

Because Only Time Will Tell : Longterm Outcomes of 100 Transobturator Tape Procedures

Stefanie M Croghan¹, Grainne Costigan¹⁻², Niall O'Dwyer³, Eoin MacCraith³, Gerry Lennon³

¹Ireland

²Independent Statistician, Ireland

³Department of Urology, St. Vincent's University Hospital, Elm Park, Dublin 4, Ireland

Number ID: 1967/2019/01
Type: Original Basic Research And Clinical Articles
Domain: Functional urology
Corresponding author: Stefanie M Croghan; email: croghans@tcd.ie
Conflicts of interest: The authors declare no conflicts of interest.
Key Words: stress urinary incontinence, midurethral sling, transobturator tape, long-term outcomes, PROMs, Patient-Reported Outcomes

Introduction Midurethral sling placement had become the most common surgical treatment for female stress urinary incontinence (SUI) prior to recent controversies surrounding polypropylene tape. Satisfactory outcomes of transobturator tapes (TOTs) are recognized at short-term follow-up, yet a lack of long-term data exists. We aimed to investigate long-term patient-reported outcomes of TOTs.

Materials and methods A retrospective review of 100 female patients who underwent TOT insertion for SUI or stress-predominant mixed incontinence (MUI) by a single surgeon over a 5-year period was performed. We identified results of pre and postoperative investigations and postoperative complications, classified by Clavien-Dindo. At long-term follow-up, patients were asked to complete ICIQ-Short Form, PGI-S and PGI-I questionnaires.

Results 100 patients were included, mean age at operation 51.7 years (33-75), mean follow-up 9.4 years (7.25 - 12.75). Clinically, 68/100 had MUI and 32/100 had pure SUI. Short-term clinical and urodynamic cure or significant improvement in SUI was seen in 98/100 and 93/100 respectively. De-novo clinical urgency/detrusor instability arose in 2/100. Grade >2 Clavien-Dindo complications occurred in 10/100 (10%) within 6 months of surgery. Long-term questionnaire response rate was 76/100 (76%). Mean ICIQ score was 6.32 (1-20). 62/76 (81.57%) described current urinary condition as "much better" or "very much better" than prior to surgery. No new complications became apparent at long-term follow-up.

Conclusions TOTs demonstrate high success rates in treatment of SUI, with no late-onset complications identified in our study. Recent concerns surrounding use of polypropylene tapes make reporting of long-term outcomes both desirable and necessary.

INTRODUCTION

Stress urinary incontinence (SUI) is defined by the International Continence Society (ICS) as the complaint of involuntary leakage of urine on effort or exertion, or on sneezing or coughing.^{1, 2} SUI has a reported mean prevalence of 48% in adult females,³ whilst likely underreported, and consistently demonstrates a negative impact on quality of life.⁴

Surgical management offers the best chance of cure to women with SUI, particularly when conservative measures have proven ineffective. Relatively recent European and North American data showed that mid-urethral slings (MUS) had overtaken more traditional operations such as the Burch colposuspension and autologous pubovaginal sling to become the most common surgical procedures performed for SUI.⁵⁻⁸ This surge in popularity likely resulted from their minimally invasive nature and comparable efficacy at short-term evaluation.^{9, 10}

However, mid-urethral slings are a 21st century technique, with the transobturator tape first described by Delorme in 2001.¹¹ Consequently, long-term data is lacking, with few studies evaluating safety and efficacy beyond the short/medium term. Outcomes of some studies have suggested a decline in TOT efficacy with time.¹²⁻¹⁴ Furthermore, the safety profile of pelvic tapes/mesh has recently been questioned.^{15,16} While current evidence suggests a much lower risk of erosion/re-intervention with mesh used for MUS alone than that used for pelvic organ prolapse repair,^{17, 18} a greater volume of long-term data relating to TOT results is desirable. A 2017 Cochrane review concluded by emphasising the need for the reporting of longer-term data relating to MUS procedures to "substantially increase the evidence base and provide clarification regarding uncertainties about long-term effectiveness and adverse event profile."¹⁹

We aimed to assess the long-term safety results and patient reported clinical outcomes of TOTs performed for patients with both stress and mixed urinary incontinence.

