



Full-thickness vascularized vaginal flap as the fixation point in the surgical treatment of vaginal vault prolapse

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Abstract

Introduction and hypothesis Post-hysterectomy vaginal vault prolapse is quite frequent and at the same time a challenging surgery for pelvic organ prolapse.

Methods One of the most popular methods of treatment is sacrospinous fixation, including its mesh modification.

Results Despite the high efficiency in the apical compartment, the incidence of the anterior compartment prolapse is quite high. Erosion remains an unsolved problem. A 44-year-old patient with grade IV post-hysterectomy prolapse underwent a sacrospinous fixation procedure with mesh according to the described technique. Surgery was performed successfully without complications. The duration of the operation was 40 min. A year after the operation, the recurrence of POP was not recorded in any compartments of the pelvic floor. It was possible to maintain the length of the vagina. Dyspareunia and vaginal erosion were not detected. The patient also noted a significant improvement in her quality of life.

Conclusion The demonstrated approach allows performing minimally invasive reconstruction of all three compartments of the pelvic floor. Moreover, the use of a full-thickness vascularized vaginal flap allows safely fixing the mesh to the vaginal vault, minimizing the risk of erosion and pain syndrome due to excessive tension.

Keywords Vascularized vaginal flap · Sacrospinous fixation · Post-hysterectomy vaginal vault prolapse · Video tutorial apical sling

Introduction

Today, hysterectomy is one of the most common gynecological operations [1]. In the US in 2010, > 433,000 hysterectomies were performed [2]. According to the literature data, the incidence of post-hysterectomy vaginal vault prolapse is up to 43% [3]. However, the treatment of such patients is challenging for the surgeon because of atrophic scar changes and the lack of reliable structures for fixation. The gold standard for treatment of post-hysterectomy vaginal vault prolapse is sacrocolpopexy.

Despite its high efficiency, the extrusion of mesh implants and suture material remains unsolved. According to various authors, the incidence of extrusion after sacrocolpopexy is comparable to that of vaginal surgery and is 0–10% [4, 5]. The most popular transvaginal reconstruction method is sacrospinous fixation. One of its variations is the UpHold system. This implant has proved to be highly effective (94–98%). However, the incidence of mucosal erosion and extrusion of the implant remains quite significant (1.7–6.5%), requiring surgical interventions [6, 7]. The goal of reducing the implant size led to the appearance of tapes with characteristics similar to those of slings. In 2016, the results of using the I-STOP sling were published. According to the data, the anatomical efficiency of the operation was 100%. However, the numbers of granulations in the surgical area and extrusions of suture material were 6.4% and 4.3%, respectively [8]. Thus, the main unsolved issue of both the abdominal and vaginal methods of apical fixation is the isolation of synthetic materials from vaginal tissues. The presented video demonstrates the original technique, which allows completely avoiding direct contact of the vaginal mucosa and synthetic material and thus safely fixing the apical structures.

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Method

A 44-year-old woman was referred to Saint Petersburg State University Hospital with complaints of vaginal bulging, frequent urination, and urgency. During the consultation, the patient emphasized the desire to maintain the ability to have vaginal intercourse. The anamnesis showed that in 2007 the patient had undergone native tissue repair of POP. In 2015, she had undergone a vaginal hysterectomy for recurrent POP. Three months after the surgery, the patient again noted a vaginal bulging. For another 5 months the vaginal cuff eversion was essentially complete. During a pelvic examination, the assessment of POP was performed using the POP-Q (Aa +1 Ba +5 C +6Ap -2 Bp +3 tv1 8 gh 3 pb 4). According to ultrasound, the volume of residual urine was 30 ml. Uroflowmetry results were: Qmax 19.9 ml/s; Qaver 9.6 ml/s. Validated questionnaires were completed to assess the patient's quality of life: PFDI-20: 118.75 (POPDI-6: 50, CRAD- 8: 31.25, UDI-6: 37.5); PISQ-12: 26; ICIQ-SF: 19. After providing the proper informed consent, the patient was operated on using the procedure described below. Antibiotic prophylaxis within 60 min before surgery consisted in the administration of ampicillin sulbactam 1500 mg. A combined anesthesia was used. The choice of this type of anesthesia made possible the patient's mobilization on the day of surgery. The patient was placed on the operating table in the lithotomy position. A Foley catheter (Ch 18) was inserted into the bladder.

