

The Role of Transobturator Tape (TOT) Operation in the Treatment of Pelvic Organ Prolapse and Stress Urinary Incontinence

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Abstract

Aim: This study aimed to assess the efficacy and safety of the Transobturator Tape (TOT) procedure in treating stress urinary incontinence (SUI), both independently and when combined with pelvic floor reconstruction surgery.

Method: In a retrospective analysis, data were collected from 251 female patients treated for SUI at Health Sciences University, İstanbul Bağcılar Training and Research Hospital, from April 2020 to April 2022. Patients were divided into two groups based on the surgical approach: TOT alone and TOT with pelvic reconstruction. The Patient Global Impression of Improvement (PGI-I) scale was used to evaluate patient-reported outcomes, measuring improvements in symptoms and quality of life post-surgery.

Results: The results demonstrated a high success rate in SUI management, with a significant percentage of patients reporting the absence of incontinence after surgery. Notably, cases with TOT alone showed slightly higher success rates and patient satisfaction compared to those combined with pelvic reconstruction. The outcomes aligned with existing research, supporting TOT as an effective intervention in diverse surgical settings.

Conclusion: TOT is a highly effective treatment for SUI, with its use either alone or in combination with pelvic reconstruction. The study emphasizes the importance of individualized surgical approaches based on patient-specific characteristics, highlighting the need for thorough preoperative assessments and patient counseling to optimize outcomes.

Keywords: Transobturator tape, stress urinary incontinence, pelvic floor reconstruction.

Transobturator Bant (TOT) Operasyonunun Pelvik Organ Prolapsusu ve Stres Üriner İnkontinans Tedavisindeki Rolü

Öz

Amaç: Bu çalışmanın amacı, stres üriner inkontinansın (SÜİ) tedavisinde transobturator bant (TOT) yönteminin, tek başına veya pelvik taban rekonstrüksiyon cerrahisiyle birlikte kullanıldığında etkinliğini ve güvenliğini değerlendirmektir.

Yöntem: Retrospektif olarak gerçekleştirilen bu çalışmada, Nisan 2020 - Nisan 2022 tarihleri arasında Sağlık Bilimleri Üniversitesi, İstanbul Bağcılar Eğitim ve Araştırma Hastanesi'nde SÜİ tedavisi gören 251 kadın hastanın verileri incelendi. Hastalar, TOT tek başına uygulananlar ve TOT ile pelvik rekonstrüksiyon yapılanlar olmak üzere iki gruba ayrıldı. Hasta Küresel İyileşme İzlenimi (PGI-I) ölçeği ile cerrahi sonrası semptomlar ve yaşam kalitesindeki iyileşmeler değerlendirildi.

Bulgular: Sonuçlar, SÜİ yönetiminde yüksek bir başarı oranı göstermiş olup, cerrahi sonrası önemli bir hasta grubunda inkontinansın sona erdiği bildirilmiştir. Sadece TOT uygulanan hastalarda, pelvik rekonstrüksiyon eklenen vakalara kıyasla başarı oranı ve hasta memnuniyeti biraz daha yüksek

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ETHICAL STATEMENT: This retrospective study was conducted at the Gynecology and Obstetrics Clinic of Health Sciences University Dr. Sadi Konuk Training and Research Hospital. Ethical approval for the study was obtained from the Clinical Research Ethics Committee of Dr. Sadi Konuk Training and Research Hospital (Approval date: 02.11.2023 / Decision No. 2023/170).

bulunmuştur. Sonuçlar, mevcut literatürle uyumlu olarak TOT yönteminin çeşitli cerrahi bağlamlarda etkili bir müdahale olduğunu desteklemektedir.

Sonuç: TOT yöntemi, SÜİ için son derece etkili bir tedavi olup gerek tek başına gerekse pelvik rekonstrüksiyon ile birlikte kullanılabilir. Çalışma, hasta özelliklerine göre bireyselleştirilmiş cerrahi yaklaşımların önemini vurgulayarak, başarılı sonuçlar için ayrıntılı preoperatif değerlendirme ve hasta bilgilendirmesinin gerekliliğine dikkat çekmektedir.

Anahtar Sözcükler: Transobturator bant, stres üriner inkontinans, pelvik taban rekonstrüksiyonu.

