Comparison of TOT and TVT in Treatment of Female Stress Urinary Incontinence

Stress Üriner İnkontinansının Cerrahi Tedavisinde TOT ve TVT'nin Karşılaştırılması

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Özet

Amaç: Tension-free vaginal tape (TVT) ve Transobturator tape (TOT) prosedürlerinin sonuç ve komplikasyonlarının karşılaştırılması. Gereç ve Yöntem: Stres Üriner İnkontinansı olan 62 hastaya TOT ve TVT yapıldı. Hastaların kliniko-patolojik özellikleri, pre ve postoperatif komplikasyon oranları, hayat kaliteleri karşılaştırıldı. Bulgular: Hastaların yarısına TOT, diğer yarısına TVT yapıldı. TOT yapılan hastaların %74'ü kür oldu, %26'sında semptomlar iyileşti. Bu gurupta 11hastada dizüri, 10 hastada pubis arkası ağrı gözlendi. TVT gurubunda ise kür oranı %90, iyileşme oranı %8 idi. İki hastada operasyon sonrası urge-inkontinans gelişti. Hastaların hayat kalitesinin toplamda %93,5 arttığı belirlendi. Kontinans sonuçları ve hayat kalitesi açısından iki presedür arasında anlamlı bir fark izlenmedi. Komplikasyon oranı TVT gurubunda anlamlı olarak yüksek bulundu. Tartışma: Kısa dönemde TOT ve TVT uygulamalarının başarısı benzerdi. Operasyonlara kolpografi eklenmesi her iki uygulamada da başarıyı düşürürken, operasyon zamanı TOT uygulamasında daha kısaydı.

Anahtar Kelimeler

Stres Ürüner İnkontinans; Transobturator Sling; Retropubik Sling; Hayat Kalitesi; TOT; TVT Komplikasyonları

Abstract

Aim: To compare the continence results and complications of the tension-free vaginal tape (TVT) and transobturator tape (TOT) procedures. Material and Method: Sixty two urinary incontinence patients; (37 were stress urinary incontinence and 25 were mixed incontinence) underwent TVT or TOT. The clinic-pathologic parameters of the patients, perioperative and postoperative complications and outcome in terms of continence and quality of life were compared. Results: TOT and TVT were performed on % 50 of the patients respectively. An objective cure rate in patients who underwent TOT was observed in 74% of cases, an objective improvement in 26% of cases. 11 of the patients had dysuria, 10 of them had suprapubic pain. An objective cure rate in patients who underwent TVT was observed in 90% of cases, an objective improvement in 8% of cases. A de novo urge incontinence presented in 2 patients. The quality of life improved in 93,5% of cases. In terms of continence results and quality of life, there was no significant difference between the procedures. The complication rate was higher with the TVT procedure when compared to that of the TOT procedure. Discussion: TOT procedure in short terms, performs similar operational success with the TVT procedure. Operational time; in consideration of the cystoscopy time, can be an advantage compared to the TVT procedure. If the operation includes anterior colporrhaphy, the success of both procedures reduces.

Keywords

Stress Urinary Incontinence; Transobturator Slings; Retropubic Slings; TOT; TVT; Complications; Quality of Life

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Introduction

The International Continence Society (ICS) defined incontinence as "the involuntary loss of urine that is a social or hygienic problem."[1]. Furthermore patients sexual, daily, social and business life is effected and to prevent this situation, most of the social and physical activities, even the fluid intake are restricted by the patient. An analyze in our country, in 1999 was performed by Demirci et al. 56,4 % of the menopausal patients describe an incontinence, and 37% of them describe incontinence at least twice a month [2]. Surgical procedures for incontinence are indicated when conservative therapy has failed to achieve the desired results. Surgical therapy for SUI focuses on the use of mid-urethral slings which have radically affected the treatment of female SUI. The surgical strategy in place is expected to improve or cure incontinence. Ulmsten introduced the tension free vaginal tape (TVT) procedure in 1996 [3]. This was a revolution that leads the other minimal invasive therapeutic options for the surgical treatment of SUI. Prospective studies, such as by Nilsson et al. [4] have demonstrated that objective cure rate is 90% and the subjective cure rate 77%.It is a successful procedure but complications such as vascular, bowel and bladder injuries related to the passage of the sling through the retropubic space have been reported [5]. In order to minimize these complications the placement of a mesh via a transobturator outside to inside route (TOT) reported by Delorme et al. [6] in 2001. It was reported that 90.6% of the patients who underwent the (TOT) procedure were cured and that SUI in 9.4% was improved. The aim of this prospective study is to compare TVT and TOT procedures in terms of continence results, complications and quality of life.

