

## Original Article

# Free of Cost Operation with Trans Obturator Tape (TOT) in Stress Urinary Incontinence among Poor Women — A Hospital-based Prospective Trial

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**Background :** A study was conducted on a group of 15 patients with Genuine Stress Urinary Incontinence, to know the outcome of placement of a Trans Obturator Tape, in terms of its effectiveness and postoperative complication at B S Medical College, Bankura, West Bengal.

**Materials and Methods :** Most of the patients were Multiparae, belonging to low socio-economic status. More than half of them belonged to the age group of 41-50 years. About half of them (53.3%) had associated cystocele/urethrocele, so they underwent concomitant anterior colporrhaphy with placement of TOT.

**Discussion :** For our study a normal Hernia mesh which was available in our OT was used for the preparation of the tape, since the Monofilament Macroporous Polypropylene Mesh is costly and could not be afforded by our patients.

**Result :** Among 15 patients, only 1 of them had urinary retention in the immediate postoperative period which was managed successfully by loosening of the mesh. After 6 weeks following surgery, all of them were continent with no residual urinary symptoms.

**Conclusion :** One of our patient presented with mesh infection 2 weeks after surgery, for which she was hospitalized and treated conservatively with IV antibiotics. She recovered completely with no urinary symptoms at the end of 6 weeks.

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**Key words :** Trans Obturator Tape (TOT), Stress Urinary Incontinence (SUI), Genuine Stress Urinary Incontinence (GSUI).

Involuntary urinary leak without the participation of the detrusor muscle of the urinary bladder that occurs during episodes of increased intra abdominal pressure during a cough, sneeze or carrying a weight is called Stress Urinary Incontinence (SUI). The reason is the increased intracystic pressure that overwhelms the urethral resistance the so-called Urethral Closing Pressure. It becomes a day to day social and hygienic problem to elderly women in whom the incidence is pretty high – nearly 30% between ages 30-60 years<sup>4</sup>. The levator ani muscle, the endopelvic fascia and their attachments on the pelvic side walls form a hammock beneath the urethra that responds to episodes of increase in intra abdominal pressure by closing the urethra transmitting a pressure from its posterior aspect towards the bony symphysis pubis thus compressing the urethro-vesicle junction the so-called

### Editor's Comment :

- Before doing TOT placement, one has to confirm it to be a case of Genuine Stress Urinary Incontinence and not urge incontinence, by thorough history and appropriate clinical test.
- It is possible to make a TOT tape by using hernia mesh which is always freely available in a government hospital.
- The learning curve for this operation is very short and the success rate is more than 90%.

Urethral Closing Pressure. The striated muscle of the urethra; also the non-striated smooth muscle of the urethra and the vascular and submucosal elastic tissue of the urethra maintain a Resting Urethral Tone mediated by  $\alpha$  adrenergic receptors in response to a constant sympathetic discharge constitutes the Intrinsic Urethral Tone that keeps the urethra closed at rest while the bladder gets filled up only to make a call for micturition when the accumulated urine within it becomes 150ml or more by increased para-sympathetic discharge leading to detrusor contraction and simultaneous lowering of urethral closing pressure by inhibition of sympathetic discharge. Any disturbance in this synchronous events leads to urinary

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incontinence. Obviously then if the Intrinsic mechanism is normal and incontinence is happening it is due to the laxity of the bladder neck or the posterior support of urethra the so-called Genuine Urinary Stress Incontinence or Incontinence due to urethral sphincter defect which needs to be corrected by surgery.

Therefore, the logical treatment of SUI is conservative first with maintaining a bladder diary and following a bladder drill ie, to pass urine after every 2-3 hours; pelvic floor exercise, use of  $\alpha$ -agonist drug like Prazosin then excluding a detrusor overactivity / dyssynergia by urodynamic test thus declaring the case as Urethral Incontinence that indicates a posterior strengthening procedure on urethra. Pelvic Organ Prolapse eg. Cystourethrocele or grade 2, grade 3, utero-vaginal descent in 80% cases contributes to urethral incontinence especially when longstanding due to traction on the bladder neck causing increased urethral mobility. Transobturator Suburethral tape is one such popular method of strengthening the posterior aspect of urethra (Fig 1) without tension that uses a polypropylene monofilament mesh in the form of a tape which is passed through the obturator foramen perforating the obturator fascia on either side at the level just above the bulb of the clitoris. Commercially available tapes are costly in the range of Rs 9 to 12 thousands. So, our effort was to make a 20cm long tape 2.5 cm wide by joining two pieces of the tapes cut out from 6" x 4" hernia mesh freely available in our OT as a free of cost government supply and perform a TOT procedure to help poor women – our results are discussed herein and we propose to use this procedure by surgeons in other government hospitals also.

