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EXPERIENCE IN SURGICAL CORRECTION OF GENITAL PROLAPSE CAUSED BY ABDOMINOPERINEAL OPERATIONS FOR COLON CANCER IN ANAMNESIS

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▪ In recent studies, it has been established that extralevator abdominoperineal extirpation (ELAPE) of the rectum can improve the oncological results of treatment of distal rectal cancer compared to standard abdominoperineal extirpation. As a result of extralevator dissection, a large defect of the perineum is formed, which requires plastic closure. While performing ELAPE, the structures that form the pelvic diaphragm are affected. This increases the risk of pelvic organ prolapse in women and significantly affects the quality of life of these patients, which requires subsequent surgical treatment. Despite the fact that pelvic organ prolapse develops as a consequence of previous surgical treatment by an oncologist, they do not consider it as a complication in the long-term postoperative period. Such patients are not referred to the operating gynecologist. Currently, this problem is poorly understood and there are no standardized approaches to the surgical treatment of pelvic prolapse in this category of patients.

▪ **Keywords:** abdominoperineal extirpation; pelvic organ prolapse; mesh implants; hysterectomy.

ОПЫТ ХИРУРГИЧЕСКОЙ КОРРЕКЦИИ ГЕНИТАЛЬНОГО ПРОЛАПСА, ОБУСЛОВЛЕННОГО БРЮШНО-ПРОМЕЖНОСТНЫМИ ОПЕРАЦИЯМИ ПО ПОВОДУ РАКА ТОЛСТОЙ КИШКИ В АНАМНЕЗЕ

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▪ В ряде исследований последних лет показано, что экстралеваторная брюшно-промежностная экстирпация позволяет улучшить онкологические результаты лечения рака прямой кишки дистальных локализаций по сравнению со стандартной брюшно-промежностной экстирпацией. В результате экстралеваторной диссекции образуется обширный дефект промежности, требующий пластического закрытия. В процессе выполнения экстралеваторной брюшно-промежностной экстирпации затрагиваются структуры, формирующие диафрагму малого таза, поэтому после этого вмешательства у женщин существует высокий риск возникновения пролапса тазовых органов. Это значительно влияет на качество жизни и вызывает необходимость в последующем хирургическом лечении. Несмотря на то что пролапс тазовых органов развивается вследствие хирургического лечения, онколог в качестве осложнения в отдаленном послеоперационном периоде его не рассматривает. К оперирующему гинекологу таких пациенток не направляют. В настоящее время эта проблема мало изучена, и поэтому не существует стандартизированных подходов к хирургическому лечению тазового пролапса у данной категории больных.

▪ **Ключевые слова:** брюшно-промежностная экстирпация; пролапс тазовых органов; сетчатые имплантаты; гистерэктомия.

Background

Among all malignant tumors, rectal cancer is the leading cause of morbidity and mortality. A total of 29,918 new cases of rectal cancer were registered in Russia in 2017, and 16,360 patients died from this disease [1].

According to the National Comprehensive Cancer Network guidelines, the standard surgical treatment for locally advanced lower-ampullar rectal cancer and anal cancer is the abdominoperineal extirpation (APE) of the rectum [1, 2].

Given the progress in surgical techniques, oncologists are achieving an increasingly good treatment results by combining therapies (chemoradiotherapy and adjuvant chemotherapy); however, new challenges are also emerging. In the past, after a classical APE, an extracted preparation with an hourglass shape and a relatively small volume, the extralevator APE (ELAPE), which is indicated for patients with magnetic resonance imaging-confirmed tumor ingrowth in the pelvic floor muscles, creates a significant cavity in the pelvis, thus increases the risk of inflammation [3, 4] and perineal hernia formation [5].

The ELAPE technique is done by dissecting outwards the rectal muscles during a perineal surgery stage, and crossing them at the pelvic bones attachment (Fig. 1). The preparation has a cylindrical shape; hence, the other name found in literature is cylindrical APE.

T3–T4 lower-ampullar and medium-ampullar colon cancers are indications for ELAPE. Currently, ELAPE is widely used in leading clinics around the world. Some researchers suggest that extralevator dissection should be performed in all cases of ELAPE [6, 7].

