



Tension Free Vaginal Tape (TVT) for Stress Urinary Incontinence - Our Experiences

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Abstract:

Introduction: There are large numbers of adult women with troublesome urine leakage have a “stress component” to their incontinence. One common procedure to treat stress incontinence is Transvaginal Tape (TVT). In this procedure a small piece of mesh is used to support urethra. This helps to keep urine from escaping uncontrollably. This study aims at finding the outcome of TVT for treating women with SUI.

Methods: We performed a prospective type of experimental study of 15 patients of 38 to 55 years old with SUI, for which they underwent TVT at Urology department, Dhaka Medical College hospital, from January 2014 to June 2020. Patients were selected as per selection criteria; detailed history and pre-operative investigations were done and all the women were counseled about the procedure and possible complications. We performed TVT procedure in dorsal lithotomy position under spinal anesthesia. First and second follow up was done at 6th and 12th weeks respectively. In each follow up in addition to routine checkup pad test was done, patients were asked of any urinary complain of LUTS.

Result: Of the 15 patients there were no major intra-operative complications; only one woman was found to have mild bladder erosion which was treated by post-operative 14 days catheterization. Average blood loss was less than 60 ml. All the patients urinated without any complication. None required surgical re-intervention. Only one patient aged 50 years and diabetic did not improved after surgery even in 2nd follow up. Success rate was 93%. Median time to return to full domestic activities was about 4 weeks.

Conclusion: TVT is safe and effective procedure for female stress urinary incontinence with an enduring, high success rate with minimal complications.

Keywords: Stress Urinary Incontinence, Vaginal Tape

Introduction

Urinary incontinence (UI) are highly prevalent among women, have a substantial effect on health-related quality of life and are associated with considerable personal and societal expenditure.¹ There is a wide variability in the UI prevalence rate due to the diversity in criteria defining incontinence, choice of study population, composition and interpretation of

questionnaire form.² A study conducted over 29,500 women aged e”18 years in Europe shows that the prevalence of UI increases with age, with a typical rate in young adults of 20-30%, a peak around middle age (prevalence 30-40%) and a steady increase in old age (prevalence 30-50%).³ Among the sub types of UI, Stress Urinary Incontinence (SUI) is the most frequently diagnosed in adult women.⁴ Hampel et al. also reported

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an estimated prevalence for urinary incontinence in 30% women aged 30-60 years, with approximately half of the cases attributed to SUI.⁵ The majority of published data suggest that around 50% of incontinent women will exhibit pure SUI with a further 30% experiencing mixed incontinence. Thus, potentially large numbers of adult women with troublesome urine leakage will have a "stress component" to their incontinence.⁶

The symptom of SUI is best defined by the International Continence Society as the complaint of involuntary leakage of urine on effort or exertion, or sneezing, or coughing and urodynamically as the involuntary leakage of urine during increased abdominal pressure, in the absence of a detrusor contraction.⁷ Aging, obesity, and smoking appear to have consistent causal relationships with the condition, whereas the roles of pregnancy and childbirth remain controversial.⁸ Diabetes, chronic cough, depression, poor health, lower urinary tract symptoms, previous hysterectomy, and stroke is also enlisted as risk factor in another study.⁹

Treatment modalities for SUI include lifestyle modification, medication and surgical correction. Due to high incidence of adverse effects, long treatment duration and long-term recurrence of pharmacological approaches it is very logical that most of the women will prefer surgical intervention in hope of quick and complete cure.¹⁰ Over the last century several surgical interventions had been done such as Kelly plication, Pereyra, Marshall- Marchetti- Krantz, Burch colposuspension and urethropexy, all of them having a high rate of post-operative complications.^{11,12,13} However, introduction of tension-free vaginal tapes procedures since 1995 when it was first described by Ulmsten et al. more than 20 years ago, constituted a revolution in the rapidly changing field of female incontinence treatment.¹² In fact, Ward and Hilton have reported both short to medium term results of a multi-centre randomized controlled trial comparing TVT with open colposuspension as the gold standard.^{13,14}

It has been shown to have excellent cure rates for SUI caused by urethral hyper-mobility (UH) and has been advocated for SUI caused by intrinsic sphincter deficiency (ISD) and recurrent incontinence after retro-pubic urethropexy.¹⁴ The overall success rate for TVT is 88% and the initial surgical success for TVT surgery is maintained over a period of greater than five years.¹⁵

Performing TVT procedure has two major steps upon which success rate depend. First is to, guide the trocar tip through the space of Retzius in such a way to avoid injury to bladder and urethra. As the surgeon has to pass the trocar almost blindly proper knowledge about

the anatomy of pelvic region and experience is very demanding here. Second is placing the tape perfectly in mid-urethral level and fine tuning of the tape tension. Slightest inaccuracy in fixing the tape may cause urinary retention or failure to make patient continent.

