Complications of TVT and TOT

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Disclosures

- Consultant
  - Gynecare, Pfizer, Astellas, Triton
- Research funding
  - Gynecare, Astellas
Introduction

- Surgery for stress urinary incontinence performed on women for over a century
- Midurethral slings have become the most popular procedures for female GSI in the last decade
- When new surgical techniques introduced initial focus on success rates
- Complication rates not emphasized
- Published information on complications of traditional incontinence operations is scarce
Cochrane Review

- Newer minimally invasive synthetic suburethral slings are as effective as traditional sling procedures with less OR time, less post-op voiding dysfunction, and less de novo urgency
Cochrane Review

- Newer slings are as effective as open retropubic colposuspension with less peri-operative complications, less post-op voiding dysfunction, shorter OR time, and shorter LOS.
  - BUT more bladder perforations with slings
- Compared to laparoscopic colposuspension, slings have less de novo urgency and UUI, shorter OR time, shorter LOS, and less time to normal activity
  - Evidence conflicts on more effective procedure
Cochrane Review

- Method of sling placement
  - Retropubic bottom-to-top approach more effective than top-to-bottom with less post-op voiding dysfunction, bladder perforations, and tape erosions
  - Retropubic route had higher objective cure rate than obturator route BUT obturator route had less post-op voiding dysfunction, blood loss, bladder perforations, and shorter OR time
    - No difference in subjective cure rates

- Tape
  - Monofilament tapes had higher objective cure rate and less tape erosions than multifilament tape
Complications of incontinence surgery - timeline (ICI)

- Immediate (0-24 hours)
- Short-term (24 hours – 6 weeks)
- Long-term (> 6 weeks)
Immediate complications

Hemorrhage

- Perivesical/periurethral plexus
- Ant repair 200mL vs. Burch 260mL (Van Geeland 1998)
- No diff. between open and laparoscopic retropubic Burch procedures when performed with concurrent vaginal prolapse repairs (Walter et. al., 2002)
- Less blood loss with needle suspension (Spencer 1987, Pelosi and Pelosi 1997)
- Minimal blood loss with lap Burch (Liu 1993, Dorsey 1994, Carey et. al. 2006)
- More bleeding with more dissection on sling (Morgan 2000)
- Less intraop. blood loss with TVT compared to Burch (Tong et. al., 2008), and no diff. in hematoma rates (Ward, Hilton 2002)
Immediate complications

**Urinary tract and visceral injuries**

- Up to 6% injury to bladder or ureter at open colposuspension
- 0.7% bladder injury in 3000 MMK patients (Mainprize, Drutz 1988)
- Lap Burch 6-10% bladder injury (Bustan et. al. 2000, Smith 1998)
- RCT TVT vs. Burch 9% vs. 2% bladder perforation (Ward, Hilton 2002)
- Urethral injury – unexpected diverticulum
- Bladder perforation more common in TVT versus TOT (Long 2009)
Short-term complications

UTI

- UTI not uncommon, rate increases with length of catheterization (6-7.5% per day, Foucher 1983); earlier catheter removal associated with less chance of UTI (Kamilya 2010)

- Less bacteruria with SP vs. urethral cath (Anderson 1985, Bergman 1987); no difference in bacteruria risk between SP cath vs. CISC (Jannelli 2007)
Short-term complications

Infection and erosion

- No direct evidence that wound infection affects cure with SUI surgery
- But infection with synthetics may lead to their removal (Mundy 1983 – removal 16% Stamey buffers)
- Granulation and abscess formation with periurethral injection (Politano 1974, 1982; Lotenfoe 1993)
- Infection of artificial sphincters in up to 9.5% (Appell 1988, Light 1988, Scott 1989, Marqués Queimadelos 1999)
- Erosion rates of up to 21% with synthetic slings (Beck 1988, Bent 1993, Bryans 1979, Muznai 1992) and chances increase with concurrent hyst (Ganj 2009)
- 2.5% Osteitis pubis with MMK (Green 1986, Mainprize 1988)
- No diff. in rate of infection or erosion between TVT and TOT (Long 2009)
Short-term complications

Voiding dysfunction

- 2-27% with retropubic colposuspension
- 2-16% with sling (1.5-7.8% need long-term CISC) (McLennan 1998, Ghonheim 1994)
Short-term complications

- Fistulae reported following anterior repair (Beck 1991), needle suspension (Guam 1984), MMK (Mainprize 1988), sling (Kersey 1983)
- Ilio-inguinal pain following colposuspension (Galloway 1987)
Long-term complications