Several recent studies have shown that ELAPE improved oncological outcomes in the treatment of distal rectal cancer compared with standard APE. However, extralevator dissection resulted to

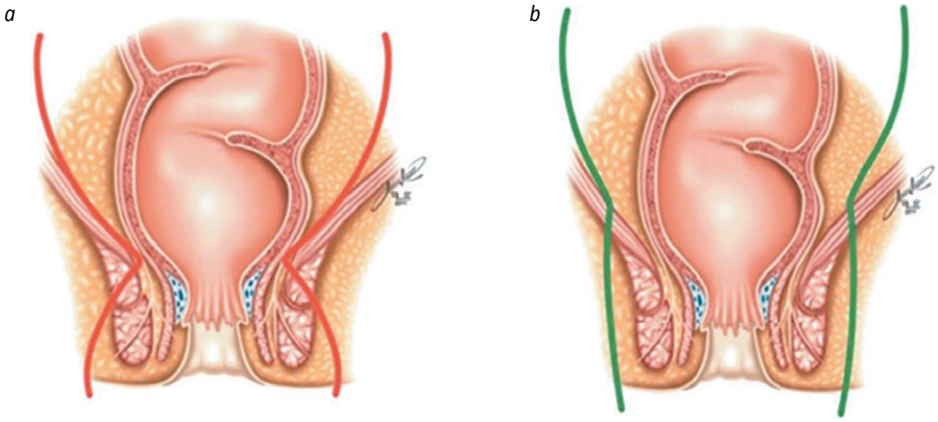

Fig. 1. Dissection line for standard (*a*) and extralevator (*b*) abdominoperineal extirpation

Рис. 1. Линия диссекции при стандартной (*a*) и экстралеваторной (*b*) брюшно-промежностной экстирпации

an extensive perineal defect which required plastic closure (Fig. 2) [8].

Although the problem seems to have existed for a long time, the issue of defect plastic closure after APE is still relevant.

Several techniques have been proposed to close the perineal defect after ELAPE. These include simple suturing of the skin and subcutaneous perineal fat, pelvic floor plasty with surgical implants, and plasty using a relocated muscle or skin-muscle flap. All techniques have its own advantages and disadvantages.

The simplest and most accessible option is to suture the perineal skin and subcutaneous tissue. According to literature, unsatisfactory results of such plasty are associated with a high rate of infectious complications in the early postoperative period and a frequent formation of perineal hernias in the long-term period (up to 67%) [9] due to the cavity between the sutured skin and small intestine loops [10].

The next option is using synthetic or biological tissues. Technically, this technique is identical to ventral hernia repair with mesh implants. However, when synthetic materials are used in the context of radiation compromising the surrounding tissues, a risk for graft rejection is present. The second major disadvantage is the inability to separate the graft from the free abdominal cavity, which consequently leads to massive pelvic adhesions with possible complications (acute intestinal obstruction and intestinal fistula). The use of the composite anti-adhesive agents in a mesh graft is problematic because of the material structure and a poor fixation of the anti-adhesive gels [11].

The third option is to relocate the vascularized muscle flaps. For this purpose, the gluteus maximus and rectus abdominis muscles (VRAM plasty) are most commonly used. Due to the complexity of VRAM flap plasty, it is predominantly used for extensive perineal soft tissue defects. These types of plastic surgery significantly increase the rate of surgical injuries, and limiting their use in weakened and elderly patients. Complications are possible in both the perineal area and donor site [11].

Many reconstructive techniques are available, hence few randomized controlled trials have been conducted to put this issue to an end; however, the problem of perineal wound defect replacement is still controversial.

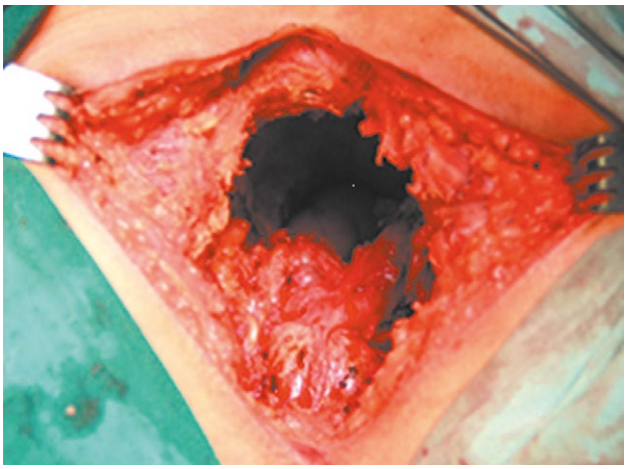

Fig. 2. Perineal wound after extralevator abdominoperineal extirpation

Рис. 2. Промежностная рана после экстралеваторной брюшно-промежностной экстирпации

This is also an issue for gynecologists. While performing ELAPE, structures that form the pelvic diaphragm are affected. This increases the risk of pelvic organ prolapse in women, and significantly affects the quality of life for these patients, which requires a subsequent surgical treatment.