Though TVT is done in many centers in Bangladesh there are limited study available. In our center we have performed TVT for SUI with a aim to find out its outcome as well as to offer definitive management to our patients.

Patients and Method

We conducted a prospective type of experimental study regarding the outcome of TVT in SUI. Purposive sample were collected in the period of January 2014 to June 2020. Total 16 patients giving history of involuntary leakage with stress events were admitted in Urology department of Dhaka Medical College Hospital after having a positive cough stress test with a comfortably full bladder.

Mean age was 45(38-55) years, mean BMI was 26.5±3.8. Total 4 patients were diabetic and 5 were hypertensive. Our exclusion criteria were previous surgery for incontinence, urogenital fistula, urogynecological malignancy, pelvic organ prolapse and predominant urge incontinence.

Pre-operative evaluation included a thorough physical examination. Abdominal examination was performed to exclude any palpable bladder mass, valsalva maneuver was done to rule out pelvic organ prolapse. Local infection was excluded by urogenital examination. Speculum examination was performed to exclude any vaginal erosion or fistulous opening into vagina. We performed urodynamic investigation in 2 patients and excluded 1 patient for TVT procedure as she was having mixed type of incontinence with some stress component.

We selected 16 patients with stress incontinence as our study population initially but after urodynamic study our final sample size became 15. All necessary investigations for anesthesia fitness was done, all the women were counseled about the procedure and possible complications.

We performed TVT procedure in dorsal lithotomy position under spinal anesthesia. For exteriorization of trocars two small 1cm transverse incision were made near each side of superior edge pubic bone. A small median vaginal incision of about 1.5 cm size was made, about 1cm proximally to urethral meatus. Then a small para-vaginal tunnel was made on either side of urethra directing to the inferior aspect of pubic bone and perforating the endo-pelvic fascia. Tunnel was made large enough to pass the TVT trocar tip. Bladder was drained, cystoscopic

visualization of bladder and urethra was done. Then a straight metallic catheter was introduced to aid in positioning of urethra and bladder neck.

We used tape prepared from vicryl-prolene composite mesh. The tape was introduced by the passage of trocer through the previously dissected tunnel on both sides. Passing the trocer in a proper direction is a crucial step here. Movement in two directions is suggested. First movement is in horizontal direction until the trocer tip perforates the endo-pelvic fascia. Second movement causes trocer progression through the space of Retzius in a line tangent to pubic periosteum to reach the supra pubic region, perforates rectus muscle with its fascia and then emerges through the previously made incisions. Trocer was removed leaving the tape end in supra pubic region. After passing tape on both sides a U-loop of pubo-vaginal sling was made at mid urethra. After adjustment of loop tension a repeat cystoscopy was performed to assess any bladder or urethral injury.

On table stress test was performed after filling the bladder with 250-300 ml fluid. In case of any leakage with coughing sling ends were pulled slightly until full continence is gained. TVT ends were cut near the skin; suprapubic and vaginal incision were closed. Vaginal pack was given to all; catheterization was done in all cases. Antibiotic prophylaxis was given. Patients were discharged on 2nd post-operative day (POD) with catheter for 7 days. Catheter was removed on 8thPOD on outdoor basis. In one patient catheter was kept for 14 days due to bladder neck erosion.

Fourteen patients voided normally after catheter removal. Only one patient suffered from continues incontinence just after catheter removal. First and second follow up was done at 6th and 12th weeks respectively. In each follow up in addition to routine checkup pad test was done, patients were asked of any urinary complain of LUTS. One patient did not improved even after 2nd follow up.

Numerical data were prepared and different valid direct questionnaire form was used for qualitative data

Table II : Outcome of our study

Success Rate	Objective cure rate	1 st follow up at 6 weeks	2 nd follow up at 12 weeks
	(Negative 1hr pad test, <1 gm change in weight)	n (%) 13(86.67)	n (%) 14(93.33)
	Subjective cure rate (LUTS Questionnaire, urge incontinence)	1 st follow up at 6 weeks n (%) 9(60)	2 nd follow up at 12 weeks n (%) 14(93.33)
Failure Raten (%)		1(6.67)	
Complication: UTIn (%)		1(6.67)	

collection. Data analysis and interpretation was done in a systematic fashion.