METHODS

A retrospective review of 100 female patients who underwent MUS insertion via the transobturator approach over a 5-year period (2005-2010) in a single centre was performed. All patients were assessed and operated on by a single surgeon. Transobturator tapes (TOTs) were offered to patients with stress incontinence (SUI) and mixed urinary incontinence with a significant stress component, in whom conservative measures had proven ineffective. Routine preoperative assessment consisted of clinical history and physical examination, and investigations comprising flexible cystoscopy, stress test, uroflow, post-void residual measurement and cystometrogram. In a minority of cases a voiding cystourethrogram

(VCUG) was performed to clarify the diagnosis and to assess the degree of bladder neck descent.

All patients were taught the technique of intermittent self-catheterisation (ISC) preoperatively. The procedure was performed on an inpatient basis, typically with a 1-2 night length of stay. Transobturator tapes were inserted via an outside-in approach. The Monarc® subfascial hammock (AMS) was the tape of choice during the study period.

Postoperatively, post-void bladder scans were performed on all patients on the ward. Patients with significant post-void residual volumes (PVRs) were instructed to perform intermittent self-catheterisation until PVRs measured < 100ml. Postoperative uroflow and cystometrogram were performed on all patients at 6-12 weeks post procedure.

To ascertain long-term outcomes, an attempt to contact all patients from this study population with TOT in situ was made. Patients were telephoned and asked for verbal consent to participation. Patients were then posted questionnaires including the International Consultation on Incontinence Questionnaire (ICIQ-Short Form), a Patient Global Impression of Severity (PGI-S) and Patient Global Impression of Improvement (PGI-I) measure, and a freetext box to record any current urological medications, any complications suffered and other unstructured feedback. The ICIQ-SF is a validated, internationally used questionnaire.²⁰ The PGI-S and PGI-I tools have been validated and demonstrated to show strong correlation with frequency of incontinence episodes, pad tests and incontinence quality of life questionnaires.²¹

Complication data was recorded by retrospective review of medical notes, and updated where necessary following receipt of long-term patient feedback. Complications were classified as per the Clavien-Dindo system.²²

Results were compiled with statistical analysis performed using SPSS.

RESULTS

Population Characteristics

100 patients, mean age at operation 51.7 years (33-75) were included. 98/100 had SUI on CMG and 100/100 at stress test. Long-term follow-up data was obtained at mean 9.25 years (7.5 - 12.75). Of contactable patients with TOT, questionnaire response rate was 76/100 (76%).

Patient characteristics are outlined in Table 1.

Outcomes: Short-Term Clinical & Urodynamic

Short-term outcomes (mean 6 months; range 3-12 months) are displayed in Table 2.

Outcomes: Postoperative Voiding

Postoperative voiding data is outlined in Table 3. We analysed the relationship between the need for intermittent self-catheterisation postoperatively and cure of SUI. We observed no statistically significant correlation between a requirement for ISC and either short-term urodynamic cure of SUI ($p = 0.31$) or long-term patient reported cure of SUI (as defined by no urine leakage on coughing/sneezing or physical exertion on ICIQ form) ($p = 0.6$), chi-square test.

Patient Reported Outcomes at Long-Term Follow-Up

PROMs at long-term follow-up are shown in Table 4.

Complications

Grade 3b Clavien Dindo complications occurred in 10/100 (10%). All complications were apparent within 6 months of surgery (Table 5). No patients developed new symptoms suggestive of mesh erosion or other late complications during the study period.