Material and Method

This study was designed prospectively and ethical approval was taken from our Institutional

Ethic Committee. Sixty two patients at Aegean Maternity and Teaching Hospital, complaining urinary incontinence with urodynamically proven SUI, including a positive stress test, underwent TVT or TOT surgery. In groups of four consecutive patients were randomized for TVT and TOT operations. Preoperative assessment included a detailed urogynaecological history and physical examination, pad use/day, urinalysis, urogynaecological clinical examination and urodynamic evaluation(with Life-tech® Janus 4.04 urodynamy device) including a stress test (cough provocation) in sitting and standing positions with a bladder volume of 300 ml, stress urethral pressure profilometry, uroflowmetry and post-void residual.

After the evaluation, patients with SUI and MUI diagnosis prepared for TVT or TOT procedures. Prior to surgery and upon re-evaluation, all patients answered standardized questionnaires to assess their quality of life. The Incontinence Impact Questionnaire (IIQ-7) was used to evaluate the effect of SUI on the patient's everyday life and the Urogenital Distress Inventory (UDI-6) was used to quantify lower urinary tract symptoms. Two surgeons performed the procedures according to the original techniques. The patients who would have another surgical procedure, the prolen tape was ejected from the suprapubic place, the fore mentioned procedure performed and then the tape distance setting was done simultaneously with the patients coughing.

The clinic-pathologic parameters of the patients included type of surgery (TVT or TOT), age, type of incontinence, previous pelvic surgery, parity, menopausal statement, preoperative pelvic organ prolapse, perioperative complications (bladder perforation, vascular injury, bleeding, hematoma and fever), postoperative complications (pain, tape erosion and postvoid residual [100 ml),postoperative urinary catheterization time, postoperative mobilization time, de novo urge incontinence and the outcome of TVT and TOT in terms of continence results and quality of life.

Surgical Procedures

Both procedures were carried out under spinal anesthesia and dorsolithotomy position. The retropubic TVT was inserted by a 1-cm incision 1,5 cm below the external urethral meatus and passed through the retropubic area to exit by two incisions above the symphisis pubis. Adjustment to tension-free was done using curved scissors. The TOT was inserted via a 2 cm vertical incision 1, 5 cm below the external urethral meatus and line of clitoral level. Bilateral tunnels developed to the descending isciopubic ramus so that a finger inserted into the tunnel could reach the bone. Groin incisions were made in genitocrural folds near the superior medial border of the obturator membrane. The needles were then passed from the groin incisions around the isciopubic ramus to the vaginally placed forefinger. The forefinger was used to guide to needle away from the bladder to attach to needle to tape. This was performed bilaterally and then the tape was pulled through the groin

The success rate of operation was defined as an objective cure through a negative cough stress test and a 1-h pad test weight of \1 g. Objective improvement was defined as a negative cough stress test and a 1-h pad test weight of \5 g. Failure was defined as a positive cough stress test. Patients follow-up was made at postoperative 1, 3, 6 months. Patients evaluated objectively and subjectively and categorized to 3 groups cure, improvement and failure. Patients in the cure group did not evaluated objectively. The statistical evaluation of the results was conducted with the SPSS statistics program. The univariate analysis was carried out with the chi-square test. AP value of \0.05 was considered statistically significant.

Results

On 31 patients TVT and TOT procedure was performed. The median age of 62 patients was 45 (34-76). Eleven of the TVT group was postmenopausal and 20 of them were at the reproductive period; 14 of the TOT group were postmenopausal and 17 of them were at the reproductive period. The mean menopausal period was 9 years in TVT group and %16 of them was using hormone replacement therapy; in TOT group the mean menopausal period was 6, 7 years and 19 % of them was using hormone replacement therapy. The mean birth rate was 2,6 at TVT group; 2,96 at TOT group. There was no statistical significance between two groups' demographical parameters.

