL AS REDUCED QUALITY OF LIFE
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¹University Hospitals Case Medical Center; ²University of Winnipeg
(Presented by: Sangeeta Mahajan)

Introduction and Objectives: Overactive bladder (OAB) symptoms are common in patients with Multiple Sclerosis (MS). Our goal is to determine the prevalence of OAB symptoms in patients with MS and correlations with physical disability and quality of life (QoL).

Methods: After obtaining IRB exemption, results from the Fall 2005 North American Research Committee On Multiple Sclerosis survey were reviewed, including the Urogenital Distress Inventory (UDI-6) an additional nocturia question, the SF-12, the Patient Determined Disease Steps (PDDS) measuring physical disability, and questions on urologic care. A total OAB symptom score was created by summing responses to the UDI-6 frequency, urgency, small leakage and nocturia questions, totaling 0 to 12. Data were analyzed using descriptive statistics, the chi-square and Student’s t-tests, analysis of variance, and multivariate logistic regression.

Results: Of 16,858 surveys mailed, 9702 (58%) were returned (75% women and 25% men). Participants with a surgically altered bladder were excluded (N=21). Of 6981 respondents, 6263 (65%) had at least one UDI-6 score >2 (moderate to severe), including 44% frequency, 41% urgency, 22% leakage and 46% nocturia, with a median OAB symptom score 5.1. Longer disease duration (r = 0.135, p<0.001) and increasing disability (r=0.291, p<0.001) were significantly correlated with an increasing OAB symptom score. Lower SF-12 scores were associated with increasing disability (p<0.001). When controlled for disability, both physical (PCS-12, r=0.17) and mental (MCS-12, r=0.16) QoL were reduced with increasing OAB symptom scores (p<0.001). Only 2361 (51%) respondents with moderate to significant OAB symptoms had ever been treated with an anticholinergic medication. Treated patient were more likely to have leakage complaints (p<0.001) and to receive oxybutynin or tolterodine while newer options were under utilized (<10% total use). Only 56% of respondents with a OAB symptom score score > 5 had ever undergone any urologic evaluation, associated with longer disease duration, higher UDI-6 score, and unemployed status (all p<0.001).

Conclusion: This is the first large-scale study to identify significant rates of moderate to severe OAB symptoms in MS patients. A significant correlation exists between increasing physical disability, longer MS duration and increasing OAB symptoms. Currently many of these patients remain underserved and untreated.

THE PREVALENCE OF CATHETER UTILIZATION IN PATIENTS WITH MULTIPLE SCLEROSIS AND THE IMPACT ON QUALITY OF LIFE
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(Presented by: Sangeeta Mahajan)

Introduction and Objectives: Catheterization for voiding dysfunction is common in Multiple Sclerosis (MS). However, the rates of use, gender preferences, the impact on patient quality of life (QoL) remain unknown.

Methods: After obtaining IRB exemption, results from the Fall 2005 North American Research Committee On Multiple Sclerosis survey were reviewed, including the Urogenital Distress Inventory (UDI-6), an additional nocturia question, the Short Form-12 QoL inventory, the Patient Determined Disease Steps (PDDS) measuring physical disability, and history of prior urologic evaluation and treatment. Responses to the urge, incontinence, frequency and nocturia questions were summed to create an OAB symptom score of 0 (none) to 12 (severe). Data were analyzed using descriptive statistics, the chi-square and Student’s t-tests, analysis of variance, and multivariate logistic regression.

Podium #12
Results: Of 16,858 surveys mailed, 9702 (58%) were returned (75% women and 25% men). Participants with a surgically altered bladder were excluded (N=21). Of 6981 respondents, 4606, (48% men and 52% women) reported at least one moderate to severe urinary symptom. Of these patients, 1719 (37%) reported use of some form of urinary catheterization, including intermittent self-catheterization (ISC, 25%), indwelling urethral foley catheterization (FC, 11%) and supra-pubic catheterization (SPC, 1%). Women had a strong preference for ISC while men preferred FC (p<0.001). Catheter use of any kind was associated with longer disease duration (OR 1.41) and higher OAB symptom score (OR 1.08). Greater disability (p<0.001) and reduced QoL were noted in catheterizing patients when compared to non-catheterizing patients. When QoL was divided by mental (MCS-12) and physical (PCS-12) components, catheterizing patients demonstrated lower mean (SD) scores and greater physical disability, MCS-12= 44.1 (12.2), PCS-12= 30.5 (9.2) and PDDS= 5.4 (2.0) versus MCS-12= 45.7 (11.5), PCS-12= 38.1 (11.8), and PDDS= 3.2 (2.3) in non-catheterizing patients (t=4.9, 23.9, 35.6 respectively, all p<0.001).

Conclusion: This is the first large-scale study to determine rates of catheter use in patients with MS and gender preferences regarding methods. Despite its necessity, urethral catheterization is associated with reduced QoL. Increased physical disability and longer disease duration resulting in greater voiding dysfunction may explain the lower QoL measures in catheter-dependent patients.

Podium #13

SUPINE AND UPRIGHT URODYNAMIC EVALUATION OF INCONTINENT ILEOVESICOSTOMY IN WHEELCHAIR-BOUND ADULTS WITH NEUROGENIC BLADDER
Polina Reyblat, MD, Priyanka Kadam, Wesley Kong, MD and David Ginsberg, MD
Rancho Los Amigos National Rehabilitation Center, Downey, CA
(Presented by: Polina Reyblat)

Introduction and Objectives: Incontinent ileovesicostomy is a safe and low pressure option for patients with neurogenic bladder (NGB). These patients spend large parts of their day in the sitting position confined to a wheelchair. This position could potentially lend itself to higher pressures within the ileovesicostomy. We evaluated detrusor leak point pressure (DLPP) of the incontinent ileovesicostomy in the supine and sitting upright position.

Methods: Urodynamic assessment of patients that underwent incontinent ileovesicostomy was performed. A standard urodynamic evaluation was performed in the supine position. After completion of the initial study, the patient was transferred into the wheelchair with urodynamic catheters secured in place. Urodynamic evaluation was repeated in the sitting position. Evaluation was performed 6 to 36 months after ileovesicostomy.

Results: Upright and supine urodynamic evaluation was performed following the Good Urodynamic Practice Guidelines. Ten patients (7 male and 3 female) were evaluated. Etiology of NGB included six patients with spinal cord injury (4 thoracic level and 3 cervical), one patient each with multiple sclerosis, myelomeningocele, and cerebral palsy. For patients with SCI, mean time from injury to surgical intervention was 10.5 years (range 1-21 years). Age at the time of surgery ranged from 24 to 57 years-old (mean 38 years-old). Mean DLLP in the supine position was 8.5 mmH20 (range 2 to 20); mean DLLP in the sitting position was 11.6 mmH20 (range 5-28). Mean change in DLPP from supine to sitting was 3.1 mm H20 (ranging from 1 to 12).

Conclusion: Ileovesicostomy is a safe option for management of the NGB in a selected patient population. Small and clinically insignificant change in DLPP was documented in all ten patients. We demonstrated that detrusor pressure remains low within ileovesicostomy while in the sitting position.
Introduction and Objectives: The National Spinal Cord Injury Statistical Center (NSCISC) has been collecting information prospectively on individuals who sustain a traumatic spinal cord injury (SCI) in centers throughout the United States since 1973. This data provides an opportunity to study the long term management of the neurogenic bladder in SCI. 

Methods: Bladder management method was determined for all patients registered in the NSCISC who had follow up information available. Data was collected at the time of discharge from the inpatient rehabilitation unit and every five years thereafter.

Results: In total there were 12,984 individuals with 33,352 follow up observations. Over time, there was a significant drop in the usage of clean intermittent catheterization (CIC), particularly in the first five years after injury. Condom catheter usage initially increased during follow up, but decreased over time. Indwelling catheter (IC) use rose steadily from 23.2% to 45.1% over thirty years whereas the rate of spontaneous voiding remained stable between 12.8 and 18.4%. The rate of urinary diversion showed a slow rise over time from 0.02 to 2.6%. Within each 5-year time period, those with an IC were more likely to be Caucasian, live in a nursing home or hospital, have a higher anatomic level of injury, be injured at an earlier date and be functionally tetraplegic compared to those who perform CIC. Only in the first five years were older persons were more likely to be managed with IC. When looking at original bladder management choice at discharge from rehabilitation longitudinally only 20% of those originally assigned to CIC and 34.6% of those assigned condom catheters remained on the same method over thirty years, whereas 71.1% of those assigned IC remained on this method.

Conclusion: Few people who originally used CIC or condom catheter as a bladder management method remain on this method over time. These methods have been shown to be the safest and are the primary methods recommended by current guidelines. Patients may need more support from their medical provider to remain on these methods of management.

Funding: NIDRR #H133N060032
Introduction and Objectives: There is much debate about the ideal bladder management after spinal cord injury (SCI). For over thirty years, the National Spinal Cord Injury Statistical Center has been collecting data on medical complications prospectively on individuals who sustain a traumatic SCI in centers throughout the United States.

Methods: Cross-sectional analyses of each five year data collection was performed on all individuals who managed their bladder with an indwelling catheter (IC), normal voiding, condom catheter (CC), or clean intermittent catheterization (CIC). Those who used other management methods were excluded (n=899) as were those who had only minimal neurological deficits (n=626). Associations of the medical complications with bladder management were adjusted for age at injury, site, residence, level of education, marital status and level and completeness of neurologic injury.

Results: There were 23,237 individuals included in the analysis with 81.1% males. For bladder management 18.5% were voiding, 23.8% used IC, 12.7% CC and 45.0% CIC at discharge from rehabilitation. In all five year time periods the need for surgery for stone removal, bladder neck resection, and surgical ulcer closure were not statistically different among management groups. In all time periods except at the year 25 collection there were a significantly greater mean number of pressure ulcers in the IC group compared to all other managements. The odds of having an ulcer was significantly less in all groups compared to IC. Mean ulcer grade was also significantly higher in the IC group at each collection period except year 25. Odds of getting a stone were greater for IC compared to voiding in years 1, 5, 10, 15 and 30. Use of IC was associated with a significantly longer length of hospital stay during a hospitalization for any cause at all time points except years 15 and 25 even after adjusting for ulcers.

Conclusion: Management with an IC is associated with more pressure ulcers, worse ulcer grade and longer hospital stays when compared to all other bladder management methods over thirty years. This information should be considered when making bladder management decisions in this population.

Funding: NIDRR #H133N060032
Podium #16

UROLOGIC MANAGEMENT OF ADULT PATIENTS WITH NEUROGENIC BLADDER AND MYELOMENINGOCELE
Polina Reyblat, MD, Donald Hannoun, MD and David Ginsberg, MD
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(Presented by: Polina Reyblat)

Introduction and Objectives: The overwhelming majority of literature evaluating the management of neurogenic bladder (NGB) in the myelomeningocele (MMC) patient population focuses on pediatric patients. As care of these patients have improved over the years, and life expectancy has increased, this has now become a disease of adult patients as well. We sought to evaluate bladder management in these patients.

Methods: We retrospectively reviewed the medical records of patients with diagnosis of MMC currently followed at our institution.

