



## Full length article

## The novel technique of post-hysterectomy vaginal vault prolapse repair: Apical sling and “neocervix” formation



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## ABSTRACT

**Objective:** We primarily aimed to evaluate the effectiveness of the novel technique: bilateral sacrospinous fixation by monofilament polypropylene apical sling combined with “neocervix” formation in surgical treatment of post – hysterectomy vaginal vault prolapse. The secondary objective was to estimate the impact of the surgery on voiding function and quality of life.

**Study design:** This prospective study involved 61 women suffering from post-hysterectomy prolapse. We used the following criteria to evaluate the results of surgical treatment: results of vaginal examination (POP-Q system), uroflowmetry, bladder ultrasound, validated questionnaires were used. All listed parameters were determined before the surgery and at control examinations in 1, 6, 12 months after the treatment.

**Results:** Mean operation time was 35 min. No cases of intraoperative damage to the bladder/rectum, as well as clinically significant bleeding were noted. At 12-month follow-up anatomical cure rate ( $\leq$ stage I, POP-Q) was 100%, 94.4% and 100% for vaginal apex, anterior and posterior vaginal walls, respectively. The following long-term complications were noted stress urinary incontinence de novo and urgency de novo were noted in 6.5% and 4.9%, respectively. Statistically significant ( $P < 0.05$ ) improvement in peak flow rate was observed according to uroflowmetry. Comparison of the scores by the questionnaires revealed a significant improvement in the quality of life in the postoperative period.

**Conclusion:** The novel technique: combination of the apical sling and purse-string “neocervix” formation appears to be effective and safe method for treatment patients with vaginal vault prolapse. The technique improves voiding function and quality of life.

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### Introduction

Hysterectomy is one of the most frequent procedures in gynecologic surgery. As an example, 433.621 surgeries were performed in 2010 in USA [1]. Achilles' heel of this procedure is that cardinal and uterosacral ligaments (1 level of support acc. to DeLancey) are separated from the cervix leaving a little fibers attached to the vagina. Defects of supporting structures at this level are primarily responsible for apical vaginal vault prolapse (VVP) [2]. Frequency of VVP requiring surgical repair is up to 8%, and 45% in patients with prior hysterectomy for uterine prolapse [3,4].

Among the techniques for VVP reconstruction the most studied and widespread are the following: McCall culdoplasty, uterosacral

ligament fixation, sacrospinous fixation and sacrocolpopexy. Today there is no consensus on the management of vaginal vault prolapse, however the key role of the apical compartment restoration is established. Nevertheless, coexistent pelvic floor defects which may be a cystocele, rectocele or enterocele are present in 72% [5]. According to DeLancey, enterocele formation often accompanies a simple eversion of the upper vagina and its correction is achieved by an additional cul-de-sac obliteration. By the authors data, a complex vaginal eversion including cystocele or rectocele (defects of the 2nd level of support) represented in 67% of cases of VVP [2]. This condition indicates a need of reconstructive technique aimed at simultaneous correction of the 1st and 2nd levels of support.

The primary objective of this study was to evaluate the effectiveness of the novel technique of post-hysterectomy vaginal vault repair: bilateral sacrospinous fixation with modern monofilament synthetic tape – apical sling combined with the “neocervix”

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formation. The secondary objective was to estimate the impact of the surgery on voiding function, quality of life and patient's satisfaction.

## Materials and methods

This study started on September 2014 and closed April 2015, was designed to be open and prospective. Women suffering from post-hysterectomy vaginal vault prolapse stage III–IV according to Pelvic Organ Prolapse-Quantification (POP-Q) system were enrolled [6]. Exclusion criteria were: history of gynecological cancer and stress urinary incontinence (SUI). Patients were provided with thorough information and signed a consent. The study was registered and approved by the ethical committee of the University Clinic of Saint-Petersburg State University.

All patients underwent physical and urogynecological examination, uroflowmetry and ultrasound measurement of post-void residual volume (PVR). Prolapse staging was recorded according to the POP-Q system. Patients with positive stress cough test were excluded from the study. Postoperative examination was performed by physicians of Department of urology in 1, 6, 12 months after surgery and then annually. Anatomical success of the surgery was defined as absence of stage 2 prolapse or higher. Voiding function was assessed by comparing pre- and postoperative data. The quality of life (QoL) was estimated at each follow-up appointment by the use of questionnaires translated and validated in Russia: Pelvic Floor Distress Inventory (PFDI-20), Pelvic Floor Impact Questionnaire (PFIQ-7), Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire (PISQ-12) [7]. Patient's satisfaction was assessed using a separate dichotomous (yes/no) questionnaire item. Also, a satisfaction criterion was the answer to the question: "Would you recommend the procedure to friends?"