Introduction

Pelvic organ prolapse (POP) and stress urinary incontinence (SUI) represent significant health concerns, affecting a substantial portion of the female population, particularly in the post-menopausal stage^{1,2}. These conditions not only impair physical health but also have profound impacts on the psychological and social well-being of affected individuals^{3,4}. POP entails the descent of pelvic organs, including the uterus, bladder, and rectum, due to weakening of the supporting structures, leading to symptoms like a bulging sensation and discomfort^{5,6}. SUI, characterized by involuntary leakage of urine during activities that increase intra-abdominal pressure, such as coughing or exercising, significantly diminishes quality of life^{7,8}.

The pathophysiology of these conditions is multifaceted, involving genetic predispositions^{9,10}, hormonal changes, and lifestyle factors^{11,12}. The co-occurrence of POP and SUI is common, necessitating comprehensive therapeutic approaches^{13,14}.

In the realm of surgical interventions, the Transobturator Tape (TOT) procedure has emerged as a pivotal technique for the management of SUI, particularly in the context of POP^{15,16}. The TOT operation, involving the placement of a synthetic mesh tape through the obturator foramen, aims to provide support to the mid-urethra, thereby mitigating SUI symptoms^{17,18}. Its efficacy and relative safety have been substantiated through numerous studies^{19,20}. Furthermore, comparisons with other surgical techniques, such as the Tension-Free Vaginal Tape (TVT), have highlighted the unique advantages and applicability of TOT in varied clinical scenarios^{21,22}.

This article aims to delve into the role of TOT in the treatment of patients with POP and SUI, integrating insights from a wide spectrum of research studies and clinical trials^{23,24}. By analyzing these diverse sources, we seek to provide a comprehensive overview of the TOT procedure's efficacy, safety, and place in current urogynecological practice.

Material and Methods

Participant Selection and Grouping

The study participants comprised women who underwent surgical treatment for stress incontinence between April 2020 and April 2022. The patients were retrospectively divided into two groups:

TOT-only group: Patients who received only the TOT procedure.

TOT with Pelvic Reconstruction group: Patients who underwent TOT in conjunction with pelvic floor reconstruction surgery.

Inclusion Criteria: Women diagnosed with stress incontinence and stage 2 pelvic organ prolapse (POP). Patients symptomatic for prolapse were assigned to the TOT with pelvic reconstruction group, while those asymptomatic were placed in the TOT-only group.

Exclusion Criteria: Patients with a history of neuromuscular disease, connective tissue disease, radiotherapy, long-term steroid use, non-stress incontinence, or previous pelvic surgery were excluded from the study.

Data Collection and Patient Demographics

Of the 282 eligible patients, 251 consented to participate and completed the Informed Voluntary Consent Form. Collected data included demographic and clinical characteristics such as age, height, weight, BMI, parity, mode of delivery, smoking status, alcohol use, marital status, menopausal status, and education level.

Intervention and Techniques

TOT-only group: 73 patients with SUI and no symptoms of prolapse underwent the TOT procedure using the lateral-to-medial suspension arm technique.

TOT with Pelvic Reconstruction group: 178 patients with symptomatic prolapse underwent simultaneous pelvic floor reconstruction surgery along with TOT. The surgical techniques varied apical, anterior, posterior, or combined repair based on the type and severity of prolapse.

Follow-Up and Outcome Measures

Patients were evaluated at one month and one year post-operation for clinical outcomes. The primary outcome measures included a stress test and the Patient Global Impression of Improvement (PGI-I) questionnaire, which were administered during the first year post-operation.

Ethical Statement

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Results

The demographic and clinical characteristics of the 251 patients in this study provide valuable insights into the profile of women undergoing the Transobturator Tape (TOT) operation for stress urinary incontinence (SUI) and pelvic organ prolapse (POP) (Table 1).