Results: We identified 88 patients that are followed on an annual basis in the urology clinic (43 females, 45 males, mean age of 38, ranging 20 to 69 years). 59 patients (67%) manage their bladder with clean intermittent catheterization (CIC), nine (10%) patients void volitionally, seven (9%) patients have indwelling catheters, six (7%) patients have an urostomy, four patients use diapers only and three patients void into condom catheter. CIC is performed by 59 patients. 22 of these patients underwent bladder augmentation alone and 19 patients underwent augmentation with continent urinary stoma formation. Five patients had an artificial urinary sphincter placed. The remaining 13 patients on CIC have not had any previous bladder surgery. Six patients also had nephrectomy performed for various causes. Mean creatinine of all 88 patients is 0.73mg/dL, ranging from 0.2 to 3.8, with seven patients with creatinine > 1.1mg/dL. Looking specifically at the bladder augmentation group (22 patients): mean creatinine was 0.8 mg/dL (range 0.4 -2.7), seven stones have been identified and treated (five pouch and two kidney) and two patients required subsequent conversion to continent stoma or ileovesicostomy. Looking specifically at the group with continent stomas (19 patients): mean creatinine was 0.76 mg/dL (0.24 -3.8), seven stones have been identified and treated and four patients have required stomal revision. The mean creatinine was 0.6 (range 0.3 -1.0) in the 13 patients on CIC only with no prior reconstructive surgery. Socioeconomic status of these patients was also evaluated and we are completing assessment of their potency and fertility.

Conclusion: Management of NGB in patients with MMC is clearly a major issue for the adult urologist. A multitude of options is available depending on the patient’s functional status and motivation. Current literature lacks data on bladder management of adults with NGB secondary to MMC.

Podium #17

PREDICTING RESPONSE TO DOXAZOSIN IN PATIENTS WITH VOIDING DYSFUNCTION AND PARKINSON DISEASE: IMPACT OF THE NEUROLOGICAL IMPAIRMENT
Cristiano Gomes, MD, Zein Sammour, MD, Bessa Jr. Jose, MD, Barbosa Egberto, MD, Lopes Roberto, MD, Sallem Flavio, MD, Trigo-Rocha Flavio, MD, Pinheiro Marcelo, MD, Bruscin Homero, MD and Srougi Miguel, MD
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(Presented by: Cristiano Gomes)

Introduction and Objectives: Lower urinary tract symptoms (LUTS) are common in patients with Parkinson’s disease (PD). Despite the widespread use of alpha-blockers for treating these patients, we are not aware of studies reporting on their results. Herein, we report our experience with the treatment of PD patients with voiding dysfunction using doxazosin.
Methods: In a prospective study, 33 consecutive men with PD and a mean age of 59.2 ± 7.0 years, who were bothered by their voiding symptoms were evaluated. Neurological dysfunction was assessed with the Unified PD Rating Scale (UPDRS). Urological assessment was performed at baseline and after 8 weeks of treatment with 4 mg/day of extended release doxazosin, including symptomatic evaluation with the International Continence Society male short-form questionnaire (ICSmsfQ), assessment of the impact of LUTS on the quality of life using the specific item of the validated ICSmaleSF questionnaire and pressure-flow urodynamics.

Results: The neurological evaluation demonstrated a mean UPDRS score of 70.6 ± 20.7 (range 19 to 137). Compared with baseline, the total ICSmsfQ score was substantially reduced from 17.4 ± 7.5 to 11.2 ± 6.9 (p < 0.001), with a median ICSmsfQ reduction of 6 points. A negative association between neurological impairment and response to doxazosin treatment was observed, with patients with UPDRS < 70 having a 2.91 higher chance of presenting a reduction of the ICSmsfQ score of greater than 7 points, in comparison to those with a UPDRS > 70 (p<0.001; 95% CI: 1.02-8.27). The impact of LUTS on the quality of life was significantly reduced from a median of 2.0 (range 0 to 3) to 1.0 (range 0 to 3) (p< 0.001). Maximum urinary flow improved from 9.4 ± 4.4 ml/s to 11.2 ± 4.6 ml/s (p = 0.025). No changes were observed in other urodynamic parameters including prevalence of detrusor overactivity (varied from 48.4% to 42.4%; p = 0.805) and detrusor pressure at maximum flow (varied from 62.9 ± 30.3 to 57.6 ± 14.5 ml; p = 0.368).

Conclusion: Eight weeks’ therapy with 4 mg/day of extended release doxazosin resulted in improvement of voiding symptoms and maximum flow rate of most patients with Parkinson’s disease. Improvement of voiding dysfunction is dependent on the severity of neurological disability which influences negatively the response to treatment.

Podium #18

PRESENTATION AND MANAGEMENT OF IATROGENIC FOREIGN BODIES OF THE LOWER URINARY TRACT FOLLOWING PELVIC SURGERY

Priya Padmanabhan, MD, MPH¹, Ryan Hutchinson, BS², W. Stuart Reynolds, MD¹, Shady Salen, MD¹, Harriette Scarpero, MD¹ and Roger Dmochowski, MD¹
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Introduction and Objectives: The surgical use of mesh technologies for pelvic surgery may increase the risk of mesh complications. These complications present challenges for identification and treatment. We review presentation, management and outcomes for a series of iatrogenic foreign bodies of the female lower urinary tract.

Methods: Retrospective review of 85 patients with mesh complications following pelvic surgery between 11/2000 and 9/2009 were evaluated for demographics, presenting symptoms, prior procedures, type of foreign body, technique and outcomes.

Results: Mean patient age was 55.1 years (22.2 - 89.8). 85 patients (48 extrusions, 40 erosions, 3 both) were treated. 42 (49.4%) had prior pelvic surgery prior to source procedure. Table 1 contains presentation, management and outcomes. Symptoms improved with excision in all extrusions, except 1 (0.45%) re-excision for persistent vaginal pain, 2 delayed re-excisions and 1 (0.9%) with persistent obturator pain requiring orthopedic exposure and mesh removal. 3 (6.3%) extrusion patients developed de novo urgency, while 5 (10.4%) had resolution of mixed urinary incontinence (MUI). Location of the foreign body erosion was urethra in 12 (30%), and bladder in 31 (77.5%). All except 2 erosions, were evident cystoscopically. 3 patients (7.5%) had a secondary procedure (2 partial cystectomy, 1 abdominal fistula repair), with 1 (2.5%) requiring a third procedure (complex urethroplasty). 2 patients (5%) developed de novo urgency, while 7 (17.5%) had resolution of MUI. 3 (2 pubovaginal sling, 1 bulking agent) patients with stress urinary incontinence (SUI) underwent anti-incontinence therapy.
**Conclusion:** This is the largest series to date of iatrogenic foreign body erosions of the bladder and urethra. While this complex population had multiple prior repairs, the low reoperation rate and dramatic symptom regression supports our management of non-endoscopic vesical repair and interpositional grafting for complex urethrovaginal fistulas.

![Table 1: Prevalence, Management and Outcomes of Extrusions and Erosions](image)

**Podium #19**

**FEMALE PELVIC ANATOMY TRAINING MODULE FOR UROLOGY RESIDENTS**

Benjamin Brucker, MD, William Jaffe, MD and Ariana Smith, MD
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(Submitted by: Benjamin Brucker)

**Introduction and Objectives:** We sought to establish an educational module on surgically relevant female pelvic anatomy that would ensure a fundamental core of knowledge necessary to diagnose and treat pelvic floor dysfunction in women.

**Methods:** A formal learning module was developed with a focus on surgically relevant female pelvic anatomy including the urethra, bladder, uterus, vagina, rectum and perineum and their supporting structures. Fourteen residents, from a single urology training program, completed a multiple choice pretest prior to participation in the learning module. The participant’s level of training, gender, and desire to pursue a female urology fellowship were gathered. Residents were queried about anticipated future operative plans to perform pelvic organ prolapse (POP) repairs and anti-incontinence procedures (using a 1-5 scale). A self-assessment of current operative experience was gathered. The participants attended the didactic conference and were retested 1 week later. Eleven residents completed all portions of the assessment. Paired Student’s t-test was used to compare the test results.

**Results:** The participants’ level of training varied from first to fourth year urology residents. The self-reported operative assessment showed the total number of POP repairs and anti-incontinence surgeries did correlate with year of training (r=0.61). Residents had been actively involved in an average of 2.3 POP repairs and 5.6 anti-incontinence procedures. After completing residency, the residents felt that would be most likely to perform anti-incontinence surgery, less certain about performing POP repairs, and very unlikely to perform transvaginal hysterectomy (3.5, 3.0 & 1.1 respectively). The average pretest and posttest knowledge assessment scores were 4.1 and 5.6, respectively. This improvement was statistically significant (p= 0.027).

**Conclusion:** Implementation of a formal training module on female pelvic anatomy lead to a statistically significant improvement in knowledge. Key concepts in female pelvic anatomy were effectively taught with a single focused conference. Without additional training, residents report they are unlikely to perform POP surgery. This study is of a limited size, but we hope to expand the scope and gather more data regarding comfort with and knowledge about basic female urologic surgeries. A larger data set will be important to aid in planning for future training needs and requirements in urology residencies programs.
**PREOPERATIVE SYMPTOM OF HESITATING URINARY STREAM IS ASSOCIATED WITH SURGICAL FAILURE AND POSTOPERATIVE VOIDING DYSFUNCTION FOLLOWING BURCH COLPOSUSPENSION OR PUBOVAGINAL RECTUS FASCIAL SLING SURGERY**

Tatiana Sanses, MD¹, Linda Brubaker, MD², Stephen Kraus, MD³, Jerry Lowder, MD⁴, Gary Lemack, MD⁵, Peggy Norton, MD⁶, Sharon Tennstedt, PhD⁷, Yan Xu, PhD⁷ and Toby Chai, MD¹

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(Presented by: Toby Chai)

**Introduction and Objectives:** To assess whether pre-operative voiding symptoms correlated with post-operative voiding dysfunction (VD) or surgical failure in women who underwent Burch colposuspension or autologous fascial sling in the Stress Incontinence Surgical Treatment Efficacy Trial.

**Methods:** Urogenital Distress Inventory (UDI) and subjects’ categorical responses (yes or no) to physical accommodations in voiding and to characteristics of urinary stream were collected preoperatively (see Table) along with urodynamic data. The definitions of overall surgical, stress-specific failures and VD (any catheter use after 6 weeks) were previously published. Logistic regression models associating symptoms with outcomes, controlling for treatment group, site and degree of pelvic organ prolapse, were used.

**Results:** Percentages of subjects who answered “yes” for each of the preoperative voiding symptoms are shown in the Table. Hesitating urinary stream was the only symptom associated with post-operative VD [OR 2.40 (95% CI 1.31-4.75, p=0.006)], overall [OR 1.55 (95% CI 1.02-2.35, p=0.04)], and stress-specific [OR 1.58 (95% CI 1.07-2.34, p=0.02)] treatment failures. Despite no significant association between pre-operative UDI-obstructive subscore and post-operative VD, an increase of 10 points on the pre-operative UDI-obstructive subscore was associated with overall [OR 1.10 (95% CI 1.00-1.20, p=0.049) and stress-specific [OR 1.21 (95% CI 1.10-1.32, p<0.0001)] treatment failures. Subjects with hesitating urinary stream had lower mean Qmax on non-instrumented uroflow (23.6 ± 10.7 vs. 26.4 ± 11.3 cc/sec, p=0.004) and higher mean Pdet at Qmax on pressure flow study (21.7 ± 12.9 vs. 17.7 ± 12.1 cm water, p=0.003), but no significant difference in mean post-void residual volume when compared to subjects without this symptom.

**Conclusion:** Preoperative symptom of hesitating urinary stream was associated with poorer outcomes. The prevalence of this complaint at 33% may make it more useful as a predictor than a common complaint (i.e. dribbling at 78%) or an uncommon complaint (i.e. pushing to urinate at 6%). Further studies into association of hesitating urinary stream and postoperative outcomes may be fruitful.