Result

We performed tension free vaginal tape (TVT) procedure in 15 patients, mean age was 45 years, and mean BMI was 26.5. There was no major intra-operative complication, only one woman was found to have mild bladder erosion on cystoscopy which was treated by post-operative 14 days catheterization only. Average blood loss was less than 60 ml. Fourteen patients urinated without any complication. Only one patient aged 50 and diabetic did not improved rather faced problem with continuous incontinence and did not improved in 2nd follow up also. Median time to return to full domestic activities was about 4 weeks.

Table I: Demographic Variables

Total number of patients	15
Mean(range) age, years	45(38-55)
Mean BMI	26.5± 3.8
Co-morbidity	Diabetes mellitus 04 Hypertension 05

We evaluated 15 patients 12 weeks post operatively, among them 9 patients were satisfactorily cured of their stress urinary symptom subjectively in 1st follow up but in 2nd follow up it raised into 14. There was no major post-operative complication. Incision sites were well healed with no signs of mesh exposure. Patients didn't complain of any urge symptoms, groin pain, urinary retention, dyspareunia.

Objective cure rate was 86.67% (13 out of 15) at first follow up which was raised to 93.33% (14 out of 15) at second follow up. Objective cure was demonstrated by full bladder cough test (300 ml), negative one-hour pad test, normal PVR without any evidence of other voiding dysfunction.

Subjective cure rate is 60% (9 out of 15) at first follow up which was improved significantly to 93.33% (14 out of 15) at second follow up. Enquiry as per LUTS questionnaire reveals significant reduction of frequency, urgency, urge incontinence, stress incontinence in these patients. No mesh related complications like erosion into vagina, obstructed voiding, suprapubic extension into bladder or erosion into bladder was noted. We faced complication and failure in 1 patient that did not improve even giving bladder sedatives.

Discussion

Surgical treatment for SUI is an area that has changed rapidly in the last 10 years following introduction of TVT¹³ Introduction of this minimally invasive technique has largely replaced traditional surgical approaches¹² At present TVT has replaced Burch colpo suspension.^{16,17} Short duration of operation, possibility even under local anesthesia, less analgesia requirement and less duration of hospital stay in TVT procedure are the main reasons behind its popularity. In fact, it is considered as gold standard for treating SUI by Ulmstem.^{18,19}

Regarding the outcome of TVT procedure, study conducted by Ward and Hilton over 170 patients shows subjective cure rate (LUTS questionnaire, stress incontinence) of 49% and objective cure rate (Negative 1 hour pad test, <1 g change in weight) of 80.6%^{5,20}

In our study, subjective cure rate is 60% at 6 weeks follow up, raised to 93.33% at 12 weeks follow up; objective cure rate is 86.66% at 6 weeks follow up, raised to 93.33% at 12 weeks follow up. Our failure rate was 6.67% which can be regarded as acceptable due to presence of comorbidity (DM) in our patient.

Our study has some limitations. As our study population was small, we had a limited perspective. We couldn't assess post-operative improvement more precisely with urodynamic study due to lack of resources. Though some studies have shown almost similar cure rate of strict objective stress testing like pad test and/or urodynamics.²¹ As we have used synthetic prolene mesh having potential to erode, mesh related complication may occur in long run. Long term follows up; at least five years is needed to assess those possible complications.

Conclusion

Designing an appropriate treatment plan for SUI is still challenging for both urologist and uro-gynecologist specially in a developing country like ours. Here most

of our patients are of post-menopausal status with comorbidities and of poor nutritional status. Moreover, in lower socio-economic society women are neglected, unaware of availability of treatment for SUI, accepting this problem as a part of their life.

This study gives a brief idea of excellent outcome of TVT procedure in one of the tertiary level hospital of our country and therefore necessitates making it accessible on a larger scale. So that, more women can be included in study and further moderation of the procedure can be planned accordingly.

Our present concern is to keep these patients in follow-up up to 3 years for assessing the sustainability of the procedure and dispel the fear of both mesh eroding complications and voiding dysfunction.

Extensive study is required regarding effectiveness of biological grafting material like autologous rectus sheath, cadaveric fascia which may give us a marvelous alternative to synthetic polyproline mesh in future.

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