

TOT versus TVT – mesh surgical treatment in stress urinary incontinence

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Abstract: *Introduction: Stress urinary incontinence is a highly debilitating condition, with an important impact over the quality of life. When the conservative treatment fails, the surgical treatment is a viable solution. Minimally invasive sling procedures have become the gold standard of surgical management for stress urinary incontinence (SUI) in women.*

Material and methods: The study was conducted on 68 patients with stress urinary incontinence, 52 have undergone the retropubic tension-free vaginal tape and 16 patients were operated using the transobturator tape procedure. All the patients were evaluated before the operation and the indication of the surgical treatment was established on the basis of physical examination (all the patients had positive cough test), abdominal ultrasound (to determine postvoid residual urine volume), urinalysis and urine culture (the majority of the patients have had before the operation recurrent urinary tract infections).

Results: The satisfaction was similar in both groups of patients, with an average satisfaction rate of 91% for TVT and 86% for the patients who have undergone TOT procedure. The patients were in a proportion of 78,9% at menopause, with an average number of natural births of 1.9 and a mean BMI of 28.2. Regarding the surgical duration, this has varied between 20 and 40 minutes, being higher in the TVT cases (up to 5-7 minutes longer than TOT), because cystoscopy was performed during the operation to verify if the bladder was perforated or not. The urethral catheter was removed immediately after the operation in the case of the TOT procedure and in the day after the operation for the patients who have undergone TVT procedures (all of these patients associated genital prolapse). The hospitalization time was 3 days. We haven't encountered significant intraoperative and postoperative complications.

Conclusions: The TOT and TVT procedures have proven to be highly effective and safe methods in the treatment of SUI. There are no significant differences regarding the efficacy of these two surgical methods, but the risk of intraoperative complications is a little higher for the TVT procedure. The mid urethral sling procedures improve significantly the quality of life for patients with stress urinary incontinence.

INTRODUCTION

Female stress urinary incontinence is a major public health problem, with psychological and social effects and with an important impact over the quality of life. Stress urinary incontinence is defined as involuntary

leakage of urine through the urethra during physical activities which increase the intra-abdominal

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pressure, like laughter, coughing and sneezing, climbing stairs. There are numerous factors which contribute to the appearance of SUI: muscle weakness of pelvic diaphragm secondary to vaginal births, gynecological interventions, overweight and obesity, hormonal disorders. When the conservative treatment (bladder control exercises and pelvic floor muscle training, lifestyle modifications such as dietary habits, weight loss and physical activities) fails, the surgical treatment is a viable solution for SUI.

The first surgical treatment for stress urinary incontinence was described by Burch in the early 1960s and for almost 30 years, till the mid 1990s, it has remained the standard treatment for stress urinary incontinence. The long term follow-ups have suggested that this type of surgical treatment is effective, with a satisfaction rate at 5 years after the operation of nearly 80% and at 10 years of 70%. At the beginning of the 1990s, DeLancey established that the physiopathology of the SUI is associated with a defect at level of the bladder neck and urethra, related with the laxity of the surrounding tissue and as well as with the insufficiency of the urethral sphincter. He reported that the urethra lays on a layer of the endopelvic fascia and anterior vaginal wall and it is stabilized to the lateral by attachments of the levator ani muscle and arcus tendinous fascia. The urethral closure is conditioned by the urethral compression against the support offered by the anterior vaginal wall and the pubocervical fascia. This was the beginning of a new era in the treatment of SUI, the minimal surgical invasive treatment which would prove to be very effective.