<table>
<thead>
<tr>
<th>Preoperative voiding symptoms</th>
<th>No. Who Answered “Yes”</th>
<th>% (n=651)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dribbling Stream</td>
<td>504</td>
<td>77.4</td>
</tr>
<tr>
<td>Hesitating Stream</td>
<td>214</td>
<td>32.9</td>
</tr>
<tr>
<td>Spurting Stream</td>
<td>208</td>
<td>32.0</td>
</tr>
<tr>
<td>Slow Stream</td>
<td>207</td>
<td>31.6</td>
</tr>
<tr>
<td>Bending to Urinate</td>
<td>179</td>
<td>27.5</td>
</tr>
<tr>
<td>Straining to Urinate</td>
<td>107</td>
<td>16.4</td>
</tr>
<tr>
<td>Steady Stream (No)</td>
<td>106</td>
<td>16.3</td>
</tr>
<tr>
<td>Pressing to Urinate</td>
<td>81</td>
<td>12.4</td>
</tr>
<tr>
<td>Leaning to Urinate</td>
<td>54</td>
<td>8.3</td>
</tr>
<tr>
<td>Other descriptions of Stream</td>
<td>49</td>
<td>7.5</td>
</tr>
<tr>
<td>Pushing to Urinate</td>
<td>41</td>
<td>6.3</td>
</tr>
<tr>
<td>Doing something else to Urinate</td>
<td>29</td>
<td>4.5</td>
</tr>
<tr>
<td>Standing to Urinate</td>
<td>22</td>
<td>3.4</td>
</tr>
</tbody>
</table>
IN VIVO MEASUREMENT OF THE ANTERIOR VAGINAL WALL BIOMECHANICAL PROPERTIES IN PROLAPSE PATIENTS UNDERGOING SURGICAL REPAIR
Elizabeth Mosier¹, Rachel Jerome², Charlie Chuong, PhD³, Robert Eberhart, PhD⁴ and Philippe Zimmern, MD²
¹UT Southwestern Medical Center, Dallas, TX; ²UT Southwestern Medical Center, Dallas, TX; ³UT Arlington, Arlington, Texas; ⁴UT Southwestern Medical Center, Dallas, TX
(Presented by: Philippe Zimmern)

Introduction and Objectives: Direct assessment of human vaginal wall biomechanical properties could offer a new approach to prolapse treatment and prevention. We tested a non-invasive device (Cutometer), already used in plastic surgery to measure skin elasticity, for intra- (IaR) and inter-tester (IrR) reliability in vaginal measurements.

Methods: Following IRB approval, women aged 35-85 with symptomatic grade 2-3 anterior vaginal wall prolapse requiring surgical repair were consented. Under anesthesia, the Cutometer (BTC-2000, SRLI Technologies) measured tissue deflection within a 10 mm orifice when the maximum suction reached 150 mmHg. Measurements were made in duplicate by the primary surgeon and a separate tester, at the suprapubic midline region, and then over the anterior vaginal wall below the bladder neck area, with the bladder empty and then filled to 300 ml. Laxity (mm%), Elastic Deformation (mm), Modulus (MPa), Energy Absorption (KPa), and Elasticity (mm%) were extracted from the pressure-deflection-time data. Intra-class correlation coefficient (ICC) was calculated to determine IaR and IrR using PASW Statistics Base 17.0 for Windows®.

Results: 24 consecutive patients, the majority being Caucasian (88%) with a mean age (58 ± 17), BMI (26 ± 5) and parity (2 ± 1) were studied. Tissue stiffness, determined by the elastic modulus, and deformation length, were not statistically different at the two bladder volumes. According to ICC, first and second data collections for IaR and IrR were not statistically different (IaR data shown in Table), meaning there was solid reliability in the measurements.

Conclusion: This is the first study to establish the reliability of Cutometer measurements in human vaginal wall prolapse tissues, a necessary step before considering its use in the clinical setting.

URETHRAL FUNCTION OF WOMEN WITH DETRUSOR OVERACTIVITY IS INTERMEDIATE THAT OF CONTINENT AND STRESS INCONTINENT WOMEN
Kimberly Kenton, MD, MS¹, Elizabeth Mueller, MD, MS¹, Lior Lowenstein, MD² and Linda Brubaker, MD, MS¹
¹Loyola University Medical Center, Maywood, IL; ²Rambam Medical Center, Haifa, Israel
(Presented by: Kimberly Kenton)
**Introduction and Objectives:** Urethral function is thought to play a role in overactive bladder (OAB) and stress urinary incontinence (SUI). Chaliha found that urethral pressure increased during filling cystometry in women with SUI, but not those with detrusor overactivity (DO), suggesting that impaired urethral function may be associated with OAB.

**Objective:** We aimed to describe the relationships between urodynamic measures of urethral sphincter function in continent and incontinent women.

**Methods:** We recruited continent women and incontinent women with symptoms of SUI or OAB to undergo standardized urodynamic testing (UDS). UDS were done using a 6 channel Laborie Dorado and microtip catheters with participants reclined at 45º. Urethral sphincter function was assessed using urethral profilometry (UPP). Two serial UPP measurements were done using an 8 French dual microtip catheter with the transducer oriented laterally facing 9 O'clock. UPP were averaged. Urodynamic methods, definitions, and units will conform to the International Continence Society standards. All participants completed demographic information and the Medical, Epidemiologic, and Social Aspects of Aging (MESA) questionnaire with stress and urge subscales.

**Results:** 86 women enrolled and underwent UDS: 30 - continent, 31 - USI, 8 - mixed urinary incontinence (MUI [USI + DOI]), 17 - DOI. Table 1 shows demographic, MESA, and urethral function parameters for the 4 groups. Continent women were significantly younger than incontinent women regardless of incontinence subtype. MESA urge scores were higher in women with DOI, while MESA stress scores were higher in women with USI. Maximum urethral closure pressures and the area of the continent zone (area under the UPP) were significantly higher in continent than SUI women, while women with DOI and mixed urinary incontinence had MUCP and continent zones which tended to be between those of continent and SUI women.

**Conclusion:** Urethral sphincter function in women with DOI and MUI tends to be intermediate between those of continent and stress incontinent women. These data suggest that DOI in some women may be a failure of urethral sphincteric function and that DOI and SUI may represent a continuum of urinary incontinence.

<table>
<thead>
<tr>
<th></th>
<th>USI N=31</th>
<th>USI + DOI N=9</th>
<th>DOI N=17</th>
<th>Continent N=30</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>48 (9)</td>
<td>51 (12)</td>
<td>63 (14)</td>
<td>39 (15)</td>
<td>&lt;.0005</td>
</tr>
<tr>
<td><strong>Body Mass Index</strong></td>
<td>28 (7)</td>
<td>32 (10.4)</td>
<td>35 (6.3)</td>
<td>296 (8.8)</td>
<td>0.05</td>
</tr>
<tr>
<td><strong>UPP Length (mm)</strong></td>
<td>25.3 (5.7)</td>
<td>25.6 (9.4)</td>
<td>36.5 (15.6)</td>
<td>34.5 (7.4)</td>
<td>&lt;.0005</td>
</tr>
<tr>
<td><strong>MUCP</strong></td>
<td>52 (24)</td>
<td>60 (2.2)</td>
<td>60 (30)</td>
<td>98 (38)</td>
<td>&lt;.0005</td>
</tr>
<tr>
<td><strong>Area of Contience Zone</strong></td>
<td>443 (282)</td>
<td>573 (512)</td>
<td>627 (407)</td>
<td>969 (524)</td>
<td>&lt;.0005</td>
</tr>
<tr>
<td><strong>MESA Urge Score</strong></td>
<td>39.9 (22.7)</td>
<td>45.6 (31.4)</td>
<td>61.5 (26)</td>
<td>4.4 (9.7)</td>
<td>&lt;.0005</td>
</tr>
<tr>
<td><strong>MESA Stress Score</strong></td>
<td>73.3 (16.9)</td>
<td>54.1 (17)</td>
<td>45 (23.9)</td>
<td>8.3 (17)</td>
<td>&lt;.0005</td>
</tr>
</tbody>
</table>

* ANOVA

Podium #23

**SALVAGE SPIRAL SLING TECHNIQUES: ALTERNATIVES FOR THE MANAGEMENT OF DISABLING RECURRENT URINARY INCONTINENCE IN FEMALES**

Alejandro Rodriguez, MD, Raul Ordorica, MD, Mitchell Hoffman, MD and Jorge Lockhart, MD University of South Florida, Tampa, FL

(Presented by: Raul Ordorica)

**Introduction and Objectives:** Females with recurrent stress urinary incontinence (SUI) following anti-incontinence surgery represent a therapeutic challenge. In our experience and that of others, standard sling procedures have failed to consistently correct these problems. We are presenting a variety of spiral sling techniques that were used in these situations.
Methods: Between January 2007 and July 2008, 29 female patients with persistent SUI following multiple failed anti-incontinence procedures (between 3 and 7 failures; average 4.5) were treated with a spiral sling. Slings were then wrapped around the urethra to provide 360 degrees of compression prior to securing without tension. 21 had a synthetic spiral sling (SSS), five had an autologous spiral sling (AUSS), and three underwent a lateral spiral sling (LSS). Patients were followed with questionnaires, number of pads, and Stamey score.

Results: Twenty-eight patients were followed for a minimum of 12 months (12-18 months). Mean age was 60 years (36-84 years). At presentation, the mean number of prior vaginal procedures and pads used was 3.5 (1-6) and 7 (3-12), respectively. Mean daily pad use decreased to 1 (0-2) (p<0.05). Postoperative mean Stamey score decreased from 2.6 to 0.3 (p<0.05). Complications included three unilateral vesical perforations, in which the contralateral LSS was used. Overall success rate was 72%.

Conclusion: Salvage spiral sling techniques represent a satisfactory alternative for the treatment of refractory urinary incontinence. When synthetic material cannot be used, autologous tissue can provide similar results. When the bladder is unilaterally perforated an LSS can be used on the contralateral side.

Podium #24

WORSE SURGICAL OUTCOMES FOR PATIENTS OVER 70 UNDERGOING A RETROPUBIC MID-URETHRAL POLYPROPYLENE SLING
Jason Kim, MD, Alvaro Lucioni, MD, Fred Govier, MD and Kathleen Kobashi, MD
Virginia Mason Medical Center, Seattle, WA
(Presented by: Jason Kim)

Introduction and Objectives: 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 sought to determine whether outcomes would differ in an older cohort of patients when compared to younger patients.

Methods: A retrospective review of prospectively collected data was performed to determine surgical outcomes for all patients undergoing MUS between October 2001 and August 2008. Each patient was mailed post-operative questionnaires to assess outcomes. We compared the results from patients aged 70 and older to patients younger than 70. 43/283 (14.8%) patients were older than 70. Surgical outcomes assessed included post-operative SUI, patient satisfaction and perceived improvement.

Results: From October 2001 to August 2008, we performed 337 MUS, of which 283 (83.9%) had answered post-operative questionnaires. We only selected the 229 patients who had at least one year follow-up. Age was significantly different (p<0.001) between the older and younger cohort with an average of 75.5 and 54.2, respectively. Average follow-up was 43.9 and 44.9 months between the older and younger cohort, respectively, and not significantly different. Significant differences in surgical outcomes were found between the older and younger cohort when assessing for degree of post-operative SUI, satisfaction, and improvement (table 1) with superior results seen in the younger patients. Assessment of pre-operative variables showed significant differences in normal spontaneous vaginal delivery, valsalva leak point pressure, BMI, and hysterectomy status. Presence of cystocele/rectocele, and smoking status were not significantly different between the 2 groups. Complication rates in the 2 groups were not significantly different.

