

Original article

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## Complications after different surgical methods for suburethral implantation of polypropylene slings in women with stress urinary incontinence

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### Abstract:

**Objective:** to identify the proportion of complications after suburethral implantation of polypropylene slings in women with stress urinary incontinence based on a seven-year experience.

**Material and Methods.** We conducted the analysis of a seven-year experience in various implantation techniques of suburethral slings in 1260 women with stress urinary incontinence: inside-out and outside-in obturator sling fixation; suprapubic sling fixation and non-trocar mini-sling installment.

**Results.** The highest incidence of complications was observed over the first two years after suburethral sling implantation was performed. Subsequently, the proportion of complications declined progressively to the lower limit values of 7–8% in the course of three last years. An incidence of early surgical complications among various suburethral sling implantation techniques had no statistically significant differences. However, after the suprapubic sling implantation, intraoperative and mesh-associated complications prevailed.

**Conclusion.** Our study confirmed that suburethral sling implantation using suprapubic fixation method was associated with a higher incidence of complications and should have been performed exclusively for the target group of the patients, for whom safer surgical procedures were contraindicated.

**Keywords:** stress urinary incontinence, suburethral polypropylene sling.

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### Introduction

Despite the progress made by contemporary medicine, urinary incontinence still remains unresolved problem. Recent epidemiological studies demonstrated that urinary incontinence symptoms were experienced at least once a year by 5–69% of women and 1–39% of men [1]. Due to specific anatomical and physiological traits of female urogenital system, such symptoms were twice as frequent in women as in men, making urinary incontinence a «female problem». Stress urinary incontinence is not a life-threatening or dangerous condition, but it significantly impairs the patient's life quality and urges doctors to search for new treatment options. The conventional method of stress urinary incontinence treatment involves a surgery leading to artificial development of fascia accompanied by formation of new fulcrum and pelvic floor support [2]. Use of synthetic materials was a revolutionary step in surgical treatment of this condition. Currently, the most commonly used invasive technique for stress urinary incontinence is the suburethral implantation of polypropylene sling with transobturator or suprapubic fixation. However, this surgical approach leaves some controversial issues including tissue reaction to

synthetic materials and risk of certain complications, such as vaginal and bladder erosions, dyspareunia, pain, vaginal synechia, infection, sling migration, etc. [3].

**Objective:** to determine the rate of post-surgical complications from the seven-year data analysis of different suburethral implantation techniques of polypropylene slings.

### Materials and methods

We performed the retrospective analysis of the seven-year experience on surgical treatment of a stress urinary incontinence. Women were treated in the following urological hospital wards: Novokuznetsk City Hospital No.1; Regional Clinical Center for Miners' Healthcare; M.A. Podgorbunsky Regional Clinical Emergency Hospital, S.V. Belyaev Regional Clinical Hospital, Prokopyevsk City Hospital No.1.

In 2011–2017, there were 1260 women surgically treated for stress urinary incontinence. Their ages ranged 36–67 years old. All patients were distributed among four groups based on applied technique of suburethral implantation of a polypropylene swing-mesh (THT Bio-Science) with a mass of 28 g/m<sup>2</sup>. Treatment group 1 (n=756) had an inside-out

obturator sling implantation, while group 2 (n=294) was characterized by an outside-in obturator sling implantation; group 3 (n=126) and group 4 (n=84) had suprapubic sling implantation and non-trocar mini-sling installment, respectively.

All patients underwent standard pre-surgical care along the guidelines of the Russian Ministry of Health Management (order No.595n). Surgeries were performed with a spinal anesthesia, based on standard procedures and in conjunction with medical necessity. Rates of intra-operative, early post-operative and mesh-associated complications, along with overall complications' rate over the 7-year period of time were evaluated.

Sample variables shown in the tables below are accompanied by indicated sample sizes (n) and probabilities (p) of null hypotheses being true. Statistical significance of differences between relative frequencies of two or more events was assessed using a chi-square criterion. The critical level of significance for testing statistical hypotheses was considered at 0.05.

