

## TRANSOBTURATOR TAPE (TOT) FOR TREATMENT OF FEMALE STRESS INCONTINENCE: EARLY EXPERIENCE

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**Objective** Evaluation of the transobturator tape (TOT), the newest tension-free technique for the treatment of female stress urinary incontinence (SUI) and its early results with 6 months follow up.

**Patients and Methods** This study was conducted at King Saud Hospital, Saudi Arabia, between September 2002 and March 2004. Fourteen cases with pure SUI were treated with Uratape, a low-elasticity polypropylene tape, according to the technique described by Delorme<sup>1,2</sup>. Preoperative assessment included full history, urogynecological examination, cough stress test, Q-tip test, cystogram and urodynamic studies. Perioperative cystoscopy was also done.

**Results** No intraoperative complications were recorded. Postoperative complications included transient incisional pain in 2 (14.3%), transient voiding difficulty in 5

(35.7%) and urgency and frequency with mild pyuria in 3 cases (21.4%). Mild groin ecchymosis was seen in 5 cases (35.7%). Vaginal wound infection and wound dehiscence with subsequent tape removal occurred in one case only (7.1%). Twelve cases (85.7%) achieved full continence and one patient (7.1%) had minimal leak with extreme stress but was fully satisfied.

**Conclusion** From the promising results of our early experience we conclude that the TOT procedure is a simple, safe, fast and minimally invasive technique for the treatment of SUI in women with few minor complications and a high success rate. Further studies on a larger number of patients will however be needed to confirm these results.

**Key Words** female, stress urinary incontinence, transobturator tape (TOT), Uratape

### INTRODUCTION

Stress urinary incontinence is the involuntary leakage of urine during exercise or movements such as coughing, sneezing and laughing. It is usually caused by weak or damaged muscles and connective tissue in the pelvic floor, compromising urethral support, or by weakness of the urethral sphincter itself<sup>3</sup>. Typically, the first line of treatment is conservative and includes pelvic floor muscle training, electrical stimulation and biofeedback. If the condition does not improve, a surgical alternative is considered. Surgical alternatives include bladder neck suspension, colposuspension, tension-free vaginal tape (TVT), traditional suburethral slings and injectable agents. Of these, TVT is currently the most popular technique<sup>4</sup>. Recently, the transobturator tape (TOT) was introduced by Delorme<sup>1</sup> as a minimally invasive procedure with current evidence of safety and efficacy. In the following, we describe our early results with this new technique.

### PATIENTS AND METHODS

Fourteen female patients with clinically and urodynamically proven pure stress incontinence (SUI) were enrolled in this study. All were subjected to full history review, urogynecological examination, cough stress test and Q-tip test. A cystogram with lateral and post voiding films as well as urodynamic studies were also done in all cases. The patients' age ranged from 43 to 66 years (mean 55.3 years). All were multipara (5-9 parities, mean 7.14). Four patients gave a history of caesarean section and two had undergone caesarean hysterectomy. Two cases had been subjected to vaginal repair (anterior colporrhaphy) for prolapse after which they developed SUI. Three patients had tried physiotherapy. All patients but one were overweight. Patients with severe genital prolapse were excluded. Only patients with a mild degree of vaginal prolapse were selected for this study. The Q-tip test revealed urethral hypermobility in 10 cases.

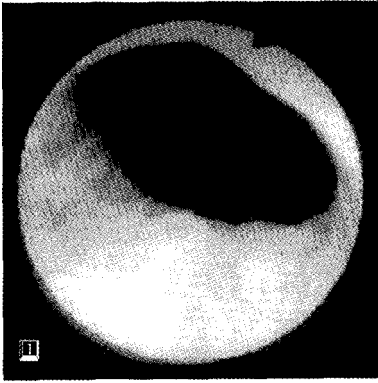


Fig. 1: Urethroscopy showing intrinsic sphincter dysfunction (ISD) and a wide bladder neck

Urodynamic studies did not prove any detrusorhyperactivity in any case while intrinsic sphincter dysfunction (ISD) was proven in 4 cases with a maximum urethral closure of less than 30 cm H<sub>2</sub>O. Bladder capacity was normal in all cases and no significant residual urine was found in any case.

All treatable causes of increased intraabdominal pressure as well as vaginal and urinary tract infection were managed preoperatively. All patients received 5000 IU heparin subcutaneously before being transferred to the operation room. Two grams of third-generation cephalosporin were administered intravenously prior to the operation and followed by 1 gram 8 hourly for 24 hours. The TOT procedure was carried out under general anesthesia at the patient's request.