Conclusion: In our case series, we have clearly shown less successful outcomes for patients older than 70 undergoing MUS. Differences in number of vaginal deliveries, hysterectomy status, VLPP, and BMI may play a role in these outcomes. The results suggest that older patients should be counseled that success rates may be lower than those of younger patients.
Podium #25

MANAGEMENT OF POLYPROPYLENE MESH COMPLICATIONS (VAGINAL WALL EXTRUSION AND URINARY TRACT EROSION) AFTER SURGERY FOR STRESS URINARY INCONTINENCE AND PELVIC ORGAN PROLAPSE

Joseph Dall'Era, MD, Ryan Terlecki, MD and Brian Flynn, MD
Aurora, CO
(Presented by: Joseph Dall'Era)

Introduction and Objectives: Polypropylene mesh is used commonly in the surgical management of female stress urinary incontinence (SUI) and pelvic organ prolapse (POP). Extrusion of mesh into the vagina or erosion into the urinary tract can result in severe complications often necessitating partial mesh removal and reconstruction. We present our treatment algorithm and discuss our series of patients undergoing urologic reconstruction for mesh complications.

Methods: A prospectively maintained database of all surgical cases of pelvic reconstruction following a mesh complication from 2003 to 2009 was analyzed. Treatment was based upon our algorithm for the management of mesh complications. Based on this algorithm, patients were classified as having either “simple” or “complex” graft complication, and treated accordingly. Demographic, historical, and operative parameters were evaluated and surgical outcome recorded.

Results: A total of 68 patients were treated for complications resulting from anti-incontinence or POP reconstructive procedures. Fifty-two of these patients were treated for mesh erosion or extrusion with a mean follow-up of 12 months. Mean age was 54.8 years. Mesh complications involved the vagina (n=42), bladder (n=4), urethra (n=2), urethra/vagina (n=2), and bladder/vagina (n=2). Twenty-four of 52 patients (46%) were initially managed as “simple” graft complications, of which 7 (29%) later progressed to operative treatment for “complex” graft complications. Twenty-eight of the 52 patients (54%) were initially managed as “complex” graft complications. The mean hospital stay in the complex group was 1.4 days. Twenty-seven of 52 patients (52%) were using at least one pad per day preoperatively for urinary incontinence. Postoperatively, of the 48 patients with data regarding pad usage, 31 (65%) reported using no pads. No patients in the complex group had recurrence of mesh extrusion/erosion at that time of last follow-up.

Conclusions: The management of vaginal or urinary tract mesh complications may require aggressive surgical treatment depending on the severity of the graft complication. Our algorithm may help triage patients to simple excision versus a near total mesh explantation. The success of this algorithm is evidenced by successful resolution of mesh extrusion/erosion while avoiding the need for further surgery to restore continence and pelvic floor support.

Podium #26

ONE YEAR FOLLOW-UP DATA ON THE MINIARCT™ SINGLE INCISION SLING SYSTEM FOR THE TREATMENT OF STRESS URINARY INCONTINENCE

Ryan Pickens, MD, Frederick Klein, MD, Joe Mobley, III, MD, MPH and Wesley White, MD
UTMCK
(Presented by: Ryan Pickens)

Introduction and Objectives: We present longitudinal surgical and quality of life outcomes in an observational cohort of patients that underwent treatment of stress urinary incontinence (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 one year 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 one year. We used our FSFI to determine how the procedure affected their sexual activity. Statistical analysis was performed.

Results: From September 2007 to June 2008, a total of 80 patients underwent placement of the MiniArc™ Single Incision Sling System at our institution for stress urinary incontinence. Seventy patients (88%) completed follow-up. Mean patient age was 57.5 years (range 26-87). Twenty-seven patients (33%) 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 17.5 months, 62 of the 70 responders (89%) denied having any symptoms of SUI, 7% reported occasional leakage and 4% 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 0.4 (p<0.005) and 0.5 (p<0.005) respectively at one year. Twenty-five (36%) patients reported urge incontinence on a daily basis. Average quality of life scores went from 4.2 pre-operatively to 8.8 at one year follow-up. Based on FSFI results, 49% of our patients never have discomfort with intercourse, 9% sometimes have discomfort and 2% always have discomfort. Forty percent of our patients are currently sexually inactive.

Conclusion: Based on our experience, treatment outcomes with the MiniArc™ Single Incision Sling System are durable at one year. Quality of life is significantly improved with minimal impact on sexual function.

Podium #27

NEW EFFICACY DATA ON PERCUTANEOUS TIBIAL NERVE STIMULATION: A MULTI-CENTER, RANDOMIZED, SHAM-CONTROLLED TRIAL FOR OVERACTIVE BLADDER SYNDROME

Kenneth M. Peters, MD¹, Donna J. Carrico, NP, MS¹, Ramon Perez-Marrero, MD², Ansar U. Khan, MD³, Leslie S. Wooldridge, MSN, RNCS, GNP⁴, Gregory L. Davis, MD⁵ and Scott A. MacDiarmid, MD⁶

¹Beaumont, Royal Oak, MI; ²Advanced Research Institute, Trinity, FL; ³Urology Health Center, Fremont, NE; ⁴Mercy Health Partners, Muskegon, MI; ⁵Gregory Davis MD FACOG, Inc. Chico, CA; ⁶Alliance Urology Specialists, Greensboro, NC

(Presented by: Kenneth M. Peters)

Introduction and Objectives: Overactive bladder (OAB) affects millions of people and is often refractory to standard therapies. Percutaneous Tibial Nerve Stimulation (PTNS) is effective, but a validated sham-controlled trial with PTNS has not previously been reported. The objective of this study was to compare the efficacy of PTNS to a validated sham in subjects with OAB syndrome.

Methods: This multi-center, double-blinded, IRB-approved trial enrolled 220 subjects; 110 randomized to PTNS, and 110 randomized to a validated sham intervention. Subjects and study coordinators were blinded to the intervention. Voiding diaries and validated questionnaires were completed at baseline and after 6 and 12 interventions. PTNS stimulation was delivered through a 34-gauge needle electrode inserted near the posterior tibial nerve using the Urgent PC device for 12 weekly 30-minute sessions. A surface electrode and 2 sham electrode pads were placed for consistency with the sham. The sham used a Streitberger placebo needle that provided the sensation of a needle, but did not pierce the skin as it retracted into its shaft. Also, TENS electrode pads were placed above and below the small toe providing the sensation of stimulation without tibial nerve activation. An inactive surface electrode was placed as in PTNS. The audible PTNS device sounds were also reproduced in the sham intervention to diminish auditory variation between groups. The primary endpoint was an intent-to-treat analysis of the subjects’ 7-point Global Response Assessment (GRA).
Results: The GRA found 54.5% were responders (moderately or markedly improved) in the PTNS group compared to 20.9% in the sham group (p<0.001). The PTNS group had statistically significant improvement for urinary urgency, frequency, and urge incontinence on the GRA compared to sham group (p<0.02). The OAB-q symptom severity score and quality of life scores showed statistically significant improvement in the PTNS group compared to the sham group (p<0.01). 52.4% of PTNS and 58.1% of sham subjects correctly guessed their intervention confirming an adequate sham. No serious adverse effects were noted.

Conclusion: This study provides Level I evidence that the therapeutic effect of PTNS is not due to a placebo effect but rather to stimulation of the tibial nerve with significant improvement in OAB symptoms. PTNS is effective, lacks major side effects and may be considered a primary treatment for OAB symptoms.

Funding: Uroplasty, Inc.

Podium #28

PERCUTANEOUS TIBIAL NERVE STIMULATION (PTNS), PELVIC FLOOR REHABILITATION (PFR) AND ELECTRICAL STIMULATION (ES) IN THE TREATMENT OF URINARY INCONTINENCE
Earl Surwit, MD¹ and Rosa Garcia, BSN, NP²
¹University of AZ, Tucson, AZ; ²University of Phoenix, Phoenix, AZ
(Presented by: Earl Surwit)

Introduction and Objectives: The objective of this study was to investigate the synergistic effect of combining PTNS with PFR and ES in the treatment of urinary incontinence (urinary urge, stress, and mixed incontinence). PTNS, PFR, and ES, all quiet the bladder, and strengthen the pelvic floor musculature. PTNS also increases bladder capacity. PTNS has a 70% to 92% response rate in urge incontinence, and a 40% to 46% cure (dry) rate. PFR has a 42% to 60% cure/improvement rate, while ES has a 32% cure/improvement rate.

Methods: 918 patients with urinary incontinence, 292 patients with urge incontinence, 287 patients with stress incontinence, and 339 patients with mixed incontinence were included in this investigation. All patients were treated twice per week with PFR, biofeedback, and ES. In stress incontinence, patients were treated with 8-100 Hz vaginal probes. Urge incontinence and mixed incontinence patients received 8-100 Hz ES and 8-10Hz ES. Immediately following the PFR (during the same clinic visit), the patients were treated with PTNS. An acupuncture needle was inserted medially and above the ankle, next to the tibial nerve. An electrode is attached to the needle and a grounding pad to the bottom of the foot. A neuromodulator is then utilized to stimulate the tibial nerve, starting at 0.25 milliamps, going up to 9 milliamps by 0.5 milliamp intervals. The duration of treatment was 30 minutes. Patients were followed-up at 3 month intervals.

Results: Patients ranged in age from 37 to 89 years, with a median age of 63. The median duration of incontinence was 3 years, with the median number of accidents per day being 2. The results in these 918 patients revealed (at 3 months) a 91% cure (dry) rate. Urinary urge incontinence (292 patients) had a 94% cure (dry) rate; stress incontinence (287 patients) had a 91% cure (dry) rate, and mixed incontinence (339 patients) with a 91% cure (dry) rate. The median follow-up is 25 months. 8 patients have relapsed, and were rendered dry again with coaching on exercises and diet. Only one patient required additional treatment. There were no complications.

Conclusion: The combination of PFR, biofeedback, ES, and PTNS demonstrates unique synergism in the treatment of urinary incontinence. The cure (dry) rate of 91% is the best reported to date for a non-surgical treatment. The combined therapy is far superior to any single therapy. The treatment is safe and well tolerated. Confirmatory trials are needed.
Podium #29

SURGICAL INTERVENTION FOLLOWING INTERSTIM® SACRAL NEUROMODULATION IMPLANT FOR THE MANAGEMENT OF LOWER URINARY TRACT SYMPTOMS -14 YEARS EXPERIENCE OF ONE CENTER
Ali AL-Zahrani and Jerzy Gajewski
(Presented by: Ali AL-Zahrani)

Introduction and Objectives: Re-operation rate of the sacral neuromodulation (SNM) remains a concern. There are very few reports addressing this issue. We are reporting a 14 years experience with SNM from our center.

Methods: Retrospective review of the patients’ data was performed to assess incidence and cause of surgical re-intervention after SNM implant between 1994 and 2008 in our center.

Results: There were 96 SNM devices implanted in 88 women (91.7%) and 8 men (8.3%). Mean age at implantation was 45 years (SD ± 12.5). The indications for implantation were painful bladder syndrome/interstitial cystitis (PBS/IC) (47.9%), urge urinary incontinence (UUI) (35.4%) and idiopathic urinary retention (IUR) (16.7%). The explantation rate was 20.8% and the median time to removal was 18.5 months (SD ± 31.7). The PBS/IC had the shortest time to explantation with mean of 15 months (P= 0.02). The reasons for the explantation were poor result in 12 patients (12.5%), painful stimulation in 6 patients (6.25%) and radiation of the stimulation to the leg in 2 patients (2%). The median long term follow was 50.7 months (SD ± 38.1). The long term success rate was 87.5%, 84.8% and 73 % in the IUR, UUI and PBS/IC respectively (P=0.6). In all, 39% of the patient needed revision of the SNM implant. The revision rate was highest in IUR (56%), while in UUI it was the lowest (32%). The main reason for revision was loss of stimulation in 24 procedures (58.5%). Other reasons includes pain from the pulse generator in 7 procedures (17%), painful stimulation in 5 procedures (12.2%) and radiation of the stimulation to the leg in 5 procedures (12.2%). There was drop in the rate of revision with the introduction of the tined lead technique from 50% (lead model 3092) to 31% (lead model 3893) however, this difference was not statistically significant (P=.1). The battery was changed in 8 patients and the mean battery life was 101.8 months (SD ± 23.4).