De novo detrusor instability

- <6% with anterior repair
- 8-27% with colposuspension
- 4-16% with needle suspensions
- 2-23% with slings
Long-term complications

- Urogenital prolapse
  - 2.5-26.7% after colposuspension

- Dyspareunia
  - Reported in 40% women after colposuspension (Galloway 1987, Ericksen 1990)
  - Reported in 1.5% after needle suspension (Raz 1991)
Complications

- Persistence or recurrence of SUI
- New onset bladder symptoms
Quality of life issues

- Need to look at overall impact
- Many patients satisfied even if not completely continent
- Black 1997:
  - 68% women satisfied with outcome of surgery (442 women)
  - 7% had deterioration in general health, 25% had deterioration of mental health
  - Only 28% achieved total continence
TVT/TOT complications

- Midurethral slings introduced as a minimally invasive and ambulatory procedure for female stress urinary incontinence
- Minimally invasive does not mean no risk
- All surgery has risk
- Patient satisfaction better if patients fully informed
Gynecare TVT Tension-free Vaginal Tape

Evolution of the TVT Procedure

- First published in *Scand J. Urol Nephrol* 1995 as an Intravaginal Slingplasty
- Descriptive Study of 50 patients:
  - 37 Mersilene
  - 5 Goretex
  - 6 Teflon
  - 2 Lyodura
- Technique was slightly different
- Sinus Tract infection in 2 Goretex cases
- 78% cured, 12% improved
<table>
<thead>
<tr>
<th>Author (# pts.)</th>
<th>Cure</th>
<th>Improvement</th>
<th>Success/Failure(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ulmsten (n=75)</td>
<td>63 (84%)</td>
<td>6 (8%)</td>
<td>69 (92%) / 6 (8%)</td>
</tr>
<tr>
<td>24 month follow-up</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ulmsten (n=131)</td>
<td>119 (91%)</td>
<td>9 (7%)</td>
<td>128 (98%) / 3 (2%)</td>
</tr>
<tr>
<td>Follow up &gt;/= 12 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wang (n=70)</td>
<td>61 (87%)</td>
<td>3 (4%)</td>
<td>64 (91%) / 6 (9%)</td>
</tr>
<tr>
<td>3-18 month follow-up</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ulmsten (n=50)</td>
<td>43 (86%)</td>
<td>6 (12%)</td>
<td>49 (98%) / 1 (2%)</td>
</tr>
<tr>
<td>36 month follow up</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total n=326</td>
<td>286 (88%)</td>
<td>24 (7%)</td>
<td>310 (95%) / 16 (5%)</td>
</tr>
</tbody>
</table>
## Intraoperative Results

<table>
<thead>
<tr>
<th>Author</th>
<th>Mean OR Time</th>
<th>Bladder Perf.</th>
<th>Blood Loss &gt; 300 cc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ulmsten</td>
<td>22 min</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ulmsten</td>
<td>26 min</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Wang</td>
<td>29 min</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Ulmsten</td>
<td>29 min</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
### PUBOVAGINAL SLING: TVT PROLENE MESH

#### PostOperative Complications

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ulmsten</td>
<td>5 (6%)</td>
<td>5 (6%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ulmsten</td>
<td>4 (3%)</td>
<td>N.R.</td>
<td>N.R.</td>
<td>2 {1 W.I. / 1 hematoma}</td>
</tr>
<tr>
<td>Wang</td>
<td>12 (7%)</td>
<td>4 (6%)</td>
<td>2 (3%)</td>
<td>N.R.</td>
</tr>
<tr>
<td>Ulmsten</td>
<td>5 (10%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Author</td>
<td>Hospital Stay</td>
<td>Mean time returning to work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------</td>
<td>-----------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ulmsten</td>
<td>same day/day after</td>
<td>10 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ulmsten</td>
<td>same day/day after</td>
<td>14 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wang</td>
<td>mean 3 days (2-8)</td>
<td>Not reported</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ulmsten</td>
<td>same day/day after</td>
<td>Not reported</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Nilsson CG et al (2008) performed an eleven year prospective study

Sixty-nine patients evaluated at 11.5 years after surgery (77% of initial cohort)

Objective cure rate of 90%

- Negative stress test & negative pad test

Subjective cure rate of 77%

- Only 3% regarded surgery as a failure
Failure of TVT

- Failure reported in 2-34%
- Slightly higher failure if older or ISD
- Work-up as for recurrent incontinence
## TVT complications
(Gynecare data May 2001)