In 1996 Ulmensten, *et al* first introduced the placement of a retropubic mid urethral sling made up of polypropylene monofilament mesh by passing it transvaginally with a trocar following the retropubic route.

That time Burch Colposuspension and the autologous rectus fascial sling procedures were the reference standards for the surgical treatment of Stress Urinary Incontinence. However, both of these operations required wider dissection of the retropubic space of Ritzelus to expose the bladder neck and hence were associated with brisk bleeding from venous plexus present within the Retropubic space. But Ulmensten's retropubic mesh-sling procedure involved minimal bleeding with the disadvantage of being blind and hence has the potential of bladder, bowel and vascular injury with a beginner hand. More than one million such procedures have been performed Worldwide with rare incidence of such serious complications and success rates reported in the range of 86% to 99%<sup>39</sup>. The transobturator approach of placement of a midurethral tape was 1<sup>st</sup> described by Delorme in 2001 is becoming popular day by day. Here the possibility of bowel, bladder injuries has been minimized since the sling is passed through the obturator foramen avoiding the retropubic space<sup>1</sup>. However, metaanalyses of small studies comparing the two procedures indicate a similar success rate and one large multicentric study with 12 months follow up after surgery comparing nearly 300 cases in each arm (Retropubic sling *versus* Transobturator sling ) in 2010 reported a success rate of 80.8% in the Retropubic group *versus* 77.7% in Transobturator group (95% CL: - 3.6 to 9.6 )<sup>39</sup> (Fig 2).

#### MATERIALS AND METHODS

This was a prospective study spanning one year during 2019-2020 where we have placed suburethral TOT tapes in 15 incontinent women though our original plan was to have 45 cases which had to be contracted due to COVID-19 situation. In absence of urodynamic study testing facility in our institution our basic criteria to select cases was an objectively demonstrated urinary leak during cough and valsalva in the absence of cystitis with or without a cystourethrocele. The confirmatory test to assign a case as urethral incontinence was a positive Bonney's test and a positive Q tip test indicating hypermobility of the urethra. Cases associated with genital prolapse with a utero-vaginal



Fig 1 — Our OT made tape and the hernia mesh



Fig 2 — Operative view of tape placement and TOT needle

descent admitted for Ward-Mayo's vaginal hysterectomy were also included for a simultaneous placement of TOT tape after vaginal hysterectomy completed and cysto-urethrocele corrected by fascial repair. A pre-designed questionnaire; urine microscopy and culture, ultrasound KUB and uterus adnexa and measurement of residual post void urine, Bonney's test ie, elevation of paraurethral tissue against the symphysis pubis and asking the woman to cough and to note the disappearance of incontinence was ascribed as a positive test; Q tip test where a sterile lubricated cotton swab was inserted well within the urethra upto the bladder neck and the woman was asked to valsalva resulting in a arc-like upward movement of the swab-stick and if the angle of excursion of the arc was more than  $30^\circ$  that indicated a hypermobility of urethra were all that we used as a study tool. Routine pre-anaesthetic investigations were complete blood count, sugar, urea, creatinine, ECG, serology for Hepatitis B,C HIV and COVID-19 RTPCR.

We prepared the TOT tape by cutting out two strips 12cm long, 2.5cm wide from a 6 inches x 3 inches polypropylene monofilament hernia mesh and then stitching them together with a 2.5 cm double breasting in the middle by placing 6 intermittent No 1-0 vicryl sutures. The two ends of this 20cm long tape was tied with 4 cm long No1-0 vicryl tags so as to tie it to the TOT needle firmly before it is pulled out of the obturator foramen. We performed outside-in technique for TOT under spinal anaesthesia when a vaginal hysterectomy was done before TOT and under saddle block when TOT was the sole procedure. Position of the patient was lithotomy with a 14F rubber catheter within bladder. Two stab incisions made just lateral to the Labio-inguinal fold 5cm lateral, 0.5cm above the bulb of the clitoris on either side for future entry of TOT needle. The suburethral connective tissue in between vaginal mucosa and urethra was infiltrated with Normal saline-Adrenaline (1 in 2 lakhs) mixture 10 ml on either side