The mean incontinence frequency at TVT group was 3,9/day (max 9, min 1), at TOT group it was 9,09/day (max18, min 4). Prior to surgery, SUI was diagnosed in 37 patients (59,6 %) of these patients, 14 underwent TOT surgery and 23 underwent TVT surgery; and mixed incontinence (SUI and urge incontinence) with a predominant SUI in 25 patients (40,3 %),

of these patients, 17 underwent TOT surgery and 8 underwent TVT surgery. 90,1% of the TVT group and 74,1% of the TOT group had pelvic relaxation diagnosis. Two of the TVT, 10 of the TOT patients were combined with another gynecologic surgery. There was no significant difference of success rates (p>0.05) and complications (p>0.05) between the combined surgical patients and the TVT group. The cure rate was 60%, the rest was improvement if TOT was combined with another surgery, cure rate was 80.95% the rest was improvement when the procedure applied alone.

The mean hospitalization period for the 22 patients who underwent only TVT was 1,4 days (max 10, min 1) and it was 2,23 days (max 4 ,min 2) for the 21 patients who underwent only TOT procedure. The cure rate was 60%, the rest was improvement if TOT was combined with another surgery, cure rate was 80.95% the rest was improvement when the procedure applied alone.

The mean hospitalization period for the 22 patients who underwent only TVT was 1,4 days (max 10, min 1) and it was 2,23 days (max 4 ,min 2) for the 21 patients who underwent only TOT procedure.

The type of per-operative and postoperative complications are listed in Table 1. Patients with voiding dysfunction discharged with a urinary catheter and a prophylactic antibiotic treatment. The patients educated to open the catheter within 3 hours period and reexamined after 3 days. The dysfunction resolved maximum in 10 days.

Headache complication which has occurred secondary to the regional anesthesia, treated by analgesic with caffeine and rapidly vanished. Tape erosion or rejection was not seen at any of the patients.

Most common postoperative complication was inguinal pain (%32.2). It could be related with the proximity of the tape ejecting point to M. gracilis and M.adductorius, as the patients complained pain with movement. This complains resolved within 2 weeks.

The longest follow-up period was 1 year, 51 of the patients (82,2%) had 6 months or more follow-up period. Mean follow up time was 8 months.

Twenty seven of the patients who underwent TVT procedure had cure, 4 of them had improvement at the subjective evaluation during the postoperative follow-up period. 2 of the patients who had improvement was SUI and 2 of them were MUI. Preoperative incontinence frequency of these patients was 3, 5/day, 0, 1/day postoperative.

Twenty three of the patients who underwent TOT procedure had cure, 8 of them had improvement at the subjective evaluation during the postoperative follow-up period. 5 of the patients who had improvement was SUI and 3 of them were MUI. Preoperative incontinence frequency of these patients was 11,8/day, 1,5/day postoperative. The patients who had MUI, after surgical procedures, was advised some complementary therapies and pelvic floor muscle exercises, weight-loss program as well as use of antimuscarinic agents (oxybutynin, tolterodine etc.)

Table 1. Previous operation histories of the groups, concomitant surgical procedures and post-operative complication rates are between the groups.

Previous surgery*	TOT (n)	TVT (n)
Abdominal hysterectomy	4	2
Myomectomy	0	1
Section caesarean	1	1
Vaginal hysterectomy +CA+Kelly	0	1
Appendectomy	1	0
Tubal sterilization	0	1
Concomitant surgery		
CA	4	2
CP	4	0
CAP	1	0
Tubal sterilization	1	0
Perioperative and postoperative complications*		
Perforation of bladder	0	1
Dysuria	11	6
Voiding dysfunction	0	2
De novo UI	0	2
Suprapubic and inguinal pain	10	10
Headache	2	1

*p>0.05
CA: Anterior colporrhaphy
CP: Posterior colporrhaphy
CAP: Anterior and posterior colporrhaphy

Discussion

The success of incontinence surgery has been increasing by the mid-urethral tension-free tape procedures. The continence mechanism of these tapes are, without effecting the urethral mobility during the resting period, avoiding urinary escape by exerting enough pressure to urethra when intraabdominal pressure rises. This is done by supporting the nonfunctional pubourethral ligaments [7,8]

Ulmsten and petros described TVT technique in 1995 for the stress urinary incontinence surgery [9]. This simple technique which has low morbidity and operational time has an 85-90% reported cure rate. In our study the cure rate was established % 87 at a 12 months follow-up.