<table>
<thead>
<tr>
<th>Complication</th>
<th>TVT</th>
<th>Traditional sling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urethral erosion</td>
<td>&lt;0.01%</td>
<td>0.3% (autologous graft)</td>
</tr>
<tr>
<td>Infection</td>
<td>&lt;0.005%</td>
<td>0.06% (autologous graft)</td>
</tr>
<tr>
<td>Vaginal erosion/extrusion</td>
<td>&lt;0.02%</td>
<td>0.06% (autologous graft)</td>
</tr>
<tr>
<td>Ret’n &gt;4wks</td>
<td>&lt;0.02%</td>
<td>8% (based on 578 pts)</td>
</tr>
<tr>
<td>Hematoma/transfusion/vascular injury</td>
<td>&lt;0.03%</td>
<td>4% (based on 279 pts)</td>
</tr>
<tr>
<td>Mortality</td>
<td>&lt;0.005%</td>
<td>0.05%</td>
</tr>
<tr>
<td>Bowel perforation</td>
<td>&lt;0.01%</td>
<td>0.9% (autologous graft)</td>
</tr>
<tr>
<td>Bladder perforation</td>
<td>&lt;0.02%</td>
<td></td>
</tr>
<tr>
<td>Other miscellaneous</td>
<td>&lt;0.15%</td>
<td></td>
</tr>
</tbody>
</table>
## TVT complications

<table>
<thead>
<tr>
<th>Complication</th>
<th>USA</th>
<th>Ex-USA</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vascular injury</td>
<td>5</td>
<td>27</td>
<td>32</td>
<td>0.012</td>
</tr>
<tr>
<td>Vaginal mesh erosion</td>
<td>18</td>
<td>7</td>
<td>25</td>
<td>0.01</td>
</tr>
<tr>
<td>Urethral erosion</td>
<td>8</td>
<td>10</td>
<td>18</td>
<td>0.007</td>
</tr>
<tr>
<td>Bowel perforation</td>
<td>7</td>
<td>10</td>
<td>17</td>
<td>0.007</td>
</tr>
</tbody>
</table>
Mortality

A number of deaths have been reported with TVT

- Three cases involved bowel perforation with delayed diagnosis, leading to fatal peritonitis
- A fourth case involved a patient with a bleeding disorder who died of uncontrollable, diffuse post-operative bleeding in the retropubic space
- The fifth case involved a woman in the UK with a pre-existing heart condition who died from a heart attack more than a week following an incontinence repair procedure complicated by a vascular injury
Surgical complications

- Impact of complications from bladder neck surgery now under more scrutiny
- Major complications of midurethral sling procedures likely under-diagnosed and under-reported in the literature (Deng et al., 2007)
- What is the value of a procedure that cures stress incontinence and replaces it with urge incontinence or voiding dysfunction?
- More studies recently of QOL impact and social impact of stress incontinence surgery
Analysis of TVT complications in Finland (Kuuva, Nilsson Acta Obstet Scand 2002)

- 38 hospitals, 1455 procedures
- 40 cases with other procedure at same time
- Retrospective questionnaire study
- Standardized training program
- No difference in complications between hospital types
Analysis of complications in Finland

- Bladder perforation 38/1000
- Intraoperative blood loss >200mL 19/1000
- Major vessel injury 0.7/1000
- Nerve injury 0.7/1000
- Vaginal hematoma 0.7/1000
- Retropubic hematoma 19/1000
- Urethral lesion 0.7/1000
- UTI 41/1000
- Voiding difficulty 76/1000
- Complete retention 23/1000
- Wound infection 8/1000
- Vaginal defect healing 7/1000
Analysis of TVT complications in Finland

- No tape rejection
- No life-threatening complication
- Complications requiring laparotomy
  3.4/1000
- TVT safe method for treating SUI provided
  appropriate training offered
Complications in Italy
(Meschia et. al. Int Urogyn J 2001)

- 404 patients from 6 hospitals
- 39% with concomitant prolapse repair
- Subjective cure 92%, objective cure 90%
- 4% failure
- 6% bladder perforation
- 0.5% required laparotomy for bleeding
- 1.5% retropubic hematoma
- 0.25% obturator nerve injury
- 4% voiding difficulty
- 0.5% defective vaginal healing
Complications and untoward effects of the TVT (Karram et. al. Obstet Gynecol 2003)