of the urethra as a hydrodissection prior to actual operation. The suburethral vaginal mucosa was held by an Allis Tissue forceps 1cm away from the external urethral meatus and a second Allis tissue forceps was also placed 3cm proximal to the first near the bladder neck. Then with gentle outward traction on both the Allis forceps the loose suburethral vaginal mucosa was incised longitudinally for a length of 3cm; further two Allis tissue forceps placed in the middle of the incision over the vaginal mucosa to provide lateral traction to facilitate sharp dissection to separate the urethra from the vaginal mucosa and then a finger dissection with little fingers (left for the right side and vice versa) was performed to reach the inferior pubic rami on either side thus getting a rhomboid shaped field of operation exposing the urethra thanks to previous hydrodissection which ensures limited capillary and venous bleeding. Now the Metzen-Bom dissecting scissors was insuauated through the suburethral incision towards the obturator foramen the tip being directed upwards and outwards towards the skin incision. The blade of the scissors was then opened up to release the obturator fascia. The same procedure was done on the other side. The Bom scissor was then taken out. Next, the TOT needle was held over the skin incision lateral to labial fold, the tip pointing perpendicularly downwards, the handle of the needle parallel to the introitus. Then a vertical pop was exerted over the needle to puncture the obturator foramen, keeping the index finger of the left hand suburethrally towards the obturator foramen, and with the right hand grasping the handle of the needle which was gradually pushed away from the introitus and at the same time giving pressure along the curvature of the needle. The needle thus follows its curvature within the obturator foramen and the fascia covering it and at the same time the left index finger guides the tip of the needle to come out through the obturator foramen within the suburethral space, thus fully exteriorizing the needle outside the operative field. The left end of the tape was tied snugly to the hub of the needle with the joining knots facing outside the urethra. The tape was then exteriorized through the obturator foramen on the skin incision by untwisting the TOT needle using the right hand of the surgeon. When the whole of the needle came out through the skin, the tape was grasped using an artery forceps and the knot with the hub of the needle was cut. Thus the needle was completely

released. The same procedure was performed to pass the other end of the tape suburethraly in the same plane to take it out through the obturator foramen on the right side of the patient with the left hand of the operator being the dominant hand and the right index finger guiding the tip of the needle through the right obturator foramen suburethraly. The TOT needle was then taken out by exteriorizing it along its curvature till the tape is visible outside the perineal skin beside the clitoris. Again the tape was grasped using an artery forceps and the knot with the hub of the needle was cut, thus releasing the needle. The blade of the Metzen Bom scissor was placed below the urethra but above the tape along the direction of urethra. The blades were then half-opened. The assistant, by his both hands gave counter traction on the 2 artery forceps simultaneously, so that the tape was now properly placed without kink or tension, with the joining knots placed outside the double breasting region, which lied below the urethro-vesicle junction. NOT TOO TIGHT, NOT TOO LOOSE, JUST ACCOMODATING THE HALF OPEN METZEN BOM SCISSORS. The redundant portion of the tape on both sides over the perineum below the 2 artery forceps were cut. Then the suburethral vaginal mucosa was stitched by intermittent 2-0 vicryl sutures. The skin on the perineal region was also closed without taking a bite on the tape, using single suture on both sides.

Postoperatively antibiotics and analgesics were given. Foleys catheter was omitted 48 hours after the surgery. Once the patient passed urine spontaneously she was discharged. If any residual incontinence persisted after omitting catheter, she was counselled regarding the possibility of residual incontinence which would resolve within 6 weeks once there was complete fibrosis of the mesh and also the surgery for stress incontinence aimed to give more control over the bladder. It cannot always cure the problem completely. The methodology was duly approved by our Institutional Ethics Committee.