Cetinel et al. studied the preoperative and intraoperative risk factors in 75 women who underwent TVT. %89 of the patients had cure and % 8 had improvement. They had considered that the only significant risk factor for failure was the age of the patient over 55[10].

TOT operation was described by Lorme in 2001, in a search of another technique with same efficacy and less complications from TVT [11]. TOT procedure has a theoretical advantage; it is not related with the retropubic space that reduces the risk of bladder injury. Bladder perforation is the most common complication observed with mid-urethral sling procedures via the retro-pubic approach, with an incidence of 0.8–21% reported in the literature [12– 13]. Using the foramen and the obturator membrane as a passage does not typically lead to perforation of the bladder. Formerly, and although it was thought that the risk of bladder perforation during the transobturator technique was negligible, several cases of intraoperative bladder injury during the transobturator technique procedure have been reported as well [14]. As seen in this study, bladder perforation was encountered only in a patient who underwent the TVT procedure. It was managed to primary repair and to keep the urine catheter o week. No complication was recorded one month after control.

Although several randomized trials have demonstrated similar continence rates between these two procedures, several randomized, partially multicentre trials which compared the com-

plications of these two methods have concluded that the TOT procedure is linked to less per-operative complications. [15-16]. Costa; in a prospective study, compare the complications of the TOT operation in 165 patients [17] Result of the study was 82, 2% cure, 6, 8% improvement, 9,5% failure. Bladder perforation was seen in 1 patient, urethral perforation was seen in 2 patients. Postoperative urinary retention was seen in 4 patients. As a result of several randomized trials similar to this one; in these last years, the TVT procedure has been increasingly replaced by the TOT as the treatment of choice.

The percentage of voiding difficulties after TVT has been reported to be 1.4–20% [18], whereas, for TOT to be 3–13% [19]. In our study, this was also noted as there was higher risk of postoperative urinary retention after surgery in the patients who underwent TVT procedure when compared to the patients who underwent TOT procedure (2 vs. 0), but the voiding dysfunction resolved within 10 days for all patients.

There is no consensus of the ideal method of tape removal when tape erosion occurs. In the most of reported cases, open surgery with complete or partial removal of the mesh was the preferred treatment; however, successful endoscopic management has been reported as well [20].

Treatment of failure after a sling procedure still represents a clinical problem. If SUI persists and the urodynamic testing demonstrates the need for a sling procedure, a second tape can be inserted. A study described the case of five female patients who received a TVT sling without the removal of the TOT sling. All patients were continent after a mean follow-up of 17 months [21].

Some authors state that in TVT procedures, the sling axis is in a different relation to the urethral axis in comparison with the TOT procedure. TOT procedures provide a less circumferential compression of the urethra, which may lead to fewer postoperative bladder irritation symptoms [13]. In our study de novo urge symptoms were seen in only two patients who underwent TVT procedure.

The surgeon's operating experience has proved to be important predictive factor of good continence rates and of recurrent incontinence. Koops et al. [22] exhibited that lower continence rates are obtained by surgeons who have performed more than 20 TVT sling procedures.

It was shown that TVT operation does not restore the urethral mobility, in addition to by using a cystogram demonstrated that urethral mobility remains after TOT procedure [23]. In fact the efficacy of the both procedure depends on the urethral mobility. Therefore additional colporraphy anterior can reduce the efficacy of the procedures by affecting the mobility of urethra. Also tape can move to proximal in the cases which applied colporraphy anterior, tape adjustment has to be done after the operation. Our findings corroborate this view. If TOT procedure applied with additional operations %60 cure and % 40 improvement occurs , furthermore TOT applied alone cure rate was %81

Conclusion

There was no significant difference between the two types of procedures in terms of continence results and quality of life. The TOT procedure though demonstrates significantly better results in terms of the rate of complications. If the operation includes anterior colporrhaphy, the efficacy of both procedures reduces. Due to its advantage of not entering the retropubic space, thus making the risk of bladder, bowel, or major vessel trauma absent, simply, the TOT procedure is, if indicated, our first choice.

Competing interests

The authors declare that they have no competing interests.

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