- 350 consecutive patients having TVT
- 55% with concomitant prolapse repair
- 4.9% bladder perforation
- 1.7% hematomas
- 4.9% voiding dysfunction
- 1.7% tape takedown (6 pts)
- 10.9% UTIs
- 0.9% nerve injury
- 0.9% vaginal erosion/poor vaginal healing
Clinical audit of TVT in the UK

- 95% cured or improved
- 4% bladder/urethral perforation
- 1% hemorrhage
- 2% long term voiding dysfunction
- 0% tape rejection or defective healing
- 12% de novo urinary retention
Complications of TVT – Canada
(Corcos J et.al. BJU July 2004)

- 241 patients
- 6 hospital (2 university and 4 community)
- 5.8% intraoperative bladder perforation
- 2.5% blood loss >500mL
- 19.7% urinary retention
- 1.9% pelvic hematoma
- 0.4% suprapubic wound infection
- 4.1% long term voiding dysfunction requiring surgical release
- 15% de novo urgency
- 7.5% persistent suprapubic discomfort
- 0.4% intravaginal tape erosion
## TVT long-term outcomes

<table>
<thead>
<tr>
<th>Author</th>
<th>N</th>
<th>Pt group</th>
<th>F/u (yrs)</th>
<th>% cure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rezapour</td>
<td>34</td>
<td>Rec SUI</td>
<td>4</td>
<td>82</td>
</tr>
<tr>
<td>Rezapour</td>
<td>80</td>
<td>Mixed</td>
<td>4</td>
<td>85</td>
</tr>
<tr>
<td>Rezapour</td>
<td>49</td>
<td>ISD</td>
<td>4</td>
<td>74</td>
</tr>
<tr>
<td>Deffieux</td>
<td>51</td>
<td>SUI</td>
<td>6.9</td>
<td>80</td>
</tr>
<tr>
<td>Nilsson</td>
<td>80</td>
<td>SUI</td>
<td>7</td>
<td>81.3</td>
</tr>
<tr>
<td>Moran</td>
<td>40</td>
<td>SUI</td>
<td>2</td>
<td>95</td>
</tr>
<tr>
<td>Nilsson</td>
<td>69</td>
<td>SUI</td>
<td>11.5</td>
<td>90/77</td>
</tr>
</tbody>
</table>
## TOT long-term outcomes

<table>
<thead>
<tr>
<th>Author</th>
<th>N</th>
<th>Pt group</th>
<th>F/u (yrs)</th>
<th>% cure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giberti</td>
<td>108</td>
<td>SUI</td>
<td>2</td>
<td>80</td>
</tr>
<tr>
<td>Cindolo</td>
<td>80</td>
<td>SUI</td>
<td>4 mo</td>
<td>92</td>
</tr>
<tr>
<td>Roumeguere</td>
<td>120</td>
<td>SUI (UDS)</td>
<td>1</td>
<td>80</td>
</tr>
<tr>
<td>Waltregny</td>
<td>91</td>
<td>SUI</td>
<td>3</td>
<td>88</td>
</tr>
<tr>
<td>Bram</td>
<td>50</td>
<td>SUI</td>
<td>1.25</td>
<td>94</td>
</tr>
</tbody>
</table>
TVT vs. TOT: a comparison in terms of continence results, complications and quality of life after a median follow-up of 48 months.  
(Zugor et. al. Int Urol Nephrol February 2010)

- 208 pts underwent TVT or TOT: 49% TVT, 51% TOT
- Complication rate significantly higher with TVT (P = 0.04)
- No sig. diff in continence results or QOL
(Cont’d) TVT vs. TOT: a comparison in terms of continence results, complications and quality of life after a median follow-up of 48 months.

(Zugor et. al. Int Urol Nephrol February 2010)

<table>
<thead>
<tr>
<th></th>
<th>TVT n=100</th>
<th>TOT n=108</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obj. Failure</td>
<td>9%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Subj. Failure</td>
<td>4%</td>
<td>1.6%</td>
</tr>
<tr>
<td>De novo UI</td>
<td>6%</td>
<td>6.2%</td>
</tr>
<tr>
<td>Hematoma</td>
<td>8%</td>
<td>4.6%</td>
</tr>
<tr>
<td>Bladder perf.</td>
<td>3%</td>
<td>0%</td>
</tr>
<tr>
<td>Excess. bleed</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td>Post-op pain</td>
<td>5%</td>
<td>5.6%</td>
</tr>
<tr>
<td>Tape erosion</td>
<td>2%</td>
<td>0.45%</td>
</tr>
<tr>
<td>PVR&gt;100 mL</td>
<td>5%</td>
<td>2.8%</td>
</tr>
</tbody>
</table>
Two-year comparison of tension-free vaginal tape and transobturator tape for female USI. (George S et. al. J Obstet Gynaecol April 2010)