In 1995, Ulmsten and Petros described the minimal invasive technique of retropubic tension-free vaginal tape. It was the first generation of sling operations, which used a polypropylene mesh. This procedure involves the blind penetration of the paraurethral and the retropubic space with a needle and the operator must exit with the needle behind the pubic symphysis. Because of its good results and low complication rate, it has become the solution for SUI. It is cited in the specialty literature that the rate of success ranges from 80 to 95%, after more than 5 years after the operation. Although the effective rate

was high, it exist the intraoperative risk of complications such as bladder and bowel perforation and vascular injuries. As a solution to these concerns, Delorme described in 2001 another minimal invasive technique, the transobturator tape procedure. As well as the TVT the TOT is also a blind procedure. During the TOT surgery the puncture is performed at the clitoral level of the inferior ramus of the pubic bone and the operator must pass with the needle through the obturator foramen. This is the second generation of sling operations for SUI. It has been proven that the efficacy of the TOT procedure is similar to the TVT and with this type of procedure the risks of perforating the bladder or the bowels have disappeared, but more patients have groin pain postoperatively and vaginal or urethral erosion due to the polypropylene mesh. Both procedures are in current use for the SUI treatment, but because of its lower complication risks and similar efficacy, the TOT procedure is more popular.

MATERIALS AND METHODS

The purpose of this paper is to present our experience at the Urology Clinic of the Central Military Emergency University Hospital "Dr. Carol Davila" regarding the minimally invasive surgical treatment of stress urinary incontinence, using the vaginal sling procedures of TVT and TOT. We have analyzed several variables like: patient age, the number of vaginal births, body mass index, and gynecological interventions like hysterectomy. We present our cases and experience regarding perioperative complications and their management and as well as the efficacy rates, compared with other studies.

Between March 2010 and November 2015, in the Urology Clinic of the Central Military Emergency University Hospital "Dr. Carol Davila", a number of 68 patients with stress urinary incontinence have been operated, using the minimally invasive technique of retropubic tension-free vaginal tape or the transobturator tape procedure. Out of the 68 patients who were admitted in our clinic for the surgical treatment of SUI, a number of 52 patients have undergone the transobturator tape procedure

and only 16 patients were operated using the tension free vaginal tape technique. The TVT procedure was used only in the cases of the patients who associated genital prolapse. TVT has the same assembly principle as the TOT, but the incisions are made in the suprapubic region. The intraoperative complication risks, like bladder or bowel perforation, are higher in the case of the TVT compared with TOT. Therefore cystoscopy is essential after puncture. In all the cases with TVT we have performed cystoscopy to exclude a potential bladder perforation. Before the operation, all the patients were examined and the indication of the surgical treatment was established on the basis of physical examination (all the patients had positive cough test), abdominal ultrasound (to determine postvoid residual urine volume), urodynamic studies (testing was not performed in all the cases), urinalysis and urine culture (the majority of the patients have had before the operation recurrent urinary tract infections).

RESULTS

The mean age of the patients was 60.9 years. The patients were in a proportion of 78.9% at menopause and the average number of natural births was 1.9 ranging between zero and five. Mean BMI was 28.2, ranging from 23.3 to 37.4. Regarding the surgical duration this has varied between 20 and 40 minutes, being higher in TVT cases (up to 5-7 minutes longer than TOT), because cystoscopy was performed during the operation to verify if the bladder was perforated or not. The mean operative time was 27 minutes. Both surgeries required a 3 day hospitalization, the patients being discharged in all the cases the day following the surgery. The urethral catheter was removed immediately after the operation in the case of the TOT procedure and in the day following the operation for the patients who have undergone TVT procedures (all of these patients associated genital prolapse). In what concerns the urinary residual volume in the first days after the operation, we haven't noticed significant differences between the two types of procedures (the patients didn't accuse incomplete bladder voiding). All the patients were reevaluated at one month after the operation using the cough test, abdominal ultrasonography to

determine the postvoid residual urine volume and to find potential complications secondary to the procedure. The long-term treatment outcomes were evaluated after 3, 6 and 12 months. Regarding the patients satisfaction, it was considered after the evaluation that the SUI was cured if the patient was completely continent, improved if partial urinary incontinence remained after the surgery and failed if the urinary incontinence remained the same or got worse after the surgery. The patient satisfaction was similar in both groups of patients, with an average satisfaction rate of 91% for TVT and 86% for patients who had undergone TOT procedure. Our results are in line with data from specialty literature.