Follow up was done subjectively and by pelvic ultrasound for residual urine 2, 6 and 13 weeks postoperatively for all patients. Nine patients could be followed up for 6 months.

#### *Surgical Technique:*

General anesthesia was administered to all patients at their request. They were placed in the gynecological position with hyperflexed thighs with the buttocks reaching the edge of the table. The operative field was cleaned with aqueous iodine including the vagina. Preliminary cystoscopy was done to exclude any bladder pathology followed by dynamic urethroscopy to assess the sphincter state (Fig.1).

The TOT procedure was done according to Delorme's description<sup>1,2</sup> using the Uratape

sling and the curved tunneller needle. A 16 F Foley's catheter was first inserted. The labia minora were fixed to the skin by nylon sutures. A 15 mm vertical vaginal incision along the line of the urethra was done in the anterior vaginal wall starting at a point 10 mm from the urethral meatus proximally (Fig. 2). Dissection of the para-urethral space was started using scissors, being deep between vesicovaginal fascia and urethra. Dissection was directed towards the ischiopubic ramus on both sides until enough room to pass a finger was created. Bilateral vertical skin incisions were made in the genito-femoral folds 10 mm outside the ischiopubic rami at the level of a horizontal line passing through the clitoris. The curved tunnelling needle was then introduced vertically (outside-in) through the skin incision just to perforate the obturator membrane. The tunneller was then directed downward and inward around the ischiopubic ramus aiming at the urethra. The passage of the tunneller was controlled by a finger of the other hand passed through the vaginal incision that deviated the urethra away from the tunneller (Fig.3).

The vagina was inspected to exclude any lateral wall perforation. The TOT sling that had been soaked in normal saline for a few minutes was then clipped to the tunneller eye. The tunneller was withdrawn, supported by a finger, until the tape could be exteriorized via the genito-femoral fold incision (Fig.4).

The same procedure was then repeated on the other side. The tape was adjusted tension-free behind the mid urethra. It was positioned in a way that the silicon-coated surface in its middle part faced the midurethra and the black-lined surface faced the vagina. A visible space between the tape and the urethra was left by interposing scissors between the tape and urethra while applying traction on the distal ends of the tape. The excess tape was then excised (Fig. 5). The skin incisions were closed subcuticularly with prolene 2/0, and the vaginal incision was closed with polyglactin 2/0 interrupted sutures. The urethral catheter was kept for 24 hours. All patients but two were discharged on the first postoperative day. The two cases had groin pain and were discharged on the second day. Early mobilization was allowed after 6 hours and daily activities could be resumed after 2 weeks. Strenuous activity and sexual intercourse were permitted after 6 weeks.

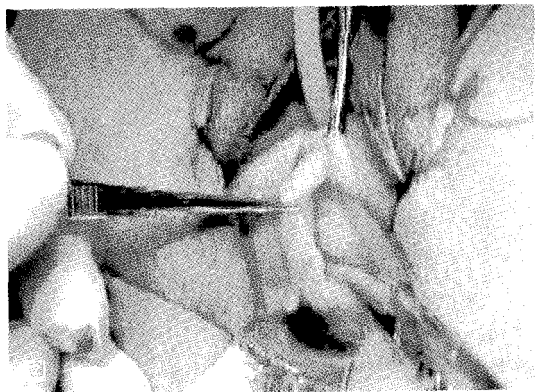


Fig. 2: Intraoperative picture showing the vaginal incision.