Table 1. Demographic and clinical characteristics of participants

Characteristic	Mean±SD	Median (Min-Max)	n (%)
Age (years)	52.06±9.91	(50-75)	-
Weight (kg)	76.60±12.57	(41.1-118.0)	-
Height (cm)	159.51±6.32	(145-180)	-
BMI	30.15±5.00	(22.16-49.12)	-
Parity	3.33±1.79	(0-16)	-
Type of Operation	-	-	TOT: 29.0% TOT+Pelvic Recon.: 71.0%
Hysterectomy Status	-	-	Hysterectomized: 19.5% Not Hysterectomized: 80.5%
Complications	-	-	None: 98.0% Present: 2.0%
Cesarean Section (C/S) Delivery	-	-	No: 82.5% Yes: 17.5%
Normal Spontaneous Delivery (NSD)	-	-	No: 3.2% Yes: 96.8%
Menstrual Status	-	-	Premenopausal: 41.4% Menopausal: 58.6%
Marital Status	-	-	Married: 86.9% Single: 13.1%
Smoking Status	-	-	Non-smoker: 80.5% Smoker: 19.5%
Education Level	-	-	None: 14.3% Primary: 77.7% Secondary: 5.2% Higher: 1.6% Postgraduate: 1.2%
Literacy	-	-	Illiterate: 11.6% Literate: 88.4%

BMI = Body Mass Index; TOT = Transobturator Tape; POP = Pelvic Organ Prolapse; NSD = Normal Spontaneous Delivery; C/S = Cesarean Section.

Table 1 shows the results:

“Age and Body Metrics”: The average age of 52.06 years and a BMI of 30.15 indicate that the study predominantly involved middle-aged, overweight women. This is consistent with the literature indicating increased prevalence of SUI and POP in this demographic.

“Surgical Intervention”: A significant majority (71%) underwent TOT with pelvic reconstruction, underscoring the common co-occurrence of SUI with POP.

“Hysterectomy Status”: Nearly one-fifth of the patients had undergone a hysterectomy, which aligns with existing research suggesting a possible link between hysterectomy and increased risk of POP and SUI.

“Lifestyle Factors”: The low percentage of smokers (19.5%) in the study contrasts with some literature that suggests smoking as a risk factor for SUI and POP.

“Education and Literacy Levels”: The varied levels of education and literacy among the participants reflect the diverse socioeconomic backgrounds, which can influence health awareness and treatment-seeking behavior.

Study Outcomes

“Efficacy of TOT”: The majority of patients reported improvement in incontinence symptoms post-TOT.

“Safety and Complications”: The low complication rate (2%) further validates the safety profile of the TOT procedure.

“Patient Satisfaction”: The high rates of reported improvement (approximately 75%) reporting 'Very Much Better' or 'Much Better' in the PGI-I scores underscore the positive impact of TOT on patient quality of life (Table 2 and Table 3).

Table 2. Incontinence status of patients.

Incontinence Status	n	%
Absent (No Incontinence)	169	67.3
Present (Incontinence)	82	32.7

Following the TOT procedure, two-thirds of the patients reported no urinary incontinence symptoms, suggesting a substantial treatment benefit.

Table 3. Patient global impression of improvement (PGI-I).

PGI-I Score	Description	n	%
1	Very Much Better	122	48.8
2	Much Better	65	26.0
3	A Little Better	33	13.2
4	No Change	12	4.8
5	A Little Worse	14	5.6
6	Much Worse	3	1.2
7	Very Much Worse	1	0.4

The PGI-I results reflect high levels of subjective improvement, with nearly 75% of patients reporting their condition as “Much Better” or “Very Much Better” postoperatively.

Table 2 and Table 3 reveal significant insights into the efficacy of the Transobturator Tape (TOT) operation in managing stress urinary incontinence (SUI).

“Incontinence Status Post-TOT”: (The data shows that 67.3% of patients reported no incontinence post-operation, indicating a high success rate of the TOT procedure in alleviating SUI symptoms.

“Patient Global Impression of Improvement (PGI-I)”: The majority of patients (74.8%) reported their condition as 'Very Much Better' or 'Much Better'. This high level of patient

satisfaction and perceived improvement is a critical indicator of the procedure's success and mirrors findings.

“Efficacy Comparisons”: The high efficacy rate observed in this study is consistent with the findings. The absence of incontinence in over two-thirds of patients post-TOT suggests a comparable or even superior efficacy to other studies.

“Patient Satisfaction”: The PGI-I scores in this study indicate a high level of patient satisfaction. The positive patient perception is a crucial aspect of the overall success of the treatment.

“Comparative Efficacy and Safety”: The low incidence of worsening conditions post-TOT (7.2% reporting 'A Little Worse' or more) in this study is noteworthy. This suggests that while TOT is highly effective, it also maintains a favorable safety profile.

Table 4. Distribution of types of operations among patients.