Despite the fact that pelvic organ prolapse developed as a consequence of a previous surgical treatment by an oncologist, it is not considered as a complication in a long-term postoperative period. However, these patients are followed up by an oncologist in the postoperative period, but as a rule, they do not consult a gynecologist even when faced with pelvic organ prolapse. Nevertheless, the mechanism of this problem is purely gynecological, and patients should be referred to an operating gynecologist in a long-term postoperative period. This topic is virtually unreported in current medical literature; therefore, this study aimed to investigate the above mentioned issues and create an algorithm for surgical treatment for patients who have undergone ELAPE with pelvic organ prolapse problem.

Study design, materials, and methods

This study aimed to compare the immediate results of different types of surgical treatment in patients with pelvic organ prolapse and history of ELAPE.

Since 2019, several patients with this pathology have been referred to St. Petersburg Clinical Hospital of the Russian Academy of Sciences. Different surgical tactics were chosen according to the age of patients, concomitant diseases, and objectives of preserving sexual life.

Three patients have been followed up clinically as part of this study to date.

Results

Clinical follow-up 1

An 80-year-old patient, who was diagnosed in 2016 with rectal cancer pT3N1cM0G2, believed to have been ill for a year when she complained of unsteady and bloody stools and excessive gas. The fibrocolonoscopy revealed a mass in the rectum 2 cm above the anus, which is histologically verified as an invasive adenocarcinoma.

In June 2016, a surgical treatment of laparoscopic abdominoperineal rectal extirpation was performed. In 2019, the patient complained of a foreign body sensation and pain in the perineal area (Fig. 3).

In this case, hysterectomy was indicated to be the first stage of surgical treatment; however, due to patient's age, poor medical history, lack of anatomical landmarks, and high risk intraoperative injuries to adjacent organs, the surgical treatment was rejected. A large amount of granulations on the posterior vaginal wall was also found on the examination, since the soft tissues above the periosteum of the pelvic bones after the previous surgery were minimal and virtually not supplied with blood. The patient underwent a local therapy with tissue regeneration stimulants for three months prior to surgery, but granulations were not completely healed. Therefore, it was not used, because of the high risks of mesh implant erosion. A pelvic ultrasound was performed during the preoperative period to rule out endometrial pathology. In view of this, a self-tissue plasty was chosen to correct the prolapse followed by a modified Le Fort colpocleisis surgery.

Surgical steps. In contrast to plastic surgeries with mesh implants under the vesicovaginal fascia, dissecting the fascia in this case is not advisable, since this would lead to tissue mass thinning in the scar area and further failure of the postoperative sutures. Dissection of the vaginal mucosa over the fascia is sufficient to form a tighter and more solid scar in the postoperative period (Fig. 4).

After dissection, the bladder was first immersed with purse-string, and then with U-shaped sutures (Fig. 5).

The next step was to suture the vesicovaginal and part of the rectovaginal fascia that remained after ELAPE (Figs. 6–8).

The surgery resulted to a desired clinical effect (Fig. 9).

Clinical follow-up 2

A 55-year-old patient was diagnosed in 2017 with rectal cancer T2N0M0.

