INTRODUCTION

In 1995, Ulmsten was the first who described surgical procedure in the treatment of urinary stress incontinence, with the aim to provide support in the middle part of female urethra without tension forces [1]. The basic principle of action of synthetic tension-free tapes (sling) placed suburethrally is induction of periurethral collagen production, which provides support for hyper-mobile urethra [2]. Initially, retropubic approach was used, but it was shown that it was associated with the high percentage of complications, which were, according to the literature, observed in 20% of cases (hematomas, bleeding, bladder injury, reoperation) [3,4]. In 2001, Delorme inaugurated a new obturatory approach with “out to inside” direction, but it was shown that this approach was also associated with the risk of bladder, urethral and vaginal perforation in about 5-6% of patients [5]. In 2003, De Leval made additional technical modifications (helical needles with guide) and presented new obturatory approach in reverse direction “inside-out”, which decreased the incidence of surgical complications to 1.3% [6]. In the last years, the so-called “mini synthetic slings” were used, but their application was not successful, which resulted in the come-back of the classic obturatory approach with “inside-out” direction and release of the newest product of Johnson & Johnson company (Gynecare, TVT Abbrevo), which should be as close as possible to the ideal standard in this surgical procedure [7,8]. The aim of the study is to present the results of treatment and complications of the synthetic tension-free prolene mesh use with the obturatory approach, using “inside-out” method sec. de Leval in the surgical treatment of stress incontinence in women.

MATERIAL AND METHODS

In the period from 2005 to 2009, 51 patients were operated for urinary stress incontinence at Surgical Department, Department for Gynecology, Clinic for Gynecology and Obstetrics, Clinical Center of Vojvodina. All patients underwent detailed clinical examination and were asked to fulfill the so-called “stress-urge” score. A complete urodynamic testing (UDT) was performed before the surgery in 6 patients with mixed type of incontinence (stress and urge type) and in 21 patients with stress incontinence (the total number being 27, i.e. 52.9% of patients). In 24 (47.1%) patients, who had not undergone the UDT, stress incontinence was confirmed by clinical examination of stress test with full bladder in standing position [9]. The indications for surgical treatment are shown in Table 1. The contraindications for the surgery included the patients on...
anticoagulant therapy, uroinfection, previous trauma and surgical interventions of pelvic bones, pregnancy or planning to get pregnant. All patients underwent the surgical technique of obturator placement of tension-free transvaginal (TVT) tape (Gynecare, Johnson-Johnson Company) with the “inside-out” direction sec. De Leval, in the way we described in detail in the previous article [10] (Figure 1). Foley catheter was placed in the urinary bladder for 24-72 h, and the patients were discharged from hospital on the 3rd-5th postoperative day. All patients were invited to the control gynecological examination 2 years after the surgery, which consisted of filling out “stress urge score” questionnaire and examination of stress test with full bladder in standing position. The UDT testing was performed in all cases when positive anamnesis for stress incontinence was obtained from the questionnaire, as well as in cases when the stress test was positive, whereby 4 (7.8%) cases of recurrence after the surgery were proved.

**Results**

The age of patients was 32 - 75 years, the average being 53.8 years. The duration of surgery was 21 - 60 minutes (on average 39 min.). The complications, including the erosion of tape (Figure 2), urinal retention, bleeding from the site of incision and transient pain in the legs, are shown in Table 2. Postoperatively, the patients spent 3-5 days in hospital (on average 3.7 days), except for 2 patients, in whom the tape was decompressed by the second look intervention in the operation room on the 4th and 7th postoperative day. Two years after the surgery, 43 (84.3%) patients were dry, 4 (7.8%) showed a significant improvement, while recurrence was detected in 4 (7.8%) patients.