Type of Operation	n (Number of Patients)	% (Percentage)
Transobturator Tape (TOT) Only	73	29%
TOT with Pelvic Reconstruction	178	71%

The majority of patients (71%) underwent TOT combined with pelvic reconstruction, reflecting the frequent coexistence of stress urinary incontinence and pelvic organ prolapse requiring simultaneous surgical management.

Table 4 outlines the distribution of surgical procedures among patients, providing critical insights into treatment choices for stress urinary incontinence (SUI) and pelvic organ prolapsed (POP).

“Predominance of Combined Surgery”: The data indicates that a significant majority (71%) of the patients underwent TOT in conjunction with pelvic reconstruction surgery. This highlights the frequent co-occurrence of SUI with POP and the need for comprehensive surgical management.

“TOT Only Procedures”: 29% of the patients underwent the TOT procedure alone. This suggests that a significant subset of patients presented with SUI without significant POP or with POP that did not warrant surgical intervention.

“Surgical Approach”: The high rate of combined surgeries in this study aligns with the trend observed in the literature. The decision for combined surgery generally depends on the severity and presence of both conditions.

“Efficacy of Combined Surgery”: Studies have also reported the effectiveness of combined pelvic floor reconstruction and TOT, indicating this approach's suitability for patients with concurrent SUI and POP.

“Selection for TOT Only”: The choice for TOT only in 29% of cases reflects a targeted approach for SUI management, consistent with recommendations for patient selection based on symptomatology and diagnostic findings.

Table 5. Comparison of incontinence based on type of operation.

Incontinence Status	Type of Operation	No Incontinence (n =169)	%	Incontinence (n =82)	%	Test Statistic	P-value
	TOT	52	71.2	21	28.8	χ^2 =0.713	0.399
	TOT + Pelvic Reconstruction	117	65.7	61	34.3		-

χ^2 Chi-Square

There was no statistically significant difference in postoperative incontinence rates between the two surgical groups ($p > 0.05$). The chi-square test was used to assess the association between type of operation and incontinence outcome.

Table 5 provides a comparative analysis of incontinence outcomes based on the type of surgical procedure performed – Transobturator Tape (TOT) alone versus TOT with pelvic reconstruction.

“Incontinence Outcomes”: The table shows that 71.2% of patients who underwent only TOT reported no incontinence, compared to 65.7% in the TOT with pelvic reconstruction group. This suggests a slightly higher success rate in managing incontinence with TOT alone, although the difference is not statistically significant (P-value = 0.399).

“Impact of Combined Surgery”: The slightly lower rate of complete continence in the TOT with pelvic reconstruction group (34.3% with incontinence) might reflect the complexity of cases involving both SUI and POP.

“Effectiveness of TOT”: The high efficacy of TOT in reducing incontinence observed in this study is consistent with the results.

“Comparative Success with Combined Surgery”: The findings of slightly lower success rates in the combined surgery group compared to TOT alone resonate.

“Statistical Significance”: The lack of statistical significance in the difference between the two groups (P-value = 0.399) suggests that while there are variations in success rates, these differences might not be substantial in clinical practice.

Discussion

This study evaluated the effectiveness and safety of the Transobturator Tape (TOT) procedure in treating stress urinary incontinence (SUI), both as a standalone procedure and in combination with pelvic floor reconstruction. The findings offer valuable insights into patient demographics, procedural outcomes, and postoperative satisfaction, aligning with current literature on SUI and pelvic organ prolapse (POP) management.

The TOT operation demonstrated a high success rate in alleviating incontinence symptoms, with 67.3% of patients reporting no incontinence post-surgery (Table 2). This aligns with prior studies that highlight the efficacy of TOT in providing significant symptom relief for SUI patients^{21,22}. Importantly, our study found a slightly higher success rate in patients undergoing TOT alone (71.2%) compared to those who had combined pelvic reconstruction (65.7%), though the difference was not statistically significant ($p = 0.399$). This observation is consistent with other research indicating that

while TOT is effective in treating SUI, additional pelvic reconstruction may be necessary only for patients with symptomatic POP^{3,4}.

The study's results further underscore the importance of personalized treatment approaches in managing SUI. The absence of statistically significant correlations between patient demographics (e.g., age, BMI, and parity) and perceived improvement, as indicated by Patient Global Impression of Improvement (PGI-I) scores, highlights that traditional demographic factors may not fully predict treatment outcomes^{23,24}. This supports findings from recent studies suggesting that while certain demographic characteristics correlate with SUI prevalence, they do not necessarily determine the efficacy or perceived success of surgical interventions^{7,25,26}. This reinforces the need for a patient-centered approach in assessing SUI severity and deciding on the most appropriate treatment method²⁷.