## Surgical technique

All surgical procedures were performed by two staff urologists experienced in this technique of POP repair. Patients received intravenous antibiotics (amoxicillin clavulanate) within an hour before the operation. Surgery was performed under general anesthesia. After the deep hydrodissection of the vaginal wall (40 cc of sterile saline), a full thickness midline vaginal incision was made. The incision passed through the most prolapsing point of the vagina, that was one of the follows: post-hysterectomy scar, anterior or posterior vaginal walls. The vaginal edges were grasped by the Allis clamps and blunt subfascial dissection was continued bilaterally. When the ischial spines were reached sacrospinous ligaments and rectum were palpated as well. Skin incisions were done in the perianal area about 7 cm laterally and 3 cm downwards from the anus. Then the introducer with the tunneler put on it passed bilaterally through the skin incisions, ischio-rectal space and perforated the sacrospinous ligaments not less than 2 cm medially from the ischial spine (Fig. 1C). The monofilament polypropylene woven unstretchable tape (60 g/m<sup>2</sup>) with atraumatic edges 1,5 cm x 45 cm (UroSling 1, Lintex LLC, St.-Petersburg, Russia) with the help of its applicators was put through the tunnelers (Figs. 1 and 2). Intactness of the rectum was checked after the sling installation.

The keystone of this procedure was the method of the vaginal vault fixation to the tape (apical sling). When the tape was put in the SSLs two USP 1 non-absorbable fixing ligatures were passed through the central part of the sling bilaterally (Fig. 3A.a). We used Ftorex nonabsorbable polyester braided coated with fluoropolymer pseudo-monofilament suture (Lintex LLC, St.-Petersburg, Russia). The latter has the same biocompatibility as monofilament polypropylene suture, though has no capillarity and micropores; it is soft and needs only three knots to fix the suture. Then the purse

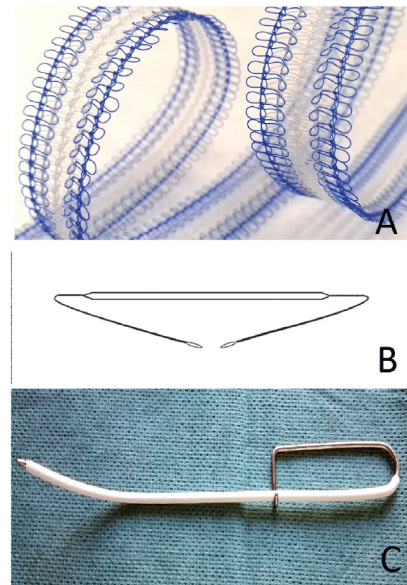


Fig. 1. A, B. Tape UroSling 1; 1C. Urofix PL tool with a tunneler put on.

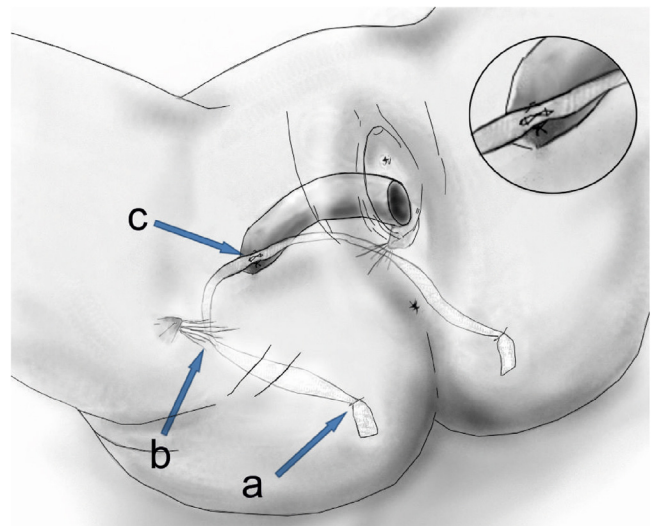


Fig. 2. The position of the apical sling: a. The apical sling, b. Sacrospinous ligament, c. Vaginal cuff.

string suture (USP 1 absorbable braided polyglycolide – PGA) was applied to the internal surface of the endo-pelvic fascia so that the lateral stitches of it passed over the fixing ligatures of the tape. Thereby the ligatures were pinned to the internal surface of the vaginal fascia (Fig. 3A.b). In cases when the thickness of the vaginal wall was enough not to perforate it we used for this step a non-absorbable suture Ftorex USP1, otherwise we used absorbable braided polyglycolic suture – PGA. Then the purse string suture was tied (Fig. 3B.a). After that the apical sling fixing ligatures were tied above the tissue conglomerate on the top of the vaginal cuff (so called "Neocervix") formed by the purse string suture (Fig. 3B.b,c). All this "neocervix" formation steps were repeated in cases, when absorbable suture was applied and durability of the construction was valued as insufficient.

So there was created the single construction of the repaired endo-pelvic fascia and the apical sling fixed to the sacrospinous ligaments bilaterally. Vagina was closed by continuous USP 2/0 PGA suture. When the skin ends of apical sling were pulled out the

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