DISCUSSION

This is one of a limited number of papers reporting on long-term outcomes of the transobturator tape. It is also relatively unusual in the availability of postoperative urodynamic data. Analysis is of a population with mixed urinary incontinence, which we feel is more representative of clinical practice than a pure SUI population.

Short-term Cure of Stress Urinary Incontinence

Our patient population reported 91% subjective cure of SUI at short-term follow up. 59% of the population surveyed (n=76) at long-term follow up reported sustained complete cure of SUI. The high short-term rate of subjective cure of SUI is similar to the 91% reported by Aygul et al. in a mixed UI population (n=92) at mean 22.17 month follow-up²³ and the 87.9% reported at 6 month follow-up by Jun et al. of an SUI population (n=223).²⁴ It is at the higher end of the 62-98% range at 12 month follow-up of the TOT populations observed by Ford et al. in systematic review of retropubic versus transobturator MUS insertion (studies 39, TOT n=3028).¹⁹ We used an 'outside-in' method of TOT placement, which appears to be equal in efficacy to the 'inside-out' approach in achieving continence.^{13, 19}

Long-term Cure of Stress Urinary Incontinence

Our data suggests a decline in complete cure rate with time. This has been observed by several other authors. The E-TOT RCT (n=341) showed a significant drop in patient-reported success rates for transobturator tape procedures between 1 and 3 year follow up, to 73% patient-reported success rate at 3 year follow-up.¹³ Kenton et al. (total n=404) reported a stepwards decline in patient reported TOT "success" with time, to 43.4% at 5 year follow-up.¹⁴ Lo et al. (n=56) reported 95% subjective cure of SUI with TOT at 1 year, dropping somewhat to 89.3% at 3 year follow up.²⁵ Jun et al follow a cohort of 223 patients and report 87.9% (n=196) to achieve cure of SUI within 6 months, and 63.68% (n=142) of the original cohort to be free of stress or mixed incontinence at 3 year follow-up.²⁴ Long-term patient reported cure rates with TOT were strikingly similar to the 59.2% reported by Al-Zahrani et al. (n=220) at 10 year follow-up¹², and the subjective cure rate of 59.6% at mean 8.33 years reported by Costantini et al.²⁶ One European study (n=160) does reports significantly higher long-term success rates of TVT-O without a decline in efficacy (97% subjective and 92% objective cure of SUI at 10 year follow-up).²⁷ It is unclear whether higher rates of voiding dysfunction were seen in this study as these were not formally assessed, but only one patient reported subjective voiding dysfunction at 10 years. The recent Cochrane review comparing retropubic and transobturator mid-urethral slings shows a possible decline in SUI cure over time with either approach.¹⁹ The 5 included trials (pooled n=683) reporting on 'medium-term' (1-5 year) outcomes, describe subjective cure of SUI range 82-91%, while the 4 included trials (pooled n=714) reporting on results at >5 year follow up describe subjective cure of SUI range 43-92%.¹⁹ Conclusions are difficult to draw given the wide variability in reported long-term efficacy and limited long-term reporting of outcomes overall. Our long-term follow-up was by questionnaire, with subjective recurrence of SUI considered if patients reported leaking urine on coughing/sneezing or on physical exertion. We recognise that this is an imperfect assessment. It is difficult to definitively differentiate recurrent SUI from, for example, incontinence secondary to cough-induced detrusor overactivity, in this way. Despite the decline in the number of patients reporting cure of SUI, we were encouraged by the high satisfaction rates, with 81.57% of patients at long-term follow-up reporting their condition remained much/very much better than preoperatively.