Conclusion: The SNM is a minimal invasive procedure with a very good long-term outcome. Re-operation rate improved with advance in surgical technique and equipment.

Podium #30

SACRAL NEUROMODULATION FOR REFRACTORY OVERACTIVE BLADDER: INITIAL INSIGHT INTO EFFECTS ON FEMALE SEXUAL FUNCTION
Bradley C. Gill, BSE, Mia Swartz, MD, MS, Courtenay Moore, MD, Howard Goldman, MD, Raymond Rackley, MD and Sandip Vasavada, MD
Cleveland Clinic, Cleveland, OH
(Presented by: Bradley C. Gill)

Introduction and Objectives: Sexual function (SF) has been hypothesized to improve following sacral neuromodulation (SNM). A comprehensive description of baseline sexual and relationship characteristics in a sample of refractory overactive bladder-wet (OAB-w) patients undergoing SNM was described previously. This study investigates the changes seen in SF at the first office visit following device implantation.

Methods: Patients undergoing SNM for OAB-w were prospectively enrolled from 2008 to present. Baseline SF was determined using 2 validated questionnaires, the Sexual Health Questionnaire (SHQ) and Female Sexual Function Index (FSFI). Follow-up visits utilized the same surveys to assess changes with treatment. Results from the SHQ were used to determine relationship status, impact of incontinence on SF, sexual activity status (inactive versus active), and reasons for sexual inactivity. Patients who reported sexual inactivity due to disability, partner problems, or age were excluded from analyses due to the need for repeated measures.
Results: A total of 33 women, median age 60[Q1-Q3: 48-69] years, underwent stage 2 implantation. Of a total 31 follow-ups, 8 women, age 54[47-63] years, were sexually active and completed both baseline and follow-up surveys at 3.2[3.0-3.7] months. Results from the SHQ showed an increase from 2(25%) to 7(88%) in the number of women who were “seldom” or “never” incontinent during intercourse. Likewise, an increase from 3(38%) to 7(88%) patients felt their incontinence “seldom” or “never” restricted sexual activity. Lastly, an increase from 3(38%) to 7(88%) women felt their orgasms were the “same” or “more” intense than before, with a reduction from 5(63%) to 1(13%) noting orgasms were “less” or “much less” intense than before. FSFI results also showed improvement. Total FSFI score improved significantly from 21.9 to 24.7 (p<0.03). The arousal sub-score improved significantly from 3.7 to 4.5 (p<0.05) and satisfaction sub-score improved from 3.8 to 4.6 (p<0.04). None of the sexually inactive women became sexually active after implantation, but 2 women became inactive following implantation.

Conclusion: As evidenced by improvements on both the SHQ and FSFI, the effects of SNS on OAB-w women support the clinical hypothesis that SNS improves SF. However, this conclusion is applicable only to those who are sexually active at baseline.

Podium #31

ULTRASOUND TECHNIQUE FOR LOCATING SACRAL FORAMINA AND PLACING AN INTERSTIM PNE LEAD*
Phillip Falkner, DVM and Eric Bonde, BME, MBA
Medtronic, Minneapolis, MN
(Presented by: Phillip Falkner)

Introduction and Objectives: We evaluated the use of ultrasound for locating the S3 sacral foramina and the use of ultrasound as a guide for placing an InterStim PNE needle into the foramen.

Methods: Fresh cadavers were used for imaging and needle placement. A GE Vivid 7 ultrasound machine was used with a 7L linear probe. The probe was operated at 4-6 MHz. With the patient (cadaver) in a prone position, the S3 foramen is approached from the coccyx as follows:

1.) Transducer is positioned in a transverse position starting at the coccyx
2.) Transducer is moved cephalad while identifying key anatomical features
   a. The Coccyx
   b. The Coccygeal Cornua (lateral coccygeal protrusions pointing posterior)
   c. The Sacral Hiatus is readily identified by partial ultrasound penetration of the sacro-coccygeal ligament and parallel line from sacral hiatus floor.
   d. The Sacral Cornua (“praying nuns”) are also readily visible at the level of the sacral hiatus. Note: S4 is at this level and can be observed laterally.
   e. The cephalad border of the Sacral Hiatus is easily observed when the sacral hiatus floor signal disappears.
   f. The Third Sacral Spinous Process is found 1cm cephalad of the sacral hiatus.
   g. The S3 foramen can be found lateral of the spinous process - between the spinous process and the lateral sacral crest. An excellent marker of the foramen is the ultrasound return signal from the anterior sacral plate.
3.) The ultrasound provides a skin to sacrum depth that can be used to help locate the needle insertion site at the skin surface for a desired 60 degree needle angle.
4.) The needle shaft and surrounding tissue movement can be observed with the ultrasound as the needle targets the foramen and to confirm S3 placement.

The needle placements in the S3 foramina were also confirmed using fluoroscopy.

Results: Five cadavers were tested using this technique. In every case the S3 foramen was identified and a PNE needle placed within the foramen. The total time to locate the S3 foramen was just a few minutes and then an additional couple minutes to place the needle into the foramen.

*Not CME Accredited
Conclusion: Ultrasound imaging can be used effectively and efficiently for locating the sacral foramina. The coccygeal approach allows for a quickly learned procedure with easily recognized, step by step landmarks for reaching the S3 foramina. Ultrasound may prove to be a valuable imaging technique in placing an InterStim PNE lead for physicians wishing to limit radiation exposure.

Podium #32

LONG TERM OUTCOMES OF ARTIFICIAL URINARY SPHINCTER IN PATIENTS WITH HISTORY OF RADIATION THERAPY OR PREVIOUS URETHRAL SURGERY
Alvaro Lucioni, MD, David Rapp, MD, Jason Kim, MD and Fred Govier, MD
Virginia Mason Medical Center, Seattle, WA
(Presented by: Alvaro Lucioni)

Introduction and Objectives: The artificial urinary sphincter (AUS) has proven to be a successful treatment for men with stress urinary incontinence (SUI). However, there are limited outcomes studies evaluating the efficacy of the AUS in patients with history of radiation therapy, multiple previous AUS placements, or previously removed AUS for urethral erosion. The purpose of this study is to report our long term outcomes after undergoing AUS placement in this difficult cohort of patients.

Methods: A retrospective chart review of 110 patients undergoing placement of AUS for SUI between 1990 and 2006 was performed. Patients with history of radiation therapy, eroded AUS, or multiple previous AUS placement were selected. A questionnaire assessing urinary control and patient satisfaction were mailed to all patients. Urinary control was assessed by the presence and quality of urinary leakage as well as the type and number of pads used three months post operatively and at present. Satisfaction, ease of use and pain was also assessed on a 10 point scale at both time intervals.

Results: 60 patients responded to the questionnaire, of which 15 had previous history of radiation therapy and 8 had multiple AUS previously placed (two patients had history of both). A total of 15 AUS devices had been placed at outside institutions: two tandem cuffs, one transcorporeal cuff, and two had a combined AUS and inflatable penile prosthesis. Six patients had their AUSs removed for erosion. The average and median follow-up was 6.1 and 4 years (range 2-16 years). In this complex group of patients, 14 had a single cuff placed, 3 had transcorporeal cuffs placed, 3 had tandem cuffs, and one had a tandem cuff with one cuff being transcorporeal. Six (29%) of the patients underwent one or more revisions of cuffs placed at our institution, 2 for product malfunction, 1 for atrophy, 2 for erosion or infection, and one for urinary retention. 76% of patients reported to be overall satisfied. Pad size and # were reduced dramatically in 71% of patients. One patient had a urethral injury requiring repair and delayed AUS placement.

Conclusion: At present the AUS remains the gold standard for the treatment of stress urinary incontinence in the male patient. We report an overall satisfaction of 76% with follow-up up to 16 years in this complex group of patients. This device provides a long term, effective and safe treatment alternative even in these severely affected individuals.

Podium #33

EXCISION AND REPLACEMENT OF THE FAILED ADVANCE MALE URETHRAL SLING FOR TREATMENT OF POST-PROSTATECTOMY INCONTINENCE
Britton E. Tisdale, MD¹, Jeremy B. Tonkin, MD¹ and Kurt A. McCammon, MD²
¹GU Reconstruction Fellow, Eastern Virginia Medical School, Norfolk, VA; ²Staff Urologist, GU Reconstruction, Eastern Virginia Medical School, Norfolk, VA
(Presented by: Jeremy B. Tonkin)
Introduction and Objectives: Post-prostatectomy incontinence (PPI) is a significant morbidity associated with prostate cancer surgery. Placement of a trans-obturator urethral sling (Advance Male SlingAMS, American Medical Systems, Minneapolis, Minnesota) has shown excellent results with minimal morbidity. One issue has been management of sling failure. We address the method and results of sling excision and replacement following initial failure.

Methods: A retrospective chart review of patients undergoing excision and replacement of an AMS at our institution was performed. A standardized surgical method similar to the described original placement method was used. The center portion of sling material was dissected off the corpus spongiosum and excised prior to replacement of the sling. Several factors including time to treatment of incontinence, time to initial failure, potential reasons for failure and end outcomes were identified.

Results: A total of 12 patients who underwent sling replacement were identified, with an average age of 66.1 yrs (47-84). The average time between treatment of the malignancy and first incontinence procedure was 21.2 months (12-40). The mean time to sling replacement was 205.6 days (3-600). Six of the twelve patients identified a period of post-operative strenuous activity associated with recurrence of incontinence. Persistent incontinence in one was recognized as inappropriate anatomical positioning. 4 patients were completely dry at last follow up with no other intervention. Another patient was dry with subsequent Coaptite injection. 7 patients were socially continent (<=1 pad per day). 2 other patients had subsequent artificial urinary sphincter placement. No mesh erosions, hemmorhage or mesh infections were identified after repeat AMS.

Conclusion: While placement of an AMS to treat PPI is effective, failures do occur. Nonetheless, repeat placement of AMS after excision of the previous mesh is a viable option for patients with persistent or recurrent bothersome incontinence.

Podium #34

TIME FROM PROSTATECTOMY TO ARTIFICIAL URINARY SPHINCTER: DOES IT AFFECT OUTCOMES?

Benjamin Whittam, W. Stuart Reynolds, MD, Ian Thompson, MD, Todd Doran, PA, Melissa Kaufman, MD, PhD and Doug Milam, MD
Vanderbilt University Medical Center, Nashville, TN
(Presented by: Benjamin Whittam)

Introduction and Objectives: Treatment algorithms are continually evolving for evaluation and management of post-prostatectomy incontinence and the optimal time for prostatectomy to artificial urinary sphincter (AUS) implantation has yet to be defined. In this effort we assessed clinical outcomes after AUS implantation within different groups depending upon time elapsed from prostatectomy.

Methods: A retrospective review of the medical records for patients who had undergone AUS from January 2004 to July 2009 was performed. Patient charts who underwent prostatectomy for prostate cancer were evaluated for demographics, preoperative voiding symptoms, urodynamic parameters, prior incontinence treatments, time from prostatectomy to AUS, postoperative voiding function including results of standardized instruments, incontinence pad counts and surgical complications, then separated into 3 groups based on time from prostatectomy to AUS implantation (<24 months, 24-48 months, >48 months).