Fig. 3: Intraoperative picture showing finger-controlled tunneller insertion



Fig. 4: Intraoperative picture showing exteriorization of the tape

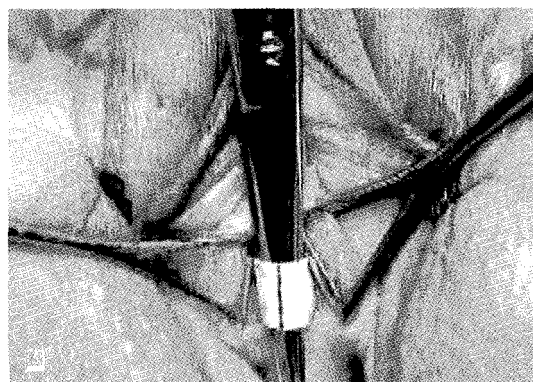


Fig. 5: Intraoperative picture showing the adjustment of the tape

## RESULTS

In total, 14 cases with pure stress urinary incontinence were operated using the TOT procedure, outside-in technique. All patients were suffering from typical symptoms of SUI documented by detailed history, physical examination, cystography, endoscopic assessment and urodynamic examination. The patients' mean age was 55.3 years (range 43 to 66 years). The mean parity was 7.14 (range 5 to 9). Eight patients had been operated previously but not for incontinence (4 caesarean section, 2 caesarean hysterectomy and 2 anterior colporrhaphy). Ten cases had urethral hypermobility and four had intrinsic sphincter dysfunction (ISD) documented by Q-tip test, endoscopy and urodynamic study. Nine cases had mild vaginal prolapse of first and second degree which did not require surgical treatment.

Surgery was done under general anesthesia in all cases. The mean operative-time, from the beginning of TOT procedure until closure of the incisions, was 25 min. (range: 19 – 35 min). No perioperative complications were encountered. No significant bleeding, no urethral, vaginal, bladder, bowel or nerve injury was encountered. During the postoperative follow up, minimal ecchymosis was noted in 5 patients in the groin incision which disappeared spontaneously. Two patients who had pain in the groin incision were hospitalized for two days and received mild analgesia. A minimal superficial infection of the vaginal incision was seen in one patient (7.1%) and was treated by local antiseptic. Another patient (7.1%) developed severe vaginal wound infection and dehiscence and required tape extraction under local anesthesia. This last patients was one of the two who had had previous anterior

**Table 1:** Postoperative Complications

Complication	No of Pts	%
Ecchymosis	5	35.7%
Transient pain	2	14.3%
Minimal vaginal erosion	1	7.1%
Vaginal incision dehiscence	1	7.1%
Urinary tract infection	3	21.4%
Transient difficult voiding	5	35.7%

**Table 2:** Final Outcome

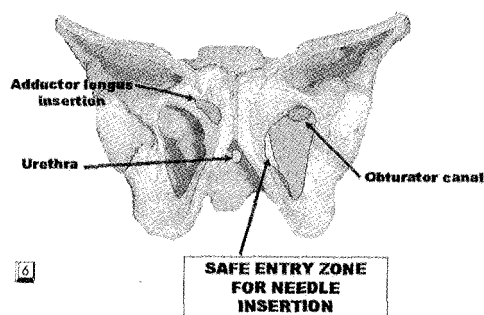
Outcome	No of Pts	%
Cured	12	85.8%
Improved	1	7.1%
Failed	1	7.1%

colporrhaphy. Urgency and frequency affected three cases and their urine analysis revealed mild pyuria that was treated by simple antibiotic. Retention was not reported in any case. Mild difficulties in micturition were encountered in five cases with an ultrasonographically estimated residual urine of less than 100 ml. After three months no more difficulty was present and the residual urine in 3 of those cases became nil and in the other 2 cases became less than 20 ml (Table 1). Complete continence was documented in 12 cases (85.8%), light incontinence during strenuous cough affected one patient (7.1%) but she nonetheless felt satisfied. In one patient the tape was extracted (failure 7.1%) (Table 2).

## DISCUSSION

Approximately 25% of community dwelling women and 50% of nursing home residents experience some degree of stress incontinence<sup>5</sup>. The understanding of the physiological concepts of SUI has been improved over the past decades and has led to the development of numerous surgical techniques aimed at curing this disorder. Among these, the retropubic tension-free vaginal tape (TVT) has been the most revolutionary. In this approach a synthetic transvaginal suburethral sling is placed through