#### DISCUSSION AND RESULTS

In our study above 90% cases (14 out of 15) were multiparous; above 50% (8 out of 15) had a cystourethrocele and above 90% cases (14 out of 15) were above 40 years of age. Incidence of postoperative urinary retention after removal of catheter was one out of fifteen and persistent urinary incontinence was also

one out of fifteen cases. Fourteen out of 15 cases had no urinary hesitancy after six weeks but the other with persistent incontinence developed recurrent urinary tract infection with severe burning sensation at the urethra. Her suburethral stitches gave away exposing the tape and an orange-red colour small stone was found stuck onto the suburethral mesh (Fig 3). We did a second operation under saddle block, dissected the stone from the mesh 0.5cm x 0.5cm size, we removed the suburethral portion of the mesh by dissecting it from underlying fibrotic tissue avoiding any urethral injury laterally upto the inferior pubic rami on either side. The suburethral mucosa was mobilized and stitched up using 2-0 vicryl suture. Till date the result is satisfactory though cannot be designated as a total cure (Fig 4). Different literature has shown a postoperative urinary retention of 10% and postoperative urinary tract infection of around 7% and even in a low cost setup cost of TOT operation was around Rs.4000/-<sup>5</sup>.

So with practice the TOT operation gives encouraging results and is gradually becoming gold standard operation in SUI, the only difficult aspect being the end-point tension of the tape over the urethra which we have practiced keeping a half-opened Bom scissors beneath the tape before closing the suburethral mucosa. Theoretically a life-threatening complication of this operation is a fatal injury to obturator vessels which is always obviated by helical configuration of TOT needle and of course a knowledge of the surface anatomy of the obturator vessels. We acknowledge



Fig 3 — Complication : Suburethral Stone



Fig 4 — After removal and repair of suburethral mucosa

that our study is rather small but we have tried to create an awareness to our colleagues in other government hospitals to practice our procedure to do free-of-cost operations for the benefit of poor women and publish their results comparing that of ours.

### CONCLUSION

The placement of TOT in the treatment of SUI was found to be an effective procedure with complete recovery of symptoms in all patients at the end of 6 weeks postoperative.

The procedure is simple and does not require a prolonged learning curve. The technique of the operation can be adopted by a resident by attending a live workshop followed by hands on training on two cases. This is in contrast to abdominal procedures like Marshall Marchetti Krantz (MMK) and Burch colposuspension which requires a prolonged learning curve.

Abdominal procedures involve approach through the retropubic space of Retzeius, which pose an increased risk of intra-operative bleeding and bladder injury, thus making postoperative cystoscopy a must. In contrast to this, TOT involves placement of a tape suburethrally through an avascular space passing through the obturator foramen on both sides, hence posing almost no risk of intra-operative bleeding and bladder injury. Therefore, postoperative cystoscopy is not always necessary following TOT placement.

A life-threatening complication of this surgery is injury to the Obturator vessels, but the configuration of the TOT needle to surpass the obturator vessels in the obturator foramen and a good knowledge of the surface anatomy of the obturator vessels make this complication very rare.

### REFERENCES

- 1 Magon N, Kalra B — Stress Urinary Incontinence: What, When, Why and then What ? <http://www.jmidlifehealth.org> IP : 244, 167.193.54.
- 2 Kim HG, Park HK — Comparison of Effectiveness between Tension Free Vagina Tape (TVT) and Transobturator Tape (TOT) in Patients with Stress Urinary Incontinence and Intrinsic Sphincter Deficiency : PLOS ONE/DOI : 10.1371/journal.pone.0156306 May 26, 2016.
- 3 Richer HE, Albo ME — New Eng.J.Med 362:22 NEJM.ORG JUNE 3, 2010. Retropubic Versus Transobturator Midurethral Slings for Stress Incontinence.
- 4 Novara G, Ficarra V — Tension-Free Midurethral Slings in the treatment of Female Stress Urinary Incontinence : A Systematic Review and Meta-analysis of Randomised Controlled Trials of Effectiveness : Uropean Urology, 52 (2007):663-679. doi:10.1016/j.euro.2007.06.018.
- 5 Khan FN, Hamid A — An Evaluation of Use of Transobturator Tape(TOT) Sling Procedure in the Current Surgical Management of Female Stress Urinary Incontinence : International Journal of Health Sciences.Vol 2;No.2,July 2008.
- 6 Barber MD, Kleeman S — Transobturator Tape Compared With Tension-Free Vaginal Tape for the Treatment of Stress Urinary Incontinence, A Randomised Controlled Trial. *Obstetrics and Gynecology* 2008; **III(3)**: 611-21.

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