- TVT
  - 76 patients
  - 9.2% voiding difficulty during first week
  - 1.3% bladder perforation

- TOT
  - 73 patients
  - 4.1% voiding difficulty during first week
  - No bladder perforations
## TVT versus TOT complications

<table>
<thead>
<tr>
<th>Complication</th>
<th>TVT %</th>
<th>TOT %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemorrhage</td>
<td>3.75</td>
<td>8.5</td>
</tr>
<tr>
<td>Postop cath</td>
<td>8.75</td>
<td>3.7</td>
</tr>
<tr>
<td>CISC</td>
<td>2.5</td>
<td>1.2</td>
</tr>
<tr>
<td>Tape release</td>
<td>3.7</td>
<td>2.4</td>
</tr>
<tr>
<td>Vaginal perforation</td>
<td>0</td>
<td>4.8</td>
</tr>
<tr>
<td>Thigh/groin pain</td>
<td>1-2</td>
<td>5-26</td>
</tr>
<tr>
<td>Bladder injury</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>
Bladder perforation

- Reported risk 0.4-19%
- Higher on learning curve
Complication: Bladder Perforation

PREVENTION:
- Inject local anesthetic for retropubic hydrodissection
- Ensure that the bladder is empty during needle passage
- Deviate the urethra/bladder neck
- Ensure the needle is passed along the cephalad surface of the pubic bone
- Perform cystoscopy of the bladder and proximal urethra after each pass of the needle

INTERVENTION:
- If the bladder has been entered, remove and reinsert needle
- Insert indwelling catheter for 1-2 days
- If repeated penetration occurs, consider conversion to open procedure
- Consider antibiotics for 5-7 days
Complication: Urethral Injury

PREVENTION:
- caution during dissection and needle passage

INTERVENTION:
- Do not place the PROLENE mesh
- Close urethral defect primarily
- Close vagina separately
- Insert indwelling catheter for 7-10 days
Complication: Vaginal Perforation

PREVENTION:
- Caution during dissection and needle passage
- Treat vaginal atrophy pre-op

INTERVENTION:
- Remove needle
- Repair vaginal wall
- Develop slightly deeper submucosal tract
Vascular injury

- Reported risk 0.07-0.9% of major vascular injury
Complication: Vascular Injury

PREVENTION:
- Avoid hip flexion greater than 60° and consider using low knee support stirrups
- Direct needle along cephalad surface of pubic bone
- Stay close to the mid-line and avoid lateral insertion of the needle
- Ensure abdominal incisions are medial to the pubic tubercle

INTERVENTION:
- For minor/venous bleeding consider electrocautery or direct pressure using finger or pack
- For major/arterial hemorrhage:
  - initiate patient support
  - consider open intervention
  - consider radiographic embolization
Infection

- **UTI**
  - Reported risk 4-8%

- **Wound infection**
  - Reported risk 0.8%
Complication: Urinary Tract Infection

PREVENTION:
• Consider peri-operative antibiotics

INTERVENTION:
• Consider antibiotics for 5 days according to culture and sensitivity
• If recurrent, consider cystoscopy to rule out foreign body
Complication: Wound Infection

PREVENTION:
- Employ aseptic technique
- Consider peri-operative antibiotics
- Strive for meticulous hemostasis

INTERVENTION:
- Treatment with antibiotics
Hematoma

- Vaginal
  - Reported risk 0.07%
- Retropubic
  - Reported risk 2%
Complication: Vaginal Bleeding / Retropubic Hematoma

PREVENTION:
• Stay close to the midline and avoid lateral insertion of the needle
• Avoid hip flexion > 60°
• Be cautious re. extensive dissection

INTERVENTION:
• Insert vaginal pack
• Consider ultrasound to facilitate diagnosis
• Consider percutaneous drainage if symptomatic (i.e., fever, pain)
Voiding problems

- Voiding difficulty
  - Reported risk 4.3-15%

- Retention
  - Reported risk 2-4%

- De novo detrusor instability
  - Reported risk 3-15%
Complication: Urinary Retention