Results: 72 patients were identified that underwent placement of artificial urinary sphincter (American Medical Systems, Inc., Minnetonka, MN) from 1/2004 to 7/2009 for post-prostatectomy incontinence. All patients were post-prostatectomy with mean patient age at time of surgery of 65.9 years (range 53 –85 years). Average length of follow up after surgery was 12.13 months (range 2 –50 months). There were 23, 21, and 28 patients in the early, mid and late AUS implantation groups respectively. All patients presented with symptoms consistent with stress urinary incontinence. Average Valsalva leak point pressure (VLPP) was 51.32, 56.87, and 52.13 in each group. The mean number of pads per day utilized additionally showed a significant reduction in each group from 6.87 to 0.91, 7.71 to 0.78, and 6.58 to 0.81. However, there was no significant difference between groups. All patients self-reported improved continence. There were a total of seven explants, 3 occurred in 24-48 month group and 4 occurred in >48-month group, none in the < 24-month group.
Conclusion: This retrospective review confirmed substantial improvement in the vast majority of patients with moderate to severe post-prostatectomy incontinence with an acceptable morbidity profile. This study shows that effectiveness of AUS does not appear to be affected by time from prostatectomy to implantation and early treatment (<24 months) should be recommended for patients with severe post-prostatectomy incontinence.

Podium #35

LONG TERM RESULTS AND COMPLICATIONS OF THE UROLUME SPHINCTER PROSTHESIS
Patrick Shenot, MD and Akhil Das, MD
Thomas Jefferson University, Philadelphia, PA
(Presented by: Patrick Shenot)

Introduction and Objectives: Although the Urolume sphincter stent prosthesis has been commercially available for over ten years, there is little published literature documenting the long-term safety and efficacy of this implant. We sought to investigate the long-term efficacy and morbidity of the Urolume sphincter stent prosthesis as an alternative to external sphincterotomy for patients with neurogenic detrusor overactivity and detrusor-external sphincter dyssynergia.

Methods: Twenty eight spinal cord injured male patients (mean age=31 years, range 22 to 59) underwent placement of a Urolume sphincter stent prosthesis. The duration of follow-up ranged from 11 to 162 months with 23 patients completing at least 8 years of follow-up. Twenty two patients were followed for at least five years (mean = 9.7 years) following Urolume implantation.

Results: A statistically significant decrease in voiding pressure occurred in the patients with matched data from pre-insertion results to post-insertion values at each follow-up period. Mean voiding pressure dropped following prior to Urolume implantation from 79.0+24.6 cm H2O to 45.3 +27.8 (p<0.05). Despite initial favorable urodynamic results, 32%(7 patients) of patients ultimately required stent explantation and only 52% (12 patients) were catheter free at a mean follow-up of 9.7 years following implantation. Of patients requiring stent explantation, 71 % developed clinically significant urethral strictures. Major complications included urethral-cutaneous fistula formation in 13%(3 patients). Fistula formation was noted up to 111 months following stent implantation.

Conclusion: Although the Urolume sphincter prosthesis placement significantly lowered the voiding pressure this device is associated with a high long-term failure rate as well a significant incidence of severe and often devastating complications that may occur years following stent placement. Continued use of the Urolume stent for external sphincter dyssynergia should be considered in only carefully selected patients.

Podium #36

CREATION OF A CONTINENT URINARY CHANNEL IN ADULTS WITH NEUROGENIC BLADDER USING A SINGLE PIECE OF BOWEL: LONG-TERM RESULTS WITH THE MONTI AND CASALE (SPIRAL MONTI) PROCEDURES
Christopher Knopick, MD and Brian Flynn, MD
Denver, CO
(Presented by: Christopher Knopick)

Introduction and Objectives: We describe our technique and long-term results with creation of a continent urinary channel in adults with neurogenic bladder (NGB) using a single piece of bowel.

Methods: From 2004 to 2009, 21 adult patients with NGB underwent creation of a continent urinary channel by a single surgeon (BJF). A retrospective chart review was performed noting the indications, technique, concomitant procedures, complications, and outcomes. Continence outcome, ease of catheterization and need for further surgical interventions are reported.
Results: 21 patients (17 females & 4 males) with a mean (range) age of 45.9 (25-76) had follow-up of 21.8 (1.4-53) months. The mean BMI was 30.6 (20.1-50.2). All patients had benign bladder disease including 19(90%) with known neurologic disease and 2 (9.5%) with a contracted bladder and from radiation therapy. Creation of a continent urinary channel or ‘tube’ was performed using the classic single Monti tube in 2, double Monti tube in 6 and the Casale (Spiral Monti) in 13. The ileum was used to construct the tube in 18(86%), sigmoid colon in 2(9.5%) and from transverse colon in 1 (4.8%). The most common concomitant reconstructive procedures included ileal enterocystoplasty in 18(86%) and bladder outlet procedures in 13(62%). Mean hospital stay was 10.4(5-37) days. The stoma location was at the umbilicus in 14(67%) or at the level of the umbilicus in 7(33%). Reoperation was performed in 1(4.8%) due to GI complications, in 2(9.5%) due to bladder calculi and in 1(4.8%) due to urethral incontinence. No patient reported incontinence per stoma while 3 complain of mild SUI. Only 2(9.5%) patients are unable to perform CIC per stoma while 2(9.5%) describe catheterization as difficult.

Conclusion: The Monti and Casale (Spiral Monti) procedures are effective in creating a long continent urinary channel for catheterization in the adult population with NGB. Reoperation for incontinence per stoma or difficult catheterization is rare.

Podium #37

TRANSVAGINAL VERSUS TRANSABDOMINAL REPAIR OF VESICO-VAGINAL FISTULAS: EVOLVING EXPERIENCE AT OUR INSTITUTION
Kevin Carlson, MD, FRCSC¹ and Laura Chang-Kit, MD²
¹University of Calgary, Calgary, AB, Canada; ²University of British Columbia, Vancouver, BC, Canada
(Presented by: Kevin Carlson)

Introduction and Objectives: Vesicovaginal fistulas (VVF) may be managed by a transabdominal (TA) or transvaginal (TV) approach. With increasing urologic training in transvaginal surgery, there has been a movement towards transvaginal repairs whenever possible. The objective of this study was to evaluate our experience with VVF’s over a 7-year period following the arrival of a fellowship-trained female urologist.

Methods: We performed a retrospective chart review of VVF’s presenting between April 1, 2002 and March 1, 2009. All final TV closures were performed by a single surgeon (KC) while the TA repairs were spread amongst a broader group of surgeons.

Results: 29 cases were identified. Average age at surgery was 50.5 years (range 27-84 years). Follow-up ranged from 3-222 weeks (median 8). The etiology of 24 (83%) was hysterectomy [17 abdominal (71%), 7 vaginal (29%)]. The remaining 5 fistulas were caused by radiation (1), birth trauma in a developing country (1), uterine rupture and caesarean section (1), and bowel surgery (2). 4 VVFs occurred after hysterectomy complicated by intraoperative cystotomy repaired by the operating gynecologist. At the time of referral to urology 5 patients (17%) had prior failed repairs: 3 patients with 1, 1 patient with 2, and 1 patient with 4 prior repairs. Ultimately, 19 fistulas (66%) were repaired transabdominally and 10 (34%) transvaginally. The time to surgical repair ranged from 2 weeks to 30 years. Compared to TA repairs, TV repairs were associated with shorter hospital stay (p=0.005), and there was a trend toward shorter operative time (p=0.09) and blood loss (p=0.07). Suprapubic catheters (SPC) were placed at the time of 12 TA repairs (71%) versus 1 TV repair (10%). One patient (10%) following TV repair developed postoperative pelvic pain syndrome, while 8 patients (42%) undergoing TA repairs experienced complications [small bowel obstruction, bladder infection, prolonged postoperative pain, incisional herania, enterotomy, prolonged ileus, prolonged pain secondary to SPC (2)]. No patients remain with fistula at the time of reporting.

Conclusion: The majority of VVF’s can be repaired via a TV approach employing tissue interposition. Compared to a TA approach, these repairs are associated with reduced hospital stay and lower morbidity, and a trend toward lesser blood loss and operating time. Suprapubic catheters can add morbidity, and are not necessary for successful outcome in uncomplicated repairs.
OUTCOME AND COST COMPARISON BETWEEN OPEN AND ROBOTIC ILEOVESICOSTOMY FOR THE NEUROGENIC BLADDER PATIENT
Alex Vanni, MD¹, Kevin Bennett¹, Linda Ng, MD² and John Stoffel, MD¹
¹Lahey Clinic, Burlington, MA; ²Boston Medical Center, Boston, MA
(Presented by: John Stoffel)

Introduction and Objectives: Our objective was to compare outcomes and cost of open versus robotic ileovesicostomy for the adult neurogenic bladder patient.

Methods: Consecutive ileovesicostomy procedures between October 2006 and January 2009 were reviewed for demographic, urodynamic, operative, post operative and cost data. All robotic surgeries were performed with a DaVinci S robot. Both open and robotic procedures utilized the same surgical template and post-operative care plan. Outcome endpoints included operative (procedural time, intraoperative complications), post operative recovery (time to return of bowel function, length of hospital stay), and procedural efficacy (continence per urethra, residual bladder volume, upper tract status). Detailed operative and inpatient costs including room and board, operating room, surgical supplies, professional fees, recovery room, intensive care unit, and robotic maintenance fees were obtained. Total inpatient cost was calculated through summation of operative and inpatient hospital costs.

Results: Seven open and eight robotic procedures were performed. Mean age was 42 years in the open group vs. 52 in the robotic (p=0.13) and mean BMI was 28.4 vs. 29.2, respectively (p=0.84). There were no differences in preoperative urodynamic data. Mean blood loss was 257 and 92 cc in the open and the robotic groups (p=0.09). Mean total operative time was 291 minutes in the open and 330 minutes in the robotic group (p=0.24). No intraoperative complications occurred in either group. Bowel function returned after a mean 6.0 and 4.8 post operative days in the open and robotic groups (p=0.32). Mean hospital stay was 10.8 and 8.2 days in the open and robotic groups (p=0.14). After a median follow-up of 12.5 versus 14.0 months, the mean postoperative bladder volumes were 125 and 36 cc in the open and robotic groups (p=0.11). Urethral incontinence was noted in 3 open (42%) and 2 robotic (25%) patients (p = 0.60). No patients had postoperative hydronephrosis. Total inpatient cost for the open and robotic groups was $14,356 and $17,344 (p = 0.05). On subgroup cost analysis, only OR supply costs were significantly different ($609 open vs. $3770 robotic, p<0.001).

Conclusions: Robotic Ileovesicostomy trended toward a lower intraoperative blood loss, shorter hospital stay, and lower post operative bladder residual volumes, but had significantly higher total inpatient costs.

LONG TERM FOLLOW UP OF ILEOVESICO STOMY AND COLOVESICO STOMY IN PATIENTS WITH NEUROGENIC BLADDER DYSFUNCTION
Akhil Das, MD, Nathan Roberts, MD and Patrick Shenot, MD
Thomas Jefferson University, Philadelphia, PA
(Presented by: Akhil Das)

Introduction and Objectives: Incontinent vesicocutaneous drainage procedures (ileovesicostomy and colovesicostomy) have been used as an alternative to cystectomy and urinary conduit for patients with neurogenic bladder dysfunction. These procedures have relatively limited long term follow up results. We sought to characterize the long term results and complications of these procedures.