Urgency

At short-term follow-up, we observed improvement or cure of clinical urgency in 85.29% (58/68). Similarly, Laurikainen et al. reported 96% of patients with moderate/severe pre-existing urgency to have been cured two months post TVT-O placement.²⁸ Our rate of de novo urgency was 1%, with an additional patient identified with detrusor instability on CMG that was not apparent on the preoperative study. This is below the rate noted by Ford et al. in systematic review, where an overall mean rate of 8.35% was reported at short-term follow up, with similar incidence seen with medial-lateral and lateral-medial approaches,¹⁹ and a 12 month rate of 11.2% reported by Lleberia Juanos et al.²⁹ Lo et al reported a lower 3.6% incidence of de novo urgency at 36 months.²⁵ Some authors have described a lower rate of de novo urgency with trans-obturator versus retropubic approaches,²⁹ however no statistically significant difference emerged in a Cochrane review.¹⁹

At long-term follow up, 67% (51/76) of our patients reported some degree of urge incontinence on ICIQ questionnaire. Whilst at first glance this appears quite a high rate, it must be noted that 68% of the original cohort had clinically mixed urinary incontinence, and 25% (8/32) patients with clinically pure SUI had demonstrable detrusor overactivity on pre-procedure CMG. This separates our cohort from the pure SUI cohort of Al-Zahrani et al., in which a 5.9% rate of UUI at 10 year follow up was apparent.¹² Furthermore, our patient cohort, due gender and age, appear naturally predisposed to UUI. Prevalence of urge incontinence of 27% has been reported in adult³⁰ and late menopausal³¹ women, which is probably an underestimate. In epidemiological studies, multiple authors have identified an increase in urge urinary incontinence with age.³²⁻³⁴ A 2-year cumulative incidence of urge urinary incontinence of 1.5 – 9.5% in women aged ≥ 50 was recorded in one large study,³² whilst a 5-year longitudinal study reported an increase of urge urinary incontinence rates from 7.6-15.9% over the study period.³⁴ We therefore feel that this rate of urge urinary incontinence represents some loss of the original 85.29% improvement in urgency at short-term follow-up with time, as well as the natural history of UUI in this patient demographic, but not de novo UUI. It should also be noted that this figure does include very occasional, small volume urge incontinence in patients with good overall satisfaction with their urinary condition.

Voiding

Intermittent self-catheterisation was performed by 46.32% (44/95) of our patients for median 3 days (2-84). Six patients underwent tape loosening due to acute urinary retention. At short-term follow up, 3 patients were unable to void volitionally for uroflow, and the remainder voided well with no clinically significant change in QMax or PVR compared to preoperative figures. Ford et al., in their Cochrane review, reported an average rate of voiding dysfunction post TOT insertion of 5.53%.¹⁹ Some heterogeneity in the definition of voiding dysfunction is noted throughout the literature however,³⁵ and some authors record voiding dysfunction at short-term follow up, for example at 2 months, rather than immediately postoperatively.³⁶ It was noted in this meta-analysis that the medial-lateral methods of TOT insertion, (unlike our practice), were associated with a higher rate of voiding dysfunction (RR 1.74, 95% CI 1.06 to 2.88).¹⁹ We did not observe a significant difference in ISC requirements over the study timeframe. We did

however note that 4/6 cases of acute urinary retention requiring tape loosening in theatre occurred within the first half of the studied insertion period (2005-2007), and therefore possibly decreased with operator experience.

Anecdotally, there is a school of thought that early postoperative urinary retention may be correlated with increased success rates in the cure of SUI. We analysed this using the need for ISC as a measure for some degree of urinary retention. We found no significant correlation between this and either short-term urodynamic or long-term clinical cure of SUI. This supports tension-free placement of TOTs, as is our aim, influenced by the hammock theory of SUI.³⁷

Satisfaction

A limited amount of information is available in the literature pertaining to long-term satisfaction scores of patients post trans-obturator tape insertion. Our results demonstrate 73.68% (56/76) of women at long-term follow up, view their urinary condition as 'normal' or 'mild.' 81.57% (62/76) respondents felt their current urinary condition was 'much better' or 'very much better' than pre-operatively. Two other published studies using similar assessment instruments also demonstrated high long-term satisfaction scores: describing their urinary condition as 'much better' or 'very much better' in 92% of women at 10-year follow-up,²⁷ and in 88% of women at 5-year follow up respectively.¹⁴