**Abbreviations**

TVT – tension-free transvaginal
UDT – urodynamic testing

**Table 1.** Indications for surgical treatment of stress urinary incontinence using obturator TVT tape

<table>
<thead>
<tr>
<th>Indications for surgery treatment/Indikacije za operaciju</th>
<th>Tabela 1. Indikacije za hirurško lečenje stres inkontinencije urina primenom TVT opturatornim pristupom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress incontinence without genital organs static disorders - 17 (33.3%)</td>
<td>Stress incontinencija bez poremećaja statike genitalnih organa</td>
</tr>
<tr>
<td>Stress incontinence and descensus uteri + cystocele gr. I</td>
<td>Stress inkontinencija i I stepen spada genitalnih organa (descensus uteri, cytocele gr. I)</td>
</tr>
<tr>
<td>Stress incontinence and anterior vaginal wall prolapse (cystocele gr. II) – 5 (9.8%)/Stress inkontinencija i spad prednjeg zida vagine (cystocela gr. II)</td>
<td>Mixed stress and urge incontinence/ Mešovita stres i urgentna inkontinencija – 5 (9.8%)</td>
</tr>
<tr>
<td>Mixed (stress and urge) incontinence after Oxford Sling operation – 1 (1.9%)/Mešovita (stres i urgentna) inkontinencija posle Oxford Sling operacije</td>
<td></td>
</tr>
</tbody>
</table>

**Table 2.** Results of the surgical treatment for stress urinary incontinence using tension-free obturator TVT tape

<table>
<thead>
<tr>
<th>Complications 8 (15.7%)/Komplikacije</th>
<th>Tabela 2. Rezultati hirurškog lečenja stres inkontinencije primenom TVT prolenske trake bez zatezanja opturatornim pristupom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erosion of TVT tape 2 (3.9%)/Erozija TVT trake</td>
<td>Urine retention 2 (3.9%)/Retencija urina</td>
</tr>
<tr>
<td>Urine retention 2 (3.9%)/Retencija urina</td>
<td>Bleeding from the incision site 1 (1.9%)/Krvenjenje iz mesta incizije</td>
</tr>
<tr>
<td>Bleeding from the incision site 1 (1.9%)/Krvenjenje iz mesta incizije</td>
<td>Transient pain in the legs 3 (5.8%)/Prolazna bol u nogama</td>
</tr>
<tr>
<td>Transient pain in the legs 3 (5.8%)/Prolazna bol u nogama</td>
<td>Results 2 years after surgery/Iskustvo lečenja dve godine nakon operacije</td>
</tr>
<tr>
<td>Results 2 years after surgery/Iskustvo lečenja dve godine nakon operacije</td>
<td>Completely dry 43 (84.3%)/Potpuno suvo</td>
</tr>
<tr>
<td>Completely dry 43 (84.3%)/Potpuno suvo</td>
<td>Significantly improved 4 (7.8%)/Znatno poboljšanje</td>
</tr>
<tr>
<td>Significantly improved 4 (7.8%)/Znatno poboljšanje</td>
<td>Recurrence 4 (7.8%)/Recidiv</td>
</tr>
</tbody>
</table>

**Fig. 1.** Application of the TVT tape using transobturator approach

*Slika 1. Plasiranje TVT trake opturatornim pristupom*

**Fig. 2.** Vaginal erosion of TVT tape 6 weeks after surgery

*Slika 2. Erozija TVT trake kroz vaginu šest nedelja posle operacije*
Discussion and Conclusion

