Surgery for Stress Urinary Incontinence

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Scope of presentation

- Evolution of surgical approach
- Preoperative Considerations
  - Non-mobile urethra, Intrinsic sphincter deficiency (ISD), Overactive bladder (OAB)
- Complications
  - Prevention and Management

Incontinence Definitions

- **Stress**: Involuntary loss of urine with increased abdominal pressure in the absence of detrusor contraction
  - Urethral hypermobility
  - Intrinsic Sphincter Deficiency (ISD)
- **Urge (Detrusor Overactivity)**:
  - Involuntary loss of urine with a strong desire to void (DO,NDO)
  - Overactive Bladder (OAB) - urgency, urinary frequency, getting up often at night, urge incontinence
- **Mixed**: both urge and stress

Operations for Urinary Incontinence

- **Suburethral Slings**:
  - Traditional (1907)
- **Colposuspension** (1949/1968)
- Bulking procedures

**Lifetime risk of surgery for SUI = 16.2%**

Wu et al AUGS abstract 2013
Do you perform surgeries for stress incontinence?

A. Yes
B. No

44% 56%

What is the most common procedure you perform for SUI?

A. Retropubic MUS
B. Transobturator MUS
C. Minisling
D. Fascial sling
E. Burch
F. Other

38% 27%

RCT of Burch vs. Fascial Sling (SISTEr Trial)

Overall cure rate at 2 years:
- Burch 38%
- Sling 47% (P<.01)

SUI specific cure rate at 2 years:
- Burch 49%
- Sling 66% (P<.001)

Albo. NEJM 2007;356:2143-55
**RCT of Burch vs. Fascial Sling**

**Serious adverse events:**
- Burch: 10%  
- Sling: 13%  
  \( P = 0.2 \)

**Overall adverse events:**
- Burch: 47%  
- Sling: 63%  
  \( P < 0.001 \)

Difference due to UTI


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**RCT of Burch vs. Fascial Sling**

**Voiding Dysfunction:**
- Burch: 2%  
- Sling: 14%  
  \( P < 0.001 \)

**Postoperative treatment of urge UI:**
- Burch: 20%  
- Sling: 27%  
  \( P = 0.04 \)

Difference due to persistence of urge (not de novo)


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**The Tension-free Vaginal Tape System**

- PROLINE mesh protected by a plastic sheath (removed at end of procedure) attached to 2 needles
- Sterile single-use device
- Stainless-steel rigid catheter guide
- Mesh identical in composition to that used in PROLINE® polyglandine suture

From TVT Lithograph;Ethicon

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**RCT of Burch vs. TVT**

- 14 centers in UK
- 175 TVT, 169 Burch

**Objective cure rate at 2 years:**
- Burch: 51%  
- TVT: 63%

\(-20\% \text{ in each group lost to f/u: considered failures}\)

\( OR = 1.7 \)  \( (95\% CI: 1.1-2.6) \)

RCT of Burch vs. TVT

- Only 20-25% of each group reported no incontinence under any circumstance
- @ 2 years:
  - More cystocele in TVT group (63 vs. 39%)
  - More cervical / apical prolapse in Burch group (60 vs. 29%)


RCT of Burch vs. TVT: results by center


RCT of Burch vs. TVT: results by surgical volume of center


Transobturator Tape (TOT)
TOMUS: Retropubic sling (TVT) vs Transobturator (TOT)

- RCT (equivalence trial), n=597
- Success (%)
  - Objective: 80.8 vs. 77.7
  - Subjective: 62.2 vs 55.8
  - Satisfaction
- Complications:
  - Retropubic higher voiding dysfunction
  - Transobturator higher neurologic sx
- No difference: UUI, satisfaction, QOL

Richter et al NEJM 2010

Adverse Events (AEs) after Mid-urethral Sling (MUS)

- 42% experienced an adverse event (25%UTI)
- Increased likelihood of at least 1 AE: prior UTI, prior continence surgery, longer surgical time, increased blood loss
- Mesh complications (erosion/exposure):3-5%
- RP: bladder perforation (5%), voiding dysfunction requiring surgery (3%), UTI more common
- TO: neurologic symptoms more common (10%)