Complications: Early

Major

Ford et al's Cochrane review identified an overall major visceral/vascular injury rate of 0.42% and a bladder perforation rate of 2.54%. The TOT was demonstrated to be associated with a lower incidence of these complications than the retropubic tape. Al-Zahrani et al. noted a rate of bladder or vaginal perforation of 1.5% (3/220) managed by a prolonged period of catheterisation in all 3. No cases of intraoperative bladder perforation, retropubic haematoma, visceral or vascular injury were identified in our study.

Infection

Urinary tract infection occurred in 4% of our patients postoperatively. Early, Clavien-Dindo 2 complications are not discussed in all papers. Our rate is similar to the 5.9% rate of postoperative UTI reported by Al-Zahrani et al.¹²

Acute urinary retention

Voiding dysfunction has been discussed above. Return to theatre for tape loosening or division took place in 6/100 cases all in the early postoperative phase. There was a clear learning-curve in relation to tape tensioning. Tamussino et al. using the Austrian national registry reported a lower rate of 24/2543 cases returning to theatre for voiding dysfunction.³⁸

Pain

Two patients suffered severe pain postoperatively. This prompted an examination under anaesthesia and cystoscopy in one patient, with normal findings, and pain subsequently resolved. Another patient suffered pain in association with adductor muscle spasm. Neurological dysfunction has previously been described with TOT; Kenton et al. reported 2/404 cases persisting after TOT at 5-year follow-up.¹⁴ Our patient underwent tape removal, and symptoms fully resolved. Our rate of significant postoperative pain is lower than the 5.85% groin pain identified by Ford et al's Cochrane review, where this complication was noted to be higher with trans-obturator than with retropubic routes of mid-urethral sling placement.¹⁹ It is, however, possible that we did not capture very mild cases that quickly resolved given the retrospective nature of the early component of our study.

Complications: Late

Dyspareunia

Two patients in our study reported persistent dyspareunia at long-term follow-up. Rates of de-novo dyspareunia of 1% (2/220) to 9% are described in patients undergoing mid-urethral sling placement.^{12, 27, 39, 40} Cochrane review of transobturator versus retropubic insertion identified no significant difference in the low rates of superficial or deep dyspareunia between the groups.¹⁹ Dyspareunia post TOT may be attributable to vaginal narrowing.⁴¹ We note with interest some improvement reported by Serati et al.²⁷ with the use of topical steroids, which is not something we tried in this study. We emphasize the importance of pre-operative patient counselling in this regard.

Tape Erosion

No patients in our cohort were identified as having symptomatic urethral, bladder or vaginal tape erosion at long-term follow up. None of our patients reported new onset dysuria, bleeding, or other symptoms indicative of this complication.^{42, 43} Similarly, Lo et al.²⁵ reported no cases of mesh erosion with use of the Monarc® subfascial hammock at 5-year follow up, and Forde et al, identified no cases of urethral or bladder erosion with the transobturator tape from the pooled results of 4 studies (pooled n=180). Vaginal erosion appears slightly more prevalent; Forde et al report an overall rate of 2.09% from the pooled results of 31 trials with 4743 participants undergoing either TOT or retropubic MUS placement, with no significant difference between techniques.⁴² Aygul et al.²³ reports a mesh erosion rate of 2% with TOT, and Kenton et al. describe 7/404 (1.73%) of patients from a mixed transobturator/retropubic population developing mesh erosion between 3-5 years of follow up, with similarly low incidence between groups.

CONCLUSIONS

We found a high patient satisfaction rate post transobturator tape insertion for both SUI and stress-predominant MUI at long-term follow up in this study. An overall low complication rate was observed, with no new complications emerging at long-term follow-up. Recent controversies surrounding use of pelvic mesh make this data particularly pertinent. We feel that the reporting of long-term prospective outcomes for this procedure is imperative, and that multi-centre studies would facilitate analysis of the risk-benefit equation and inform policy regarding the future use of synthetic mid-urethral slings.