J. Y. Han et al in a study about the effectiveness of TVT and TOT procedures in women with overactive bladder and stress urinary incontinence, stated that TVT and TOT procedures have decreased the proportion of the daily incontinence in these patients, with a slightly higher efficacy in the TVT group. In a study published in 2013 the "Scandinavian Journal of Urology", V. Nyyssonen concluded that 70% of the patients that were included in the study, with symptoms of detrusor over activity, declared significant improvement after the mid urethral tape surgery. There was no significant difference between the two operating techniques.

Cerniauskiene and collaborators in a comparative study regarding TOT and TVT outcomes reported that the satisfaction rate for the patients who have undergone the TOT procedure was 81,3%, meanwhile the satisfaction rate for the TVT group was 90%.

Zyckowski et al stated in their comparative study regarding the TVT and TOT surgery, that the patient satisfaction rate at 6 months after surgery was 96,4% for TVT patients and 96.1% for TOT patients. Regarding the cough test and pad test, they have stated that it was negative in 91.5% and 94.4% in TVT cases, and in 93% and 93% TOT cases. The findings in our study were similar to general literature. We have observed in our study that the cough test was negative for 91.2% of TVT cases and 92% of TOT cases at 6 months, and the pad test was negative for 94% of TVT cases and 92.8% of TOT cases at 6 months postoperative. We haven't encountered significant

intraoperative and postoperative complications. We haven't had significant bleeding during the interventions. The mean blood loss was under 25 ml. Local hematoma was encountered in 5 TOT cases and in only one TVT case and conservative treatment was effective. We haven't had any bladder or bowel perforation complications. We have encountered one case of relapse of incontinence due to the exaggerated physical activities, at two and a half years after the operation. In this case, we have performed a second intervention. We have removed the mid urethral portion of the tape and we have performed the tension-free vaginal tape procedure. The results at 3 and 6 months after the operation were good, although it is mentioned in general literature that in the case of reintervention for relapse of SUI the outcomes may not be as good as in the case of the first operation.

De novo overactive bladder symptoms ranged between 3 and 4.5% without differences between TOT and TVT patients. The pharmacological treatment which was applied in these cases has had good results. There are studies in which it is mentioned that the incidence of the overactive bladder symptoms ranges between 4 and 30 % after the operation.

Bladder botulinum toxin A injection and percutaneous sacral nerve modulation have proven to be good alternatives for the TOT and TVT surgery. Since its introduction (2005-2006) the number of patients who were admitted for bladder botulinum toxin A injections has increased constantly,

overtaking in 2010 the number of TVT/TOT procedures. So far we haven't applied this method of treatment for the SUI.

With the passing of the time, the number of patients who have undergone TOT/TVT surgery and have chosen to remove their tapes grows. Most tape removals are performed at a relatively short time after the procedure, the main cause being urinary retention or tape extrusion. We haven't encountered such situations in our study.

CONCLUSIONS

The minimally invasive surgical treatment of SUI (TOT/TVT) has become the gold standard for patients with this debilitating condition. Mid-urethral sling surgery is performed to fix the urethra and involves few anatomic changings in the surrounding tissues.

These procedures have proven to be highly effective, increasing the quality of life for the patients who suffer from SUI. Regarding the efficacy rate of this two type of procedures it hasn't been noticed significant differences in the study that we have done, our results being in line with specialty data.

In terms of complications the risks are higher for the TVT procedure, due to the risk of bowel or bladder perforation. To exclude this possible accident, which may happen during TVT, cystoscopy is essential. Therefore, the TOT procedure has become more popular.

Till the introduction of TVT and TOT, SUI was either simply accepted or required invasive surgery.

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