In the first studies published by De Leval et al, no intraoperative complications were reported in operated patients. The postoperative complications included urine retention (5.4%), pain at the pelvic floor (15%), problems with healing of vaginal mucosa and uroinfection (5.2%). Pain diminished spontaneously 48 hours after the surgery [6]. In our study, we recorded the following complications: transient leg pain (5.8%), urinary retention (3.9%), problems with healing of vaginal mucosa (3.9%) and bleeding from the site of incision (1.9%). In 2 (3.9%) patients, postoperative urine retention occurred, and it was resolved by repeated intervention in the operation room, by tape decompressing and cutting on one side. In both cases, the patients had anterior vaginal wall prolapse (II grade cystocele) associated with stress incontinence. During the surgery, the cystocele was corrected first and then the TVT tape was placed. There is a possibility that a higher extent of surgical dissection around the neck of the bladder during the treatment of cystocele caused moving and drop of the tape, which further caused retention by mechanical pressure on the neck of bladder. Both patients are still continent 2 years after the surgery. In all cases, pain in the legs was transient, and it disappeared spontaneously during 24-72 hours after the administration of analgetics. According to the cumulative literature data referring to 40 different studies, which included 5529 patients operated by using obturatory TVT, bleeding or hematoma were detected in less than 0.3% of cases; whereas 88% of the operated patients were dry two years after the surgery [3,6,8,11-13]. Our results, which are similar to those from the literature, show that 84.3% of operated women at Clinic for Gynecology and Obstetrics in Novi Sad were dry 2 years after the surgery. In our study, the UDT examination confirmed stress urinary incontinence recurrence in 4 patients (7.8%), and after the detailed analysis of medical history and causes of the recurrence, a repeated surgical treatment was suggested. The newest TVT obturatory system called Abbrevo (Gynecare, Johnson Johnson) has been released on market. The advantages in comparison with the standard obturatory system are the lesser extent of dissection, which is performed only to the level of obturatory membrane, reduction and standardization of tape length on both sides. The membrane is perforated by the helical needles, instead by the scissors, and by the guide placed only to the obturatory membrane, which results in the postoperative pain alleviation [8,14,15]. It can be concluded that the obturatory approach of synthetic TVT tape placement using “inside-out” technique is a minimally invasive and reliable technique in surgical treatment of stress incontinence, with the success of 85-90% in the period of 2 years after the surgery.

References

Sažetak

U radu su prikazani rezultati hirurškog lečenja 51 pacijentkinje kod kojih je u periodu od 2005. do 2009. ispod srednjeg dela uretre opturatornim pristupom postavljena prolenska traka bez zatezanja radi lečenja stres urinarne inkontinencije. Kod svih pacijentkinja sa simptomima urgentne inkontinencije ili s pret- hodnim operacijama zbog stres inkontinencije, pre operacije ra- deno je kompletno urodinamičko ispitivanje. Indikacije za ope- raciju bile su: stres inkontinencija bez poremećaja statike geni- talnih organa – 17 (33,3%), stres inkontinencija i blazi stepen spada genitalnih organa (descensus uteri et cistocele gr. I) – 23 (45,2%), stres inkontinencija i spad prednjeg zida vagine (cysto- cela gr. II) – 5 (9,8%), mešovita stres i urgentna inkontinencija – 5 (9,8 %) i mešovita stres i urgentna inkontinencija posle pret- hodne operacije – 1 (1,9%). U radu je primenjena hirurška teh- nika opturatornog postavljanja prolenske trake bez zatezanja (Gynecare, Johnson-Johnson Company) u smeru „unutra prema spolja” po De Levalu. Komplikacije su evidentirane kod osam (5,7%) pacijentkinja: erozija trake 2 (3,9%), retencija urina 2 (3,9%), krvaranje iz mesta incizije 1 (1,9%) i prolazna bol u no- gama u 3 (5,8%) slučaja. Dve godine nakon operacije 43 (84,3%) pacijentkinje su suve, 4 (7,8%) imaju znatno poboljšanje dok je recidiv zabeležen kod 4 (7,8%) operisane pacijentkinje. Opturatorni pristup u plasiranju prolenske trake bez zatezanja uspešan je i savremen metod u hirurškom lečenju stres urinarne inkonti- nencije kod žena.

Ključne reči: Stres inkontinencija urina; Prolenske trake bez zatezanja (TVT trake); Operativne hirurške procedure; Žensko; Uretra + hirurgija; Biokompatibilni materijali

Rad je primljen 21. II 2011.
Prihvaćen za štampu 11. IV 2011.