### Results

The highest complication rate was observed during the first two years after initial polypropylene suburethral mesh was installed. Later on, incidence of complications was progressively diminishing. It remained stable at 7-8% level over the last three years (Table 1).

Intraoperative complications, such as bladder injury, were significantly more prevalent in the patients undergoing suburethral implantation of polypropylene sling by using a suprapubic technique (Table 2). Incidence of early postoperative complications at various techniques of suburethral polypropylene sling implantation had no statistically significant difference. Mesh-associated complications, such as a bladder erosion, were statistically more prevalent in the patients after suburethral polypropylene sling implantation using the suprapubic method.

### Discussion

Surgical treatment of pelvic prolapse using synthetic mesh implants is a promising and progressively improving reconstructive technique [4]. A method of choice for the treatment of stress urinary incontinence in women is the suburethral tape implantation. It has a lasting beneficial effect, being a relatively simple, minimally invasive and inexpensive procedure [5]. However, like any surgical intervention, suburethral implantation of a polypropylene sling is associated with a risk of complications depending on a surgeon's experience, individual anatomical features and tissue reactivity towards synthetic materials.

**Table 1 . Overall rate of complications over 7 years**

Parameter	2011	2012	2013	2014	2015	2016	2017
Number of patients	139	165	198	243	227	199	89
Complication rate, %	25.9*	20.6	13.1	8.6	7.9	7	7.8

\* p<0,05 between 2011 and 2013-2017.

It is worth noting that a surgeon's experience turned out to be crucial for decreasing an occurrence of complications. Our study has shown that refining practical skills allows to reduce complication occurrence by 3 times.

Our experience confirmed the point of view of A.I. Neymark, who opined that an alternative way to decrease the complication rate was to follow the principle of using the most appropriate suburethral tape placement technique for each individual patient [6]. Specifically, using this principle allowed the author to lower the rate of complications down to 3%. Most researchers recognize that every technique has its own benefits and flaws, thus being suitable just for a specific target group of the patients [7].

Non-trocar mini-sling implantation is used at light stages of this medical condition, in the patients with relatively low body mass. That is why it is rarely associated with intraoperative and early postoperative complications, which is confirmed by our data and literature sources [8].

In-out and out-in modifications of obturator sling implantation are used at moderate manifestations of discussed condition, being simple and having a good corrective effect. However, they require longer time to separate anterior vaginal wall from urinary bladder. The observed results are consistent with published data showing minor frequencies of intraoperative and postoperative complications in such patients [9].

**Table 2. Occurrence of intraoperative, early postoperative and mesh-associated complications, %**

Complications	Group 1 (n=756)	Group 2 (n=294)	Group 3 (n=126)	Group 4 (n=84)
Intraoperative complications				
Bladder injury	1.58	1.36	7.9*	0
Peritoneal injury	0	0	1.6	0
Bleeding (blood loss over 200 ml)	1.05	1,7	4.76	1.19
Labial / fornical injury	0.93	1.7	0	0
Early postoperative complications				
Infection	0.26	0	0	0
Hematoma (volume > 300 ml)	1.5	2.72	3.17	2.4
Micturition disorders	3.7	4.1	4	1.19
Mesh-associated complications				
Bladder erosion	1.85	1.7	8.7*	1.19

\* p<0.05.

Suprapubic sling placement is recommended for the patients with severe symptoms, recurrent cases, as well as the presence of significant comorbidities and a high body mass. One of the studies showed that the patients prescribed to have a suprapubic sling placement have a high risk of intraoperative and mesh-associated complications [10].

### Conclusion

Our data confirmed that suburethral sling placement with suprapubic fixation was associated with a higher risk of complications. Thus its use was only justified in selected patients, for whom application of safer techniques was not feasible.

**Conflict of interest:** none stated.

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