Methods: 11 female and 6 male patients. Mean age=41 years (range 24 to 59), with mean duration of neurogenic bladder of 12.3 years (range 4 to 17 years) underwent Ileovesicostomy (15 patients) or colovesicostomy (2 patients). Median follow-up was 9.8 years (range 4.4-13.7 years). All 11 females required concomitant pubovaginal sling urethral compression to minimize urinary leakage from a patulous, nonfunctional urethra.
Results: Effective low-pressure urinary stomal drainage was achieved (mean stomal leak point pressure of 13.1± 7.6 cm H2O) without the need for chronic catheterization in all patients with a mean duration of follow-up of 24 months (range 6-60 months). All 11 females required concomitant pubovaginal sling urethral compression to minimize urinary leakage from a patulous, nonfunctional urethra. Conversion to urinary conduit was required in 18% (3 patients) of patients. Conversion to clam ileocystoplasty was elected in one patient who had regained sufficient hand function to allow intermittent urethral catheterization 8.5 years following initial ileovesicostomy. No significant complications were associated with revisional surgeries. Despite continued low pressure drainage, recurrent infections associated with progressive lower urinary tract distention developed in 24% (4 patients).

Conclusion: Ileovesicostomy and colovesicostomy effectively establish low-pressure urinary drainage in patients with neurogenic bladder dysfunction, preserve upper tract function, and may be constructed with minimal short-term associated morbidity. Favorable short to medium term results have been reported, however, these procedures are characterized by significant long-term failure rates. Failures are associated with progressive urinary stasis or urethral incontinence. Despite the significant failure rate, conversion to another form of urinary drainage is feasible. These procedures continue to be a reasonable alternative option in this difficult to manage patient population.

Podium #40

THE EFFECTS OF ACUTE AND CHRONIC STRESS ON BLADDER STRUCTURE AND FUNCTION
Ariana Smith, MD¹, Joanne Leung, BS², Suny Harper, BS³, Rong Zang, DDS, PhD², Shlomo Raz, MD², Emeran Mayer, MD² and Larissa Rodriguez, MD²
¹University of Pennsylvania, Philadelphia, PA; ²UCLA, Los Angeles, CA
(Presented by: Ariana Smith)

Introduction and Objectives: Stress appears to play a role in the exacerbation of urinary tract disorders including painful bladder syndrome (PBS) and overactive bladder (OAB). To better understand the mechanism underlying this relationship, we aimed to characterize changes in micturition, anxiety behavior and bladder pathology in rats exposed to water avoidance stress (WAS) a potent psychological stressor.

Methods: 24 female Wistar rats were subjected to WAS (placed on a platform surrounded by water) or sham (platform with no water) 1 hour a day for 10 days. The number of fecal pellets excreted on the platform was counted as a measure of stress induced colonic motility. Immediately after WAS or sham on days 1 and 10, rats were placed in a metabolic cage for a 2-hour voiding assessment and urine was collected for norepinephrine (NE) ELISA. Fecal pellet excretion, voiding parameters and NE levels were compared to sham and to baseline values obtained prior to intervention. Anxiety behavior was quantified via light-dark box transition test. 4 animals from each group were sacrificed on day 10, bladders harvested, compared histologically and RNA extracted for real-time PCR. The remaining 8 animals in each group underwent repeat voiding assessment every 3 days for 1 month after which the above protocol was repeated. Student’s t-test was used to determine significance.

Results: Rats exposed to WAS developed a significant increase in micturition frequency and a decrease in latency to void and volume voided when compared to sham and to baseline. Alteration in micturition parameters persisted for nearly 1 month. Stressed rats showed increased fecal pellets and anxiety consistent with prior studies. Additionally, bladder specimens from stressed animals revealed increased angiogenesis (confirmed by CD 31 antibody) and decreased brain derived growth factor expression when compared to sham. No difference in urinary NE levels was found.

Conclusion: Psychological stress results in a robust and lasting alteration in micturition parameters. The response appears to be related to hypothalamic-pituitary axis activation, resulting in end organ functional manifestations and changes in tissue expression and angiogenesis. Similar effects previously reported on the gastrointestinal system together with these findings argue for initiation of this response centrally. We present a novel model of urinary frequency in the rat subjected to WAS; this model may represent a valid tool for studying PBS and OAB.
WHAT IS THE PREDICTIVE VALUE OF URODYNAMICS WHEN COMPARED TO CLINICAL HISTORY AND VALIDATED INSTRUMENTS?

Daniel Caruso, MD, MBA, Prashant Kanagarajah, MD, Ross Krasnow, MD, Brian Cohen, MD and Angelo Gousse, MD
University of Miami-Miller School of Medicine
(Presented by: Prashanth Kanagarajah)

Introduction and Objectives: Multichannel urodynamic testing (UD) has been used to calculate the sensitivity and specificity of the Urinary Distress Inventory (UDI-6), other questionnaires, and findings on clinical exam. Results have been variable. The aim of our study was to discover the sensitivity and specificity of urodynamic testing after a voiding dysfunction specialist established a diagnosis of voiding dysfunction or urinary incontinence based on a clinical evaluation.

Methods: We retrospectively reviewed a database of 1003 patients who presented with voiding dysfunction or urinary incontinence. A diagnosis of urinary frequency (UF), urge urinary incontinence (UUI) or stress urinary incontinence (SUI) was made by the same voiding dysfunction specialist based on history, pelvic exam, and response to the UDI-6 questionnaire. UD was performed according to International Continence Society (ICS) criteria. The following urodynamic parameters were measured: maximum cystometric capacity (MCC), detrusor overactivity and evidence of SUI (UD-SUI). Urodynamic parameters were paired with clinical findings to determine predictive values. The sensitivity and specificity of UD parameters were calculated and supported using Pearson’s Chi-Square analysis.

Results: A total of 537 patients (366 females and 171 males) met study criteria. Patients had the following diagnoses based on clinical evaluation: UF-75%; UUI-51%; SUI-57%. MCC had poor sensitivity (0.196) and moderate specificity (0.835) in predicting UF. The correlation of MCC and UF did not reach statistical significance. The UD parameters DO and UD-SUI had higher specificity in the evaluation of UUI (0.884) and SUI (0.991) respectively. The associations between the following UD parameters and clinical findings were statistically significant: DO and UUI; UD-SUI and SUI (each p=<0.001).

Conclusion: UD testing is not always a reliable test in diagnosing voiding dysfunction or UI, especially in UF. However, demonstration of DO and UD-SUI are specific tests for the diagnosis of UUI and SUI. Therefore, a multi-systematic approach combining clinical findings with UD evidence is needed to diagnose voiding dysfunction and UI.

THE SUCCESS AND LONG-TERM DURABILITY OF SINGLE-INCISION TRANSURETHRAL INCISION OF THE BLADDER NECK (TUIBN) FOR FUNCTIONAL BLADDER NECK OBSTRUCTION

Priya Padmanabhan, MD, MPH, Roger Dmochowski, MD and Douglas Milam, MD
Department of Urologic Surgery, Vanderbilt University
(Presented by: Priya Padmanabhan)

Introduction and Objectives: Functional bladder neck obstruction (PBNO) can cause severe lower urinary tract symptoms (LUTS), with associated misdiagnosis. TUIBN is the most effective treatment for PBNO, yet given the young age at presentation, retrograde ejaculation was of great concern. Unilateral incision was adapted to preserve antegrade ejaculation (AE). Our objective was to assess the success and long-term durability of single incision TUIBN.

Methods: Retrospective review of 65 men treated with single incision TUIBN for PBNO between September 1999 and January 2008 were evaluated for demographics, prostate size, American Urological Association Symptoms Score (AUASS), uroflowmetry (UF), post-void residual (PVR), and videourodynamic (UDS).
Results: Mean patient age was 43.6y (19-66). 66% used \( \alpha \)-blocker therapy without effect. All patients had a UDS diagnosis of PBNO. 34 patients had preoperative UDS data available. Mean prostate size was 22.1g (10-40). Mean peak voiding pressure was 67.35cm H2O (70-180). Single-incision TUIBN was performed by knife in 22% and holmium laser in 78%. Follow-up data was available for 45 men with mean follow-up of 20.5 months (0-96). Table 1 contains mean peak UF rates (Qmax), PVR and AUASS at baseline and follow-up, noting significant improvement in Qmax and AUASS in short-term. At 24-30 months, there is a significant rise in the AUASS, correlating with a drop in Qmax. Age, method of incision, and prostate volume had no effect on outcomes. New erectile dysfunction was not reported by any men. 87% maintained AE. 7 (15.5%) patients required repeat procedures (4 double-incision TUIBN, 3 transurethral resection of prostate) for recurrent symptoms at 32.4 mo (11-65). 3 patients had interstim placement 45.3 months later for anti-cholinergic refractory urgency.

Conclusion: This is the largest series to date with follow-up of single-incision TUIBN for men with PBNO. We report short-term improvements in symptoms and preservation of AE, yet recurrence of LUTS at 2 years. Preservation of sexual function and AE are key factors in this choice of treatment. While this is a valuable short-term option for young, sexually active males, counseling on the limited durability should be discussed.

Podium #43

A SINGLE CENTER, PROSPECTIVE, RANDOMIZED STUDY TO EVALUATE THE EFFECT OF REPEAT INTRA-DETRUSOR INJECTIONS OF BOTULINUM TOXIN-A FOR REFRACTORY IDIOPATHIC OVERACTIVE BLADDER PATIENTS.
Angelo Gousse, MD, Prashanth Kanagarajah, MD, Rajinikanth Ayyathurai, MD and Daniel Caruso, MD
University of Miami-Miller School of Medicine
(Presented by: Prashanth Kanagarajah)

Introduction and Objectives: We report our experience of treating patients with idiopathic overactive bladder (OAB) refractory to anti-muscarinic therapy with repeat injections of Botulinum toxin-A (BTX-A) once every 6 months over a period of 3 years. This is the first prospective, randomized trial conducted to study the efficacy of 2 dose levels of BTX-A (100U and 150U) after repeat intra-detrusor injections in idiopathic OAB population.

Methods: During a 7 year period we recruited 60 patients to take part in this institutional review board approved, investigator initiated, prospective, single center randomized trial. Patients enrolled in the study were eligible to receive 6 injections of BTX-A during the 3 year study duration, with a minimum inter-injection time period of 6 months. Each patient was randomly allocated to receive either 100U (n=30) or 150U (n=30). Subjects completed a three day voiding diary (3VD), urogenital distress inventory-6 questionnaire (UDI-6) and graded their current quality of life on a 10cm visual analogue scale (VAS) prior to study enrollment and at week 6 after every injection. The outcome analysis was based on the amount of improvement noted on the UDI-6 and VAS scores at 6 weeks post injection as compared to at study enrollment. The results of the injections were analyzed using paired sample T test, one-way ANOVA and Fisher’s exact test.
Results: Mean age was 56.7 (range 23 –83 years). There were 9 (15%) males and 51 (85%) females. The mean UDI-6 and VAS scores dropped significantly (p=0.0001) post injection when compared to pre injection levels (Table-1). The UDI-6 and VAS scores after repeat injections of BTX-A did not differ significantly in patients belonging to the 100U and 150U treatment arms. The mean inter injection time interval was 5.74 months.

Conclusions: Repeat injections of BTX-A is capable of significantly reducing the UDI-6 scores and improving the quality of life in patients with idiopathic overactive bladder symptoms refractory to anti-muscarinic therapy. Intra-detrusor BTX-A injections can be used as a long term treatment alternative for this selected patient population.

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<th>Post Injection UDI-6</th>
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*p<=0.0001

Podium #44

OVERACTIVE BLADDER SYMPTOM SEVERITY IS NOT RELATED TO CYSTOMETRIC BLADDER CAPACITY

Jerry Blaivas, MD¹, Lorraine Liang, BS¹, Jeffrey P. Weiss, MD¹, Michael Amirian, BS¹ and Chandra Samaroo²
¹SUNY Downstate Medical School, Brooklyn, NY; ²Institute for Bladder & Prostate Research
(Presented by: Jerry Blaivas)

Introduction and Objectives: It is widely assumed that patients with overactive bladder (OAB) have low cystometric bladder capacities (CMBC) and that there is an inverse relationship between the severity of OAB and CMBC. The aim of this study is to test that hypothesis.