## Obturator Anatomy

**Fig. 6:** Diagram illustrating the safe path of the sling

the retropubic space without using suspension sutures<sup>4,5</sup>. The sling is held in place by the friction between the mesh and the tissue canal created by the metallic needle. Later, scar tissue fixes the mesh, thus preventing migration. This results in a mid-urethral complex support that stabilizes the mechanism generated by the pubo-urethral ligament and levator ani muscle without modifying cervico-urethral mobility<sup>3,7</sup>. The blind passage of the tunneller needle in the retro-pubic space can result in injury of the bladder, urethra, blood vessels, nerves and bowel<sup>8-10</sup>. A TVT acute angle can lead to temporary or permanent urinary retention. Pain and de novo detrusor instability can also result<sup>11</sup>. Delorme and colleagues described an alternative approach to avoid these complications. In this procedure the tape is inserted through the obturator foramina from outside to inside. This approach is claimed to be safer<sup>12,13</sup>. The space that the needle passes through has been extensively studied and has been found to be a very safe space to work in (Fig.6). The needle and the sling do not pass through the abdominal wall. There is no risk of major bleeding (no major blood vessels), bowel, bladder or nerve injury. The obturator nerve and vessels are nowhere near to the surgical tract especially in the hyperflexed gynecological position<sup>14</sup>. The needle is also guided by a finger placed vaginally; therefore, there is a minimal blind passage of the needle. The TOT sling is claimed to form a subfascial hammock of support under the urethra mimicking the pubourethral ligament. This ligament provides the backboard of support to prevent urinary leakage with stress events. When it is damaged by childbirth trauma, aging or straining SUI may ensue<sup>15</sup>. The TOT sling position

reproduces the natural position of the pubourethral ligament and replaces the damaged ligament with a permanent mesh tape which provides the support needed to prevent leakage. The angle of the TOT sling is much less acute than other known slings, such as TVT. This in turn results in fewer problems with urinary dysfunction such as urinary retention<sup>2</sup>.

In our study no intra-operative visceral injury, serious complication or hemorrhage occurred. Vaginal perforation as well as bladder perforation associated with cystocoele was reported in few series<sup>16</sup>. In this study we did not experience any of these complications which is similar to other big series<sup>2,13,17</sup>.

Few post-operative complications have been reported by different authors. These complications included urinary tract infection (20%)<sup>13</sup> and transient pain (16%)<sup>17</sup>. Both were recorded in our study (21.4% UTI and 14% pain). In some few series<sup>17,18</sup> complete retention was reported, however this complication was not encountered in our series. Similar to other studies<sup>2,13,19</sup>, five of our patients (35.7%) experienced transient difficult micturition, while urethral necrosis reported by Game et al.<sup>20</sup>, did not occur in our series. Vaginal wound infection and dehiscence complicated one of our cases (7.1%), and the tape had to be removed.

The overall success in this study was 92.9% (12 cases achieved complete continence and one patient reported minimal leakage under severe stress conditions). This rate is comparable to what has been reported by other authors<sup>2,13,17,19</sup>. The operative time in the beginning of our study was maximally 35 minutes and decreased over time to 19 minutes.

From the promising results of our early experience we conclude that the TOT procedure is a simple, safe, fast and minimally invasive technique for the treatment of SUI in women with few minor complications and a high success rate. Further studies on the long-term results of this technique will however be needed.

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## RESUME

### Les bandelettes trans-obturatrices (TOT) dans le traitement de l'incontinence urinaire féminine d'effort: expérience prélinéaire

**Objectifs :** Évaluation de la bandelette trans-obturatrice (TOT), la plus récente technique d'implantation de bandelettes sans tension pour le traitement de l'incontinence urinaire d'effort (SUI) et ses premiers résultats à 6 mois. **Patients et Méthodes :** Cette étude a été comportée à l'Hôpital King Saud, Arabie Saoudite, de septembre 2002 à mars 2004. Quatorze cas avec SUI pur ont été traités par Uratape, un polypropylène dont l'élasticité est basse, d'après la technique décrite par Delorme<sup>1</sup>. L'évaluation préopératoire a inclu l'histoire de la maladie, l'examen uro-gynécologique, épreuve à l'effort de toux, épreuve du Coton-tige, cystogram et études urodynamique. La cystoscopie périopératoire a aussi été réalisée. **Résultats :** Aucune complication peropératoire n'a été enregistrée. Les complications postopératoires ont inclu des douleurs transitoires des sites d'incisions chez 2 patients (14.3%), des problèmes mictionnels chez 5 (35.7%) et urgence et fréquence avec pyurie dans 3 cas (21.4%). L'ecchymose du pli de l'aîne a été vu dans 5 cas (35.7%). L'infection de la plaie vaginale et la déhiscence de la cicatrice avec expulsion de la bandelette dans un cas (7.1%). Dans douze cas la continence est parfaite (85.7%) et une patiente (7.1%) avait des fuites minimales lors des gros efforts mais était complètement satisfaite. **Conclusions :** La procédure du TOT pour le traitement de SUI chez les femmes est une technique simple, sûre, rapide et mini-invasive avec peu de complications mineures et un haut taux du succès. Cependant il faut attendre les résultats à long terme.

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