Complications: RP vs TOT

<table>
<thead>
<tr>
<th></th>
<th>Retropubic (%)</th>
<th>Transobturator (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyspareunia</td>
<td>3.8</td>
<td>18.5</td>
</tr>
<tr>
<td>Vaginal exposure</td>
<td>11</td>
<td>25</td>
</tr>
<tr>
<td>Pain</td>
<td>10</td>
<td>32</td>
</tr>
<tr>
<td>De novo OAB</td>
<td>49</td>
<td>41</td>
</tr>
<tr>
<td>Obstructive Sxs</td>
<td>48</td>
<td>30</td>
</tr>
<tr>
<td>Infection (tape)</td>
<td>4.2</td>
<td>18.5</td>
</tr>
<tr>
<td>Nec Fasciitis</td>
<td>0</td>
<td>2.8</td>
</tr>
</tbody>
</table>

Petri et al 2012
**Time Interval: Surgery – Treatment for Complication**

- **Petri et al 2012**

**Outcomes/Complications 2yrs : Burch, Fascial Sling (FS), MUS**

- Significant difference in overall failure rate
  - No difference FS vs. MUS
  - Higher in Burch vs. MUS (1.69)
- Burch more likely to seek retreatment (1.81) and report SUI symptoms (1.40)
- IIQ scores improved more in the FS
- No difference in overall complications

**Kenton et al 2013 AUGS abstract**

**Urodynamics before Surgery?**

- Office evaluation + UDS (76.9%) vs office evaluation only (77.2%): primary outcome “successful treatment” (n=630)
- No difference: QOL, satisfaction, adverse events, treatment selection
- UDS: less likely to be diagnosed with OAB, more likely voiding dysfunction


**Urodynamic Testing?**

- **Arguments against:**
  - Lack of standardization
  - Artifact
  - Discordance with symptoms
- **Argument for:**
  - Detection of detrusor instability
  - Detection of poor urethral function
  - Prediction of voiding dysfunction
Non-mobile Urethra

MUS
- Very low success rate with maximum straining angle \( \leq 20 \) and MUCP <15 (17%)
- if < 20 and MUCP >15 (50%)

Clemons Int Urogyn J 2006

Urethral Bulking Procedure

TOT: in women with poor urethral function

- Varying study design
- VLPP<60 or MUCP <40-42
- Objective outcome (varies)
- Normal urethra: 224 “cured” / 250 total
  - 89.6% (95% CI= 85.8-93.4)
- Poor urethral function: 161/250
  - 64.4% (95% CI= 58.5-70.3)
- OR= 4.8 (95% CI= 2.9-7.7)

Importance of “OAB”

- Lower success rate for mixed UI than stress UI alone with surgical treatment:
  - 55% vs. 81% cure rate @ 5 years
- Poor durability of success with mixed UI:
  - 60% cure @ 4 years \( \Rightarrow \) 30% @ 4-8 years
- De novo and persistent urge UI is the most common cause of dissatisfaction after surgery.

**Urodynamic Testing and/or Consultation:**
- Non-mobile urethra
- Prior anti-incontinence surgery
- History of radiation therapy
- Uncertain diagnosis: symptoms do not correlate with objective findings
- Neurologic disease
- Procedure planned other than retropubic sling

**Postop Voiding Trial**
- Retrograde vs Spontaneous
  - Retrograde fill more likely to empty adequately and be discharged without catheter (61 vs 32%)¹
- Perioperative medication exposure
  - Higher anticholinergic medication exposure increases risk of failed void trial²
- Use of hydro-dissection

¹ Foster et al 2007, ² Walter et al 2013 AUGS abstract

**Use of Hydro-dissection? Pain/Urinary retention**
- Dunivan et al (Bupivacaine vs no Injection): pain scores lower in Bupivacaine group at 2 hours postop (also used more NSAIDs in hospital); no difference in voiding trial success
- Bracken et al (Bupivacaine vs Saline): No difference in pain score, med use or successful void trial; PVRs higher in bupivacaine group

**Urinary Retention**
- 10-20% >24 hours
- (possible) Predictors: age, concomitant prolapse surgery, p det <12 cm H2O, Valsalva voiding pattern (absence of detrusor contraction), low preoperative flow rate
  - Preoperative symptoms
- 1.9-3.3% require surgical intervention
Urinary Retention
Conservative Measures