Methods: This was a prospective observational study of 243 consecutive patients with lower urinary tract symptoms (LUTS) who completed the overactive bladder symptom score (OABSS) and underwent urodynamic studies. Based on the OABSS patients were divided into 2 groups–OAB & non-OAB. Exclusion criteria included UTI, hematuria & neurogenic bladder. Comparisons were made between OABSS, presence or absence of detrusor overactivity (DO) and CMBC using Spearman’s nonparametric rank correlation coefficient utilizing GraphPad Instat statistical software.

Results: 102 were excluded for UTI, hematuria and neurogenic bladder. Of the 141 remaining patients there were 51 men and 90 women (mean age of 68) 89 were in the non-OAB group and 52 in the OAB group. CMBC ranged from 90 to 1500 ml in the OAB group and 195 to 3084 in the non-OAB group. Mean CMBCs were 550 and 470 respectively (p=0.16) & 12% of the OAB patients had a CMBC of > 700 ml. There was no correlation between CMBC and OABSS in the OAB group (r=0.18) or the LUTS Group (r<0.001). The presence of involuntary contractions correlates with OABSS (r = 0.33, p<0.0001) and correlates inversely with cystometric bladder capacity (r = -0.32, p=0.0001).

Conclusion: In patients with LUTS, the OABSS score does not correlate with CMBC in either OAB or non-OAB patients. Although there were significant relationships between OABSS, CMBC & DO, the correlations were weak. These data suggest that sensory phenomena may be major factors in the genesis of OAB. Further, the fact that 12% of patients with OAB had CMBC > 700 ml should serve as a reminder to the clinician that large capacity bladder can co-exist with OAB.
OUTCOMES OF INTRAVESICAL BOTULINUM TOXIN FOR IDIOPATHIC OVERACTIVE BLADDER SYMPTOMS: A SYSTEMATIC REVIEW OF THE LITERATURE
Jennifer Anger, MD, MPH¹, Aviva Weinberg, MD, PhD², Marika Suttorp, MA³, Mark Litwin, MD, MPH³ and Paul Shekelle, MD, PhD³
¹UCLA Department of Urology, Los Angeles, CA; ²Stanford, CA; ³Los Angeles, CA
(Presented by: Jennifer Anger)

Introduction and Objectives: The use of intravesical botulinum toxin injection in patients with medication-refractory, non-neurogenic (idiopathic) overactive bladder (OAB) has gained widespread popularity. We sought to systematically review the evidence for the efficacy and safety of botulinum toxin in the management of OAB.

Methods: We performed a systematic review of the literature to identify articles published between 1985 and March 2009 on intravesical botulinum toxin A (BTX) injections for the treatment of refractory idiopathic overactive bladder in both men and women. Database searched included MEDLINE, CENTRAL, and EMBASE. Two independent reviewers (JA and AW) reviewed each study title and abstract. Data were tabulated from case series and from randomized controlled trials (RCTs). Data from RCTs were pooled where appropriate.

Results: Our literature search identified 432 titles. Twenty-six full articles were included in the final review. Three randomized controlled trials addressing the use of botulinum toxin-A were identified. The pooled random effects estimate of effect across all three studies was -3.88 (95% C.I. -6.15, -1.62), meaning that patients treated with BTX had 3.88 fewer incontinence episodes per day compared to patients treated with placebo (Figure 1). The data from the UDI long and short forms were pooled and demonstrated significant improvements in quality of life compared with placebo, with a standardized mean difference of -0.62 (CI -1.04, -0.21). Data from case series demonstrated significant improvements in OAB symptoms, urodynamic parameters, and quality of life, despite heterogeneity in methodology and case mix. However, based on the randomized controlled trials, there was a nine-fold increased risk of elevated post-void residual after BTX compared with placebo (8.55, 95% CI 3.22-22.71).

Conclusion: Intravesical injection of botulinum toxin resulted in improvement in medication-refractory OAB symptoms. However, the risk of elevated post-void residual and symptomatic urinary retention was significant. Several questions remain concerning the optimal administration of BTX for the OAB patient.

Funding: NIDDK (1 K23 DK080227-01, JTA)
TEST-RETEST RELIABILITY OF THE URGENCY, SEVERITY AND IMPACT QUESTIONNAIRE (USIQ) FOR PATIENTS WITH OVERACTIVE BLADDER
Lior Lowenstein, MD, MS¹, Kimberly Kenton, MD, MS², Mary Pat FitzGerald, MD, MS², Linda Brubaker, MD, MS², Mary Tulke, BSN², Joye Fordham, MD² and Elizabeth R. Mueller, MD, MSME²
¹Rambam Health Care Campus; ²Loyola Medical Center, Chicago, IL
(Presented by: Elizabeth R. Mueller)

Introduction and Objectives: We previously established content and discriminant validity of the Urgency Severity and life Impact Questionnaire (USIQ), a new instrument to measure the severity and quality of life impact of urinary urgency. The USIQ has 2 scales, the 5 question symptom (USIQ-S) and the 8 question quality of life (USIQ-QoL). Our aim was to measure the test-retest reliability of the USIQ in patients seeking care for overactive bladder (OAB).

Methods: Following IRB approval, we recruited women seeking care for OAB from our tertiary center. Participants completed the following questionnaires: USIQ, Overactive Bladder (OAB-q), Medical Epidemiologic and Social Aspects of Aging (MESA) and Urinary Distress Inventory (UDI-6), on two separate occasions, 2 weeks apart prior to treatment for OAB. Paired t-test was used for comparison between non-parametric variables, while intraclass correlation was used for detection of the degree of associations between the repeated scores. Cronbach’s α test was used to evaluate the internal consistency of the questionnaires during the two visits.

Results: The 24 participants had a median age of 63 (23-89) years; most were Caucasian (88%). Reproducibility of the instruments was excellent; the USIQ-S and USIQ-QoL scores at the 2 visits did not differ significantly (Table 1). There was a high level of internal consistency for USIQ-S and USIQ-QoL at visits 1 and 2 (Cronbach’s α = 0.85 and 0.83, p<0.001 and Cronbach’s α = 0.87 and 0.94, p<0.001 respectively). Repeated measures of USIQ-S and USIQ-QoL demonstrated a moderate to excellent intraclass correlation coefficient (0.76 and 0.92, respectively p<0.0001). We did not detect significant differences in scores of other validated instruments, suggesting reasonable stability of underlying symptoms over this time.

Conclusion: The USIQ has excellent test-retest reliability. This valid, reliable measure can be used in clinical and research trials to measure the severity of urgency and the impact of this symptom on patients’ QoL.

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2010 LAPIDES ESSAY CONTEST WINNER

GHRELIN: A PUTATIVE MECHANISTIC LINK BETWEEN OAB AND OBESITY
Pradeep Tyagi\textsuperscript{1}, Vikas Tyagi\textsuperscript{1}, Erich Witteemer\textsuperscript{3}, Naoki Yoshimura\textsuperscript{2}, Kenneth M. Peters\textsuperscript{1} and Michael B. Chancellor\textsuperscript{1}
\textsuperscript{1}Department of Urology, William Beaumont Hospital, Royal Oak, MI; \textsuperscript{2}Department of Urology, University of Pittsburgh, PA; \textsuperscript{3}Allegheny College, Sewickley, PA
(Presented by: Pradeep Tyagi)

**Purpose:** Several epidemiological and clinical studies suggest obesity as a risk factor in the pathology and poor management of overactive bladder (OAB), yet no information exists on the mechanistic link between the two disorders. In the present study, we hypothesized that appetite inducing; peptide hormone ghrelin and its cognate receptor GHSR (growth hormone secretagogue receptor) are key members that link obesity with OAB.

**Methods:** Human bladders were obtained from organ donors and total RNA was extracted from preserved tissue specimens. Isolated RNA was reverse transcribed and PCR-amplified (40 cycles) using GHSR primers. Expression of \(\beta\)-actin was used as positive control. After PCR amplification, cDNA was analyzed by electrophoresis on 2% agarose gel and visualized by ethidium bromide staining. In addition, relaxant effect of ghrelin peptide was investigated in precontracted human and rat bladder strips by cumulative dose addition.

**Results:** Expression of GHSR mRNA was detected in human bladder. PCR yielded cDNA products with the expected length of 110bp for GHSR in human bladder tissue specimens. Cumulative addition of ghrelin into the myobath evoked concentration-dependent reduction in the frequency of spontaneous contractions in human bladder strips. In addition, ghrelin addition to isolated rat bladder strips pre-contracted with 75mM KCl produced dose dependent reduction in contractility with maximum recorded reduction of \(~40\%\) at 10-6 mol/L conc.

**Conclusions:** This is the first study to demonstrate the expression of GSHR in human bladder and its inhibitory effect on bladder contractions. We have identified a new mechanism whereby obesity can directly cause the overactive bladder. This effect represents a potential novel mechanism through which, besides cholinergic and adrenergic systems, detrusor acutely modulate its contractility and thereby voiding frequency. These findings indicate the mechanism underlying the association of obesity with OAB and promise of a new drug target.
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<td>Scott Serels, MD</td>
<td>Bladder Control Center of Norwalk; Chief of Urogynecology, Norwalk Hospital, CT</td>
<td>Scott Serels</td>
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<td>2</td>
<td>PLACEMENT OF A TINED ELECTRODE AT THE PUDENDAL NERVE</td>
<td>Kenneth Peters, MD, Kim Killinger, RN and Brain Boguslawski, BS</td>
<td>William Beaumont Hospital</td>
<td>Kenneth Peters</td>
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<td>THE RACKLEY CONTINENT NEO-URACHUS FOR URINARY DIVERSION</td>
<td>Michael Ingber, MD, Farzeen Firoozi, MD, Courtenay Moore, MD, Sandip Vasavada, MD and Raymond Rackley, MD</td>
<td>Glickman Urological and Kidney Institute, Cleveland Clinic, Cleveland, OH</td>
<td>Michael Ingber</td>
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<td>TRANSVAGINAL COMBINED SACROSPINOUS RECTOPEXY AND VAGINAL VAULT SUSPENSION</td>
<td>Farzeen Firoozi, MD¹, Kelly A. Garrett, MD², Brooke Gurland, MD², Michael Ingber MD¹, Howard B. Goldman, MD¹</td>
<td>Glickman Urological and Kidney Institute, Cleveland Clinic, Cleveland, OH</td>
<td>Farzeen Firoozi</td>
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<td>PERCUTANEOUS TIBIAL NERVE STIMULATION</td>
<td>Michael Ingber, MD, Farzeen Firoozi, MD, Courtenay Moore, MD, Raymond Rackley, MD, Sandip Vasavada, MD</td>
<td>Glickman Urological and Kidney Institute, Cleveland Clinic, Cleveland, OH</td>
<td>Michael Ingber</td>
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<td>ROBOTIC-ASSISTED LAPAROSCOPIC SACROColPOPEXY</td>
<td>Jennifer Anger, MD, MPH¹, Ja-Hong Kim, MD², and Peter Schulam, MD, PhD²</td>
<td>UCLA Department of Urology, Los Angeles, CA; Los Angeles, CA</td>
<td>Jennifer Anger</td>
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<td>7</td>
<td>CONSTRUCTION OF FEMALE NEOURETHRA USING BUCCAL MUCOSA</td>
<td>Gamal Ghoniem, MD, FACS</td>
<td>Cleveland Clinic Florida</td>
<td>Gamal Ghoniem</td>
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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.

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Signature of Applicant ___________________________ Date __________________

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