Transobturator Versus Transabdominal Mid Urethral Slings: A Multi-Institutional Comparison of Obstructive Voiding Complications

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Purpose: In the last year TO slings have become an increasingly popular alternative to TA slings for the surgical treatment of SUI. Proposed advantages of the transobturator approach include improved speed, safety and the reduction of obstructive complications. We assessed outcomes of TO and TA slings in a large series of women treated at several institutions to compare the rate of obstructive complications from these procedures.

Materials and Methods: We reviewed the charts of 504 consecutive women who had synthetic mid urethral sling procedures (154 TO or 350 TA) performed by 24 different urologists for SUI at 8 institutions from 2002 to 2004. Obstructive complications were defined as increased PVR (greater than 100 cc), or the need for CIC, prolonged Foley catheter drainage or urethrolysis.

Results: While TO and TA sling procedures appeared to be similarly efficacious in eliminating the need for incontinence pad use (TO 89%, TA 86%, $p = 0.36$), the transobturator approach was associated with fewer obstructive complications (TO 11.0%, TA 18.3%, $p < 0.05$). Urethrolysis was required in none of the 154 TO cases and 8 of 350 (2.3%) TA cases. Concomitant pelvic surgery did not significantly increase the likelihood of obstructive voiding complications in either group.

Conclusions: Although TO and TA sling procedures had similar short-term results for decreasing pad use in patients with stress urinary incontinence, the transobturator approach is associated with fewer obstructive voiding complications.

Key Words: urinary incontinence, urinary retention, urinary catheterization, surgery

Mid urethral polypropylene slings have become increasingly popular for the treatment of SUI. Much of the reported experience with these synthetic slings comes from TVT, a transabdominal technique originally described by Ulmsten and Petros in 1995.[1] Although widely accepted and safer than earlier alternatives,[2] this approach has been associated with a number of potentially severe complications including urinary retention, bladder perforation, vaginal erosion, retropubic hematoma and bowel injury.[3–5] In 2001 the transobturator approach was developed in France by Delorme as a potentially safer alternative.[6] Since being introduced in the United States in May 2003, transobturator slings have rapidly become widely accepted. Several studies have shown the approach to offer similar efficacy and fewer complications.[6,7] One proposed advantage of the transobturator sling is that it occupies a more natural, transverse anatomical position than that of the more sagitally placed transabdominal sling. The purpose of this large multicenter study was to evaluate our experience with TO and TA synthetic sling procedures for SUI and compare their respective obstructive complication rates.

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MATERIALS AND METHODS

Using an institutional review board approved protocol, a detailed retrospective chart review was conducted of 504 women undergoing surgical treatment for SUI using a TO or TA approach for mid urethral sling placement. This review included all consecutive women who underwent mid urethral sling procedures during a 2-year period at 8 different institutions with a minimum followup of 6 months. Sling types were performed according to the practice preference of the 24 contributing board certified urologists after informed consent was obtained. The abdominal slings evaluated were the Gynecare TVT™ and SPARC™. The transobturator slings evaluated were the Monarc™ and ObTape™, and all were done using outside-in needle placement. All slings are composed of polypropylene. The Gynecare TVT™ and SPARC™ transabdominal slings are composed of loosely knitted monofilaments, similar to the Monarc™, differing only in the direction of needle passage. The ObTape™ sling is a cross-linked multifilament polypropylene mesh which differs slightly from the Monarc™.[8]

Preoperative data recorded included surgical approach, age, parity, history of prior anti-incontinence surgery, PVR, number PPD required and concomitant pelvic/vaginal sur-

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TABLE 1. *Demographic and preoperative patient characteristics*

	TO	TA	p Value†
Mean age ± SD	57.1 ± 14.4	58.6 ± 13.3	Not significant*
Mean parity ± SD (range)	2.8 ± 1.6 (0–12)	2.8 ± 1.7 (0–11)	Not significant†
No. PVR greater than 100 cc (%)	22 (14.3)	49 (14.0)	Not significant†
No. prior anti-incontinence surgery (%)	31 (20.1)	63 (18.0)	Not significant†
PPD ± SD	2.1 ± 1.5	1.9 ± 1.4	Not significant†

* 2-Tailed independent samples t test.
† Fisher's exact test.

gery performed (anterior repair, posterior repair, hysterectomy and abdominal sacrocolpopexy). De novo urgency was defined as the development of symptoms of urgency and frequency which were not present before the sling procedure and required the administration of oral anticholinergics. Changes in SUI symptoms were evaluated by assessing the number of PPD needed by the patient after surgery. This was obtained by the primary surgeon at followup visits and recorded using a standardized chart evaluation instrument.