- Catheter use
  - Indwelling vs. self CIC
- Double voiding
- Pelvic floor muscle relaxation (PT)
- Pharmacologic
  - Diazepam, Bethanechol (no proven benefit), alpha adrenergic antagonist
- Urethral dilation (anecdotal reports only) – not recommended

Urinary Retention
Surgical Management

- Tape pull down (small series) - ~72hrs
- Sling release/transection (wait until >4 weeks)
- Formal urethrolysis (70-85%)


Vaginal Mesh “Exposure”

- Recent IUGA/ICS expert panel
- Extrusion, erosion
- Risk Factors: BMI>30, age/menopause, hematoma, cellulitis, DM, smoking (3.7), steroid use
- 2-3% (or lower)

Mesh Exposure

Prevention
- Hemostasis
- Tension free closure
- Preoperative estrogenization
- Avoid in smokers, poorly controlled DM

Management
- Observe, abstain from intercourse, estrogen cream
- Office excision possible
- Excision/revision in OR

Davila 2012
Urethral/Bladder Mesh Erosion

Presenting symptoms: OAB, retention, pain/dysuria, recurrent UTI, recurrent SUI

Surgical
- Transurethral approach (techniques described to allow minimally invasive approach)
- Vaginal incision

Pregnancy after MUS
- Standard recommendation is to avoid surgery for SUI and/or POP until childbearing complete
- 7,472 procedures 2004-2012; 13 women with subsequent pregnancies
- No difference in continence rates after CS vs SVD (overall 64% continent after delivery)
- Voiding dysfunction

Adams-Piper et al 2013 AUGS abstract

Erosion

Botox®

1Brubaker J Urol 2008, 2Sahai J Urol 2007
Conclusions

- Tranobturator and Retropubic MUS have similar short-term efficacy
- TOT appears to have lower efficacy in severe incontinence
- Complication rates are similar but, nature of morbidities differ
- Most complications 1-5 years; low threshold for cystoscopy

Conclusions

- Slings are superior to Burch at 2 years
- Hydro-dissection with saline
- Patient selection, attention to technique
- Counseling

Evidence of Poor Results with TOT in Patients with Weaker Urethral Function

<table>
<thead>
<tr>
<th>Study</th>
<th>Criterion</th>
<th>TOT</th>
<th>TVT</th>
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<tbody>
<tr>
<td>Biller 2006</td>
<td>“ISD”</td>
<td>57%</td>
<td>78%</td>
</tr>
<tr>
<td>O’Connor 2006</td>
<td>VLPP≤60</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>Miller 2006</td>
<td>MUCP≤42</td>
<td>84%</td>
<td>97%</td>
</tr>
<tr>
<td>Six studies ~300 pts</td>
<td>ISD</td>
<td></td>
<td>83%</td>
</tr>
</tbody>
</table>
Serious Complications With TVT

- Vascular injury: ~1: 10,000
- Bowel perforation: ~1: 17,000
- Urethral erosion: ~1: 25,000
- Hematoma: ~1: 25,000
- Nerve injury: ~1: 125,000

TVT: Long-term follow-up

<table>
<thead>
<tr>
<th>N=</th>
<th>Cure rate %</th>
<th>F/U years</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>94</td>
<td>85</td>
<td>5</td>
<td>Chene 2006</td>
</tr>
<tr>
<td>707</td>
<td>73</td>
<td>5</td>
<td>Ankardal 2006</td>
</tr>
<tr>
<td>970</td>
<td>85</td>
<td>5</td>
<td>Holmgren 2006</td>
</tr>
<tr>
<td>134</td>
<td>77</td>
<td>5</td>
<td>Doo 2006</td>
</tr>
<tr>
<td>129</td>
<td>74</td>
<td>6</td>
<td>Kuuva 2006</td>
</tr>
<tr>
<td>90</td>
<td>81</td>
<td>7</td>
<td>Nilsson 2004</td>
</tr>
<tr>
<td>52</td>
<td>79</td>
<td>4.5</td>
<td>Tsivian 2004</td>
</tr>
</tbody>
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Deaths Reported: FDA MAUDE

TVT:
- Bowel perforation: 7
- Hemorrhage: 1
- Sepsis unknown origin: 2
- Pulmonary embolism: 1
- Hemorrhage (ancillary procedure): 1

TOT:
- Hemorrhage: 1
- Pulmonary Embolism: 1