PREVENTION:
• Pre-operatively consider urodynamic studies to rule out voiding dysfunction
• Intra-operatively avoid placement of device under tension and perform cough test

INTERVENTION:
• If patient is unable to void immediately post-operatively, rule out hematoma and discharge patient with indwelling catheter for 24-72 hours
• If patient is still unable to void after 72 hours, consider reopening the site under local anesthesia, placing a right-angle forceps under the mesh, and pulling down slightly on the mesh approx 5-10 mm.
• If this procedure is not performed within the first 5-10 days (prior to tissue in-growth), consider cutting the mesh under local anesthesia in the midline after 4 weeks of catheterization. Tissue in-growth will maintain continence in approx 70% of patients.
Complication: De-Novo Urgency

PREVENTION:
• Consider pre-operative urodynamic studies to rule out voiding dysfunction
• Avoid placement of device under tension
• Perform cough test

INTERVENTION:
• If persists, consider behavioral therapy and/or an anticholinergic medication
• Consider releasing mesh under local anesthesia
Less common complications

- Bowel perforation
  - Reported risk <0.01%
- Vaginal erosion
  - Reported risk 2-11%
- Urethral erosion
  - Reported risk 0.01-0.9%
Bowel perforation

- 9 reported cases in the literature
- Rooney and Cholhan. Obstet Gynecol 2010
- Gurshumov et al. Int Urogyne J 2009
- Phillips et al. Int Urogyne J 2009
- Bafghi et. al. J Gynecol Obstet Biol Reprod 2005
- Leboeuf et. al. Urology 2004
- Fourie and Cohen. Int Urogyne J 2003
- Meschia et. al. Int Urogyne J 2002
- Peyrat et. al. Eur Urol 2001
Complication: Bowel Perforation

PREVENTION:
• Direct needle along cephalad surface of pubic bone
• Consider pre-operative imaging for patients with previous surgery (review operative notes)
• Consider placing patient in Trendelenburg position if concurrent laparoscopy is being performed

INTERVENTION:
• Aggressively evaluate signs or symptoms suggestive of peritonitis
  - imaging
  - open exploration
Complication: Vaginal Extrusion of Mesh*

PREVENTION:
• Ensure vaginal closure (inspect for button-holes)
• Counsel patient to avoid intercourse until healed (4-6 weeks)
• Local estrogen treatment of vaginal mucosa

INTERVENTION:
• Consider treating post-operative infection with antibiotics and estrogen
• Consider trimming the mesh and restoring the vaginal mucosa

*The risk of vaginal mesh extrusion may be increased in women with post-operative infection, previous vaginal surgery, vaginal atrophy, or vaginal injury
Urethral erosion

More than 11 published case reports

- 0.007% risk
- Quiroz and Cundiff. Int Urogyn J 2009
- Wijffels et al. Int Urogyn J 2009
- Siegel. Int Urogyn J 2006
- McLennan. Int Urogyn J 2004
- Wai et al. Int Urogyn J 2004
- Tunn et al. Ultrasound Obstet Gynecol 2004
- Vassallo et al. Obstet Gynecol 2003
- Madjar et al. Urology 2002
- Haferkamp et al. J Urol 2002
- Koelbl et al. BJOG 2001
Complication: Urethral Erosion

PREVENTION:
• Avoid excessive dissection
• Avoid placement of device under tension

INTERVENTION:
• Consider local excision of mesh, layered closure of urethra and an indwelling urethral catheter for several days
• May require urethral reconstruction
• May require procedure for recurrent stress urinary incontinence
What if...

Patient begins to move?

- Stop procedure
- Instruct anesthesiologist to increase sedation
- Evaluate anesthesia
- It is prudent to discuss the steps of the procedure with the anesthesiologist/anesthetist prior to procedure
What if...

You encounter resistance on passing the needle?

• Re-direct tip of needle by carefully maneuvering introducer handle
• Avoid using excessive force
• Check orientation and alignment
Summary

- TVT and TOT are minimally invasive procedures for stress urinary incontinence in women
- Not without risk
- More published on TVT and TOT procedures than many other surgeries we perform
- Low complication rates overall with good success
Complications of incontinence operations

- Jarvis G. Surgery for GSI. BJOG 1994
- Chaliha C, Stanton SL. Complications of surgery for GSI. BJOG 1999
Cochrane Review

- RCTs or quasi-RCTs