Three different postoperative categories were recognized as measures of efficacy, namely 0 pads per day, 1 to 2 PPD and more than 2 PPD. Intraoperative complications were recorded when present. Obstructive voiding complications recorded included increased PVR (greater than 100 cc) or the need for CIC, prolonged Foley catheter drainage (more than 1 week) or urethrolysis. Many patients had more than 1 of the complications mentioned, but only 1 (the most severe) was recorded for each patient. Urethrolysis was selected according to surgeon discretion after all conservative measures had been attempted and deemed unsuccessful during several months. Statistical analysis of obstructive complications was performed using Fisher's exact test for categorical variables and the 2-tailed independent samples t test for continuous variables. Two-factor ANOVA was used to determine the relationship between PPD before and after surgery.

RESULTS

Patient characteristics. Between September 2003 and July 2004, 504 women with followup data available were identified from the Urology Service at Brooke Army Medical Center (44), Urology Specialists of the Carolinas (27) and Urology San Antonio (433). The TO sling procedure was performed on 154 women (138 Monarc™ and 16 ObTape™ slings). A total of 350 women received TA slings (334 Gynecare TVT™ and 16 SPARC™ slings). Preoperative characteristics of patients undergoing TO and TA procedures appeared to be similar (table 1). Mean followup was 9 months for the TO group (range 6 to 16) and 20 months (range 18 to 26) for the TA group.

Pad use and complication rates. TO and TA sling groups showed similar excellent results in relieving incontinence, with 118 of 154 (89.4%) TO and 280 of 350 (85.6%) TA cases with 0 PPD use postoperatively ($p > 0.05$, table 2). The overall complication rate in this series was 16.1%, with PVR greater than 100 cc lasting more than 1 week being the most common obstructive finding (table 3). However, the TO approach was associated with significantly fewer obstructive complications (17 of 154, 11.0%) than the TA approach (64 of 350, 18.3%, $p < 0.05$). Most obstructive voiding complications (prolonged CIC or Foley catheter drainage) resolved during several weeks. Urethrolysis was required in none of the 154 TO cases and 8 of 350 (2.3%) in the TA group—a difference that approached but did not attain statistical significance ($p = 0.11$). De novo urge was also noted more rarely in the TO group (1.3%) compared to the TA group (6.0%, $p = 0.02$).

Concomitant surgery. Concomitant procedures such as anterior repair, posterior repair, hysterectomy and/or abdominal sacrocolpopexy were performed in 179 patients (35.5%). A total of 48 women in the TO group (31.2%) and 131 in the TA group (37.4%) underwent concomitant pelvic or vaginal surgery (77 anterior repair, 11 posterior repair, 17 hysterectomy or 74 complex [any combination of these surgeries with abdominal sacrocolpopexy]). While obstructive complications increased minimally in the TO (8 [8.3%]vs 4 [9.5%], $p = 0.85$) and TA (29 [14.3%] vs 30 [22.9%], $p = 0.17$) groups when concomitant procedures were performed, obstructive voiding complications were noted significantly more often in TO compared with TA procedures ($p = 0.04$).

Intraoperative complications. Serious complications in this series were rare. The TO group did not have any perioperative complications, while the TA group had 1 case (0.3%) of pelvic hematoma and 4 (1.1%) bladder perforations. Two perforations were amenable to needle replacement alone while the other 2 required open cystotomy for repair. There were no cases of bowel or vascular injury.

DISCUSSION

With more than 500 patients evaluated, to our knowledge this report is the largest and only multi-institutional comparison of TO and TA sling techniques. TO and TA approaches appear to be similarly efficacious in eliminating the need for incontinence pad use (TO 89.0% vs TA 86.0%), a finding previously noted by de Tayrac et al in a smaller comparative series of 61 patients (TO 90.0% vs TA 83.9%).[7] Obstructive voiding dysfunction is recognized as the most common reported complication of TA sling placement (17% to 50%).[9] Four large series of more than 200 patients showed a 2.8% to 8.0% urethrolysis rate after TA sling placement,[10–13] a finding not unlike our TA urethrolysis rate of 2.3%. Postoperative urinary retention was reported in only 13.3% of TO vs 25.8% in TA cases in the de Tayrac et al series.[7] Our data further suggest that signs of postoperative obstruction occur less often after TO than TA sling procedures. Most obstructive complications were self-limited in nature, resolving after several weeks.

Avoidance of the retropubic space in TO procedures is a major advantage which reduces the risk of potentially serious bladder, bowel or vascular injury that has been reported with the TA approach. Prior pelvic surgery (18.7% in our

TABLE 2. *Postoperative incontinence pad use*

No. Pads	TO (%)	TA (%)	p Value
0	89.4	85.6	0.36
1–2	9.1	9.5	1.00
Greater than 2	1.5	4.9	0.11