An interesting finding of this study is the relationship between hysterectomy status and postoperative incontinence outcomes. Patients who had previously undergone hysterectomy exhibited a reduced risk of postoperative incontinence, a finding that contrasts with some studies linking hysterectomy with an increased risk of pelvic floor dysfunction¹¹. However, other research suggests that, in selected cases, hysterectomy may alleviate SUI symptoms, particularly when combined with appropriate surgical support, such as TOT²⁸. Further investigation is warranted to elucidate the factors contributing to this complex relationship, as hysterectomy may impact pelvic anatomy differently depending on the individual patient profile¹¹.

In terms of patient-reported outcomes, the majority of participants reported substantial improvements in quality of life post-surgery, with 74.8% indicating that their condition was 'Very Much Better' or 'Much Better' on the PGI-I scale (Table 3). These high levels of satisfaction align with findings from other studies emphasizing TOT's positive impact on patient quality of life and symptom perception^{20,28}. Furthermore, the low complication rate (2%) observed in this cohort is consistent with previous reports highlighting TOT's safety profile in SUI treatment¹⁴. Complication rates were comparable across both surgical groups, suggesting that TOT, whether alone or combined with pelvic reconstruction, remains a viable and safe option for SUI management.

From a clinical perspective, these findings emphasize the importance of comprehensive preoperative assessment and patient counseling. As indicated by our data and supported by literature, individualized treatment planning that considers each patient's specific symptoms and anatomy can optimize surgical outcomes²⁶. Moreover, given the high patient satisfaction and low complication rates associated with TOT, clinicians can confidently recommend this approach to suitable candidates, particularly those without significant POP or with minimal prolapse symptoms.

In conclusion, our study supports the TOT procedure as a highly effective and safe intervention for SUI, whether performed alone or in conjunction with pelvic reconstruction. These findings reinforce the procedure's utility in a variety of clinical contexts and underscore the value of patient-centered approaches in SUI management.

Conclusion

Study's findings offer significant insights into the effectiveness of the Transobturator Tape (TOT) operation for treating stress urinary incontinence (SUI), both as a standalone procedure and in conjunction with pelvic floor reconstruction surgery.

The majority of patients (67.3%) reported an absence of incontinence post-surgery, indicating a high success rate of the TOT procedure. This is particularly notable in the group that underwent TOT alone, where 71.2% of patients experienced no incontinence post-operation. According to the Patient Global Impression of Improvement (PGI-I) scores, a significant proportion of patients reported substantial improvement in their condition post-surgery, with 48.8% stating they felt 'Very Much Better' and 26% 'Much Better'. The slightly higher success rate of TOT alone (71.2% no incontinence) compared to TOT with pelvic reconstruction (65.7% no incontinence) suggests that TOT is very effective in treating SUI, especially in less complicated cases.

Based on the outcomes of our study and the comparative analysis with existing literature, the following recommendations can be proposed for clinical practice and future research:

Tailored Surgical Approach: Clinicians should consider individual patient characteristics, such as the presence and severity of pelvic organ prolapse (POP), when deciding between TOT alone and TOT combined with pelvic reconstruction. The decision-making process should be patient-centric, involving detailed discussions about potential outcomes and complications.

Preoperative Assessment and Counseling: Comprehensive preoperative assessments, including urodynamic studies, should be mandatory to accurately diagnose SUI and any associated pelvic floor disorders. Counseling about the possible outcomes and realistic expectations should be an integral part of preoperative preparation.

Monitoring and Follow-Up: Postoperative follow-up, including objective measures such as stress tests and subjective assessments like the PGI-I, is crucial. Regular monitoring can help in early identification and management of any complications or recurrent symptoms.

Patient-Reported Outcomes: Future studies should continue to emphasize patient-reported outcomes, as they provide valuable insights into the patient's perspective on the effectiveness and impact of surgical interventions on their quality of life.

Training and Skill Development: Given the technical nuances of TOT and combined pelvic reconstruction procedures, ongoing training and skill development for surgeons are recommended. This would help in optimizing surgical outcomes and minimizing complications.

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