REFERENCES

1. Blackmore R. International Continence Society Fact Sheets. ICS, 2015.
2. Abrams P, Cardozo L, Fall M, et al. The standardisation of terminology in lower urinary tract function: report from the standardisation sub-committee of the International Continence Society. *Urology*. 2003; 61: 37-49.
3. Hunskaar S AE, Burgio K, et al. . Epidemiology and natural history of urinary incontinence. In: Abrams P, Khoury S, Wein A, eds. *Incontinence—first international consultation on incontinence.*: Plymbridge Distributors, 1999, p. 199-226.
4. Broome BA. The impact of urinary incontinence on self-efficacy and quality of life. *Health Qual Life Outcomes*. 2003; 1: 35.
5. Oliphant SS, Wang L, Bunker CH and Lowder JL. Trends in stress urinary incontinence inpatient procedures in the United States, 1979-2004. *Am J Obstet Gynecol*. 2009; 200: 521 e1-6.
6. James MB, Theofanides MC, Sui W, Onyeji I, Badalato GM and Chung DE. Sling Procedures for the Treatment of Stress Urinary Incontinence: Comparison of National Practice Patterns between Urologists and Gynecologists. *J Urol*. 2017; 198: 1386-91.
7. Kurkijarvi K, Aaltonen R, Gissler M and Makinen J. Surgery for stress urinary incontinence in Finland 1987-2009. *Int Urogynecol J*. 2016; 27: 1021-7.
8. Withington J, Hirji S and Sahai A. The changing face of urinary continence surgery in England: a perspective from the Hospital Episode Statistics database. *BJU Int*. 2014; 114: 268-77.
9. Ogah J, Cody JD and Rogerson L. Minimally invasive synthetic suburethral sling operations for stress urinary incontinence in women. *Cochrane Database Syst Rev*. 2009: CD006375.
10. Fusco F, Abdel-Fattah M, Chapple CR, et al. Updated Systematic Review and Meta-analysis of the Comparative Data on Colposuspensions, Pubovaginal Slings, and Midurethral Tapes in the Surgical Treatment of Female Stress Urinary Incontinence. *Eur Urol*. 2017; 72: 567-91.
11. Delorme E. [Transobturator urethral suspension: mini-invasive procedure in the treatment of stress urinary incontinence in women]. *Prog Urol*. 2001; 11: 1306-13.
12. Al-Zahrani AA and Gajewski J. Long-term patient satisfaction after retropubic and transobturator mid-urethral slings for female stress urinary incontinence. *J Obstet Gynaecol Res*. 2016; 42: 1180-5.
13. Abdel-Fattah M, Mostafa A, Familusi A, Ramsay I and N'Dow J. Prospective randomised controlled