1. After hydrodissection of the tissues of the vaginal vault and the most prolapsing (anterior) wall, an inverted U-shaped flap, up to 2 cm wide and about 4–5 cm long on all layers, was cut out so that the edge of the flap (base of the U) was directed towards the sacrospinous ligament to fix the implant, and the base of the flap (upper part of the U) was located in the optimal apical point of the formed vagina.
2. Next, a midline incision was made through all layers of the most prolapsing (anterior) wall over the total length of the vagina.
3. The access to the left sacrospinous ligament was made with the subsequent trocar installation of the apical sling (Lintex Urosling polypropylene mesh 1 LLC, Russia) according to the inside-out technique.
4. The mesh was fixed to the back (adventitial) side of the U-shaped de-epithelialized flap with three USP 0 PVDF monofilament sutures, so that the knots were turned in the opposite direction of the vaginal lumen.
5. After the immersion of the flap with the implant in the wound, it was sutured with absorbable stitches (PGA, USP 0).
6. Next, anterior and posterior subfascial colporrhaphy was performed.

Results

The duration of the operation was 40 min. Intraoperative blood loss was 35 ml. Vaginal packing and a urethral catheter were placed and removed within 18 h after operation. No intraoperative and early postoperative complications were recorded. According to the ultrasound, residual urine was 2 ml; hematomas in the operation area were not visualized. During the examination 12 months after the surgery, no signs of POP, erosion or any pain were detected. The results of the questionnaires were as follows: PFDI-20: 31.25 (POPDI-6: 4.17, CRAD-8: 18.75, UDI-6: 8.33), PISQ-12: 34, and ICIQ-SF: 3. According to the ultrasound, the volume of residual urine was 0 ml. Uroflowmetry results were: Qmax: 32.6 ml/s; Qaver: 18.6 ml/s.

Discussion

The main goal of sacrospinous colpopexy is to restore DeLancey level I support. According to Allegre et al., the short-term efficiency using the UpHold system for anterior and apical compartments was 81.8% and 92.3%, respectively [9]. However, one patient complained of de novo dyspareunia, and the erosion rate was 2.7%. Similar results were obtained by the Nordic TVM group, but anterior compartment prolapse was detected in 22.4% and posterior in 25.4% of women [10]. Pain syndrome, which required removal of the implant, was recorded in 1.8% of cases. The vaginal erosion rate was 1.4%. The main differences from UpHold were unilateral sacrospinous fixation, absence of stitching devices, and fixation of the mesh to the deepithelialized flap in the presented technique. The use of an apical sling rather than direct suturing of the flap to the sacrospinous ligament pursues two aims: the first is to minimize the dissection (one surgical channel for 1 finger is not more than 7–10 mm); the second is to prevent buttock pain caused by high pressure of the sutures on the sacrospinous ligament due to the tension of the fixing ligatures. The use of an elastic flap for sacrospinous fixation, rather than direct rigid suturing of the vaginal vault, could theoretically reduce the risk of developing pain syndrome. Moreover, when we fix the mesh to the flap, which is actually outside of the vagina, we can put non-absorbable stitches through and through this flap—it is easy and durable. On the contrary, direct fixation to the apex is quite challenging because of the very thin and atrophic tissues of the apex. The latter leads to an increased risk of erosions. However, the rather short follow-up period (1 year) does not allow to fully evaluate the results of the proposed technique in the treatment of post-hysterectomy prolapse.

Conclusion

The presented video demonstrates the successful reconstruction of all three compartments of the pelvic floor using sacrospinous fixation. The original fixation of the synthetic mesh to the full-thickness vascularized vaginal flap increased the safe fixation to tissues and completely isolated the synthetic material, thereby avoiding the risk of erosion. Theoretically, this approach also reduces the risk of pain syndrome. Further follow-up will fully assess the efficiency and safety of the described technique.

Electronic supplementary material The online version of this article (<https://doi.org/10.1007/s00192-021-04790-2>) contains supplementary material. This video is also available to watch on <http://link.springer.com/>. Please search for this article by the article title or DOI number, and on the article page click on ‘Supplementary Material’.

Declaration

Conflict of interest None.

Financial disclaimers None.

Consent Written informed consent was obtained from the patient for publication of this video article and any accompanying images.

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