- trial of transobturator tapes in management of urodynamic stress incontinence in women: 3-year outcomes from the Evaluation of Transobturator Tapes study. *Eur Urol.* 2012; 62: 843-51.
14. Kenton K, Stoddard AM, Zyczynski H, et al. 5-year longitudinal followup after retropubic and transobturator mid urethral slings. *J Urol.* 2015; 193: 203-10.
 15. Kuhlmann-Capek MJ, Kilic GS, Shah AB, Diken ZM, Snyder RR and Phelps JY, 3rd. Enmeshed in Controversy: Use of Vaginal Mesh in the Current Medicolegal Environment. *Female Pelvic Med Reconstr Surg.* 2015; 21: 241-3.
 16. Chermansky CJ and Winters JC. Complications of vaginal mesh surgery. *Curr Opin Urol.* 2012; 22: 287-91.
 17. Chughtai B, Barber MD, Mao J, Forde JC, Normand ST and Sedrakyan A. Association Between the Amount of Vaginal Mesh Used With Mesh Erosions and Repeated Surgery After Repairing Pelvic Organ Prolapse and Stress Urinary Incontinence. *JAMA surgery.* 2017; 152: 257-63.
 18. MacDonald S, Terlecki R, Costantini E and Badlani G. Complications of Transvaginal Mesh for Pelvic Organ Prolapse and Stress Urinary Incontinence: Tips for Prevention, Recognition, and Management. *Eur Urol Focus.* 2016; 2: 260-7.
 19. Ford AA, Rogerson L, Cody JD, Aluko P and Ogah JA. Mid-urethral sling operations for stress urinary incontinence in women. *Cochrane Database Syst Rev.* 2017; 7: CD006375.
 20. Abrams P, Avery K, Gardener N, Donovan J and Board IA. The International Consultation on Incontinence Modular Questionnaire: www.icicq.net. *J Urol.* 2006; 175: 1063-6; discussion 6.
 21. Yalcin I and Bump RC. Validation of two global impression questionnaires for incontinence. *Am J Obstet Gynecol.* 2003; 189: 98-101.
 22. Dindo D, Demartines N and Clavien PA. Classification of surgical complications: a new proposal with evaluation in a cohort of 6336 patients and results of a survey. *Ann Surg.* 2004; 240: 205-13.
 23. Aygul C, Ozyurt R, Sik BA and Kumbasar S. Evaluation of the efficacy of transobturator tape surgery in the treatment of stress urinary incontinence using urodynamics and questionnaires. *Turk J Obstet Gynecol.* 2016; 13: 172-7.
 24. Jun T, Yoon HS, Kim HS, Lee JW, Bae J and Lee HW. Recurrence rate of stress urinary incontinence in females with initial cure after transobturator tape procedure at 3-year follow-up. *Investig Clin Urol.* 2017; 58: 54-60.
 25. Lo TS, Jaili S, Tan YL and Wu PY. Five-year follow-up study of Monarc transobturator tape for surgical treatment of primary stress urinary incontinence. *Int Urogynecol J.* 2016; 27: 1653-9.
 26. Costantini E, Kocjancic E, Lazzeri M, et al. Long-term efficacy of the trans-obturator and retropubic mid-urethral slings for stress urinary incontinence: update from a randomized clinical trial. *World J Urol.* 2016; 34: 585-93.
 27. Serati M, Braga A, Athanasiou S, et al. Tension-free Vaginal Tape-Obturator for Treatment of Pure Urodynamic Stress Urinary Incontinence: Efficacy and Adverse Effects at 10-year Follow-up. *Eur Urol.* 2017; 71: 674-9.
 28. Laurikainen E, Valpas A, Kivela A, et al. Retropubic compared with transobturator tape placement in treatment of urinary incontinence: a randomized controlled trial. *Obstet Gynecol.* 2007; 109: 4-11.
 29. Lleberia-Juanos J, Bataller-Sanchez E, Pubill-Soler J, Mestre-Costa M, Ribot-Luna L and Vizcaino MA. De novo urgency after tension-free vaginal tape versus transobturator tape procedure for stress

- urinary incontinence. Eur J Obstet Gynecol Reprod Biol. 2011; 155: 229-32.
30. Lara C and Nacey J. Ethnic differences between Maori, Pacific Island and European New Zealand women in prevalence and attitudes to urinary incontinence. N Z Med J. 1994; 107: 374-6.
 31. Iosif CS and Bekassy Z. Prevalence of genito-urinary symptoms in the late menopause. Acta Obstet Gynecol Scand. 1984; 63: 257-60.
 32. Komesu YM, Schrader RM, Ketai LH, Rogers RG and Dunivan GC. Epidemiology of mixed, stress, and urgency urinary incontinence in middle-aged/older women: the importance of incontinence history. Int Urogynecol J. 2016; 27: 763-72.
 33. Lifford KL, Townsend MK, Curhan GC, Resnick NM and Grodstein F. The epidemiology of urinary incontinence in older women: incidence, progression, and remission. J Am Geriatr Soc. 2008; 56: 1191-8.
 34. Waetjen LE, Liao S, Johnson WO, et al. Factors associated with prevalent and incident urinary incontinence in a cohort of midlife women: a longitudinal analysis of data: study of women's health across the nation. Am J Epidemiol. 2007; 165: 309-18.
 35. Ahn C, Bae J, Lee KS and Lee HW. Analysis of voiding dysfunction after transobturator tape procedure for stress urinary incontinence. Korean J Urol. 2015; 56: 823-30.
 36. Houwert RM, Renes-Zijl C, Vos MC and Vervest HA. TVT-O versus Monarc after a 2-4-year follow-up: a prospective comparative study. Int Urogynecol J Pelvic Floor Dysfunct. 2009; 20: 1327-33.
 37. DeLancey JO. Structural support of the urethra as it relates to stress urinary incontinence: the hammock hypothesis. Am J Obstet Gynecol. 1994; 170: 1713-20; discussion 20-3.
 38. Tamussino K, Hanzal E, Kolle D, et al. Transobturator tapes for stress urinary incontinence: Results of the Austrian registry. Am J Obstet Gynecol. 2007; 197: 634 e1-5.
 39. Mengerink BB, Van Leijssen SA, Vierhout ME, et al. The Impact of Midurethral Sling Surgery on Sexual Activity and Function in Women With Stress Urinary Incontinence. J Sex Med. 2016; 13: 1498-507.
 40. Paul F, Rajagopalan S, Doddamani SC, Mottemmal R, Joseph S and Bhat S. Effect of midurethral sling (transobturator tape) surgery on female sexual function. Indian J Urol. 2015; 31: 120-4.
 41. Elzevier HW, Putter H, Delaere KP, Venema PL, Lycklama a Nijeholt AA and Pelger RC. Female sexual function after surgery for stress urinary incontinence: transobturator suburethral tape vs. tension-free vaginal tape obturator. J Sex Med. 2008; 5: 400-6.
 42. Forde JC, Davis NF and Creagh TA. Evaluation of Presenting Symptoms and Long-Term Outcomes of Patients Requiring Excision of a Transobturator Tape (TOT). Ir Med J. 2015; 108: 270-2.
 43. Shah HN and Badlani GH. Mesh complications in female pelvic floor reconstructive surgery and their management: A systematic review. Indian J Urol. 2012; 28: 129-53.

Attached tables:

1. Table1 Population Characteristics.docx
Caption/remarks: Table 1: Population Characteristics
2. Table2 Table 2- Short-term Outcomes.docx
Caption/remarks: Table 2: Short-Term Outcomes
3. Table3- Pre and Postoperative Voiding Fu.docx
Caption/remarks: Table 3: Pre and Post-Operative Voiding Function
4. Table4 - Long-term Patient Reported Outc.docx

Caption/remarks: Table 4: Long-Term Patient-Reported Functional Outcomes
5. Table5- Complication Data.docx
Caption/remarks: Table 5: Complication Data

Table1 Population Characteristics.docx

Failed conversion of the file to PDF preview. The table preview will be prepared by the editorial office within 24 hours.

Table2 Table 2- Short-term Outcomes.docx

Failed conversion of the file to PDF preview. The table preview will be prepared by the editorial office within 24 hours.

Table3- Pre and Postoperative Voiding Fu.docx

Failed conversion of the file to PDF preview. The table preview will be prepared by the editorial office within 24 hours.

Table4 - Long-term Patient Reported Outc.docx

Failed conversion of the file to PDF preview. The table preview will be prepared by the editorial office within 24 hours.

Table5- Complication Data.docx

Failed conversion of the file to PDF preview. The table preview will be prepared by the editorial office within 24 hours.