In June 2016, surgical treatment of laparoscopic rectal APE with the formation of a sigmostoma was performed. The postoperative period was complicated by subcutaneous paraproctitis and

Fig. 3. Patient's condition before surgery
Рис. 3. Состояние пациентки до операции

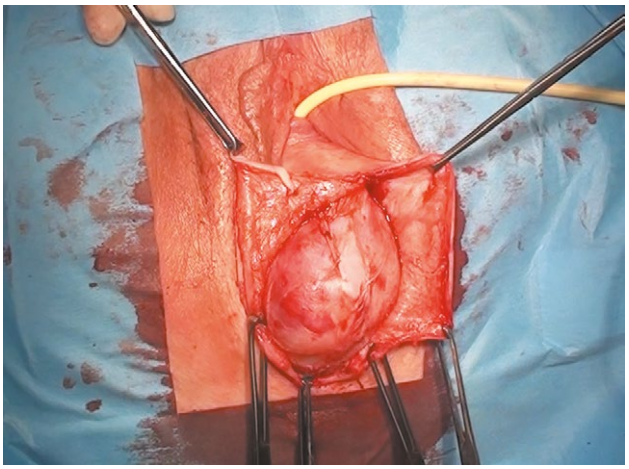

Fig. 4. Bladder dissection
Рис. 4. Диссекция мочевого пузыря

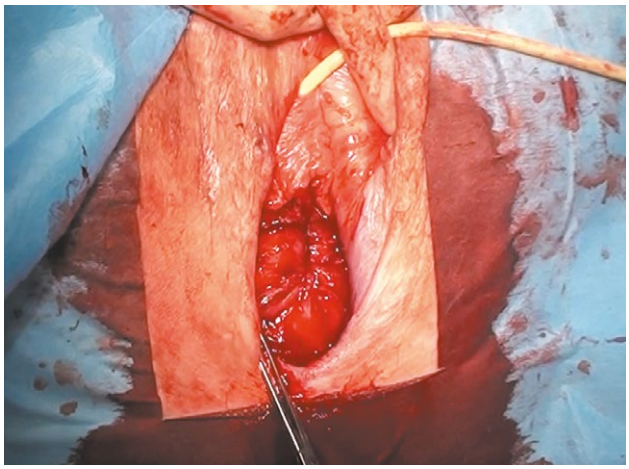

Fig. 5. Immersion of the separated bladder with circular sutures

Рис. 5. Погружение отсепарированного мочевого пузыря циркулярными швами

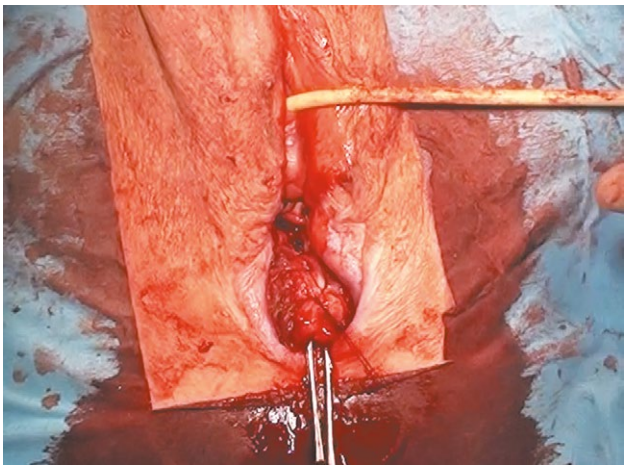

Fig. 6. Suturing the vesicovaginal and rectovaginal fascia

Рис. 6. Сшивание везиковагинальной и ректовагинальной фасций

perineal wound suppuration. A perineovaginal fistula was consequently formed.

In 2019, the patient complained of a foreign body sensation and pain in the perineal area (Fig. 10).

During follow-up, the situation was similar to the previous case. A large amount of poorly healing granulations along the posterior vaginal wall was observed. A three-month course of topical estrogens was administered in the preoperative period with a little positive effect.

A similar surgical approach was chosen, but with the absence of somatic pathology and the presence of the anatomical landmarks, hysterectomy was performed in the first step of surgical treatment, followed by colpocleisis after suturing

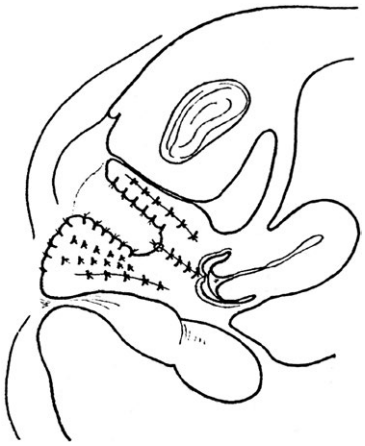

Fig. 7. Schematic representation of the perineum after surgery

Рис. 7. Схематичное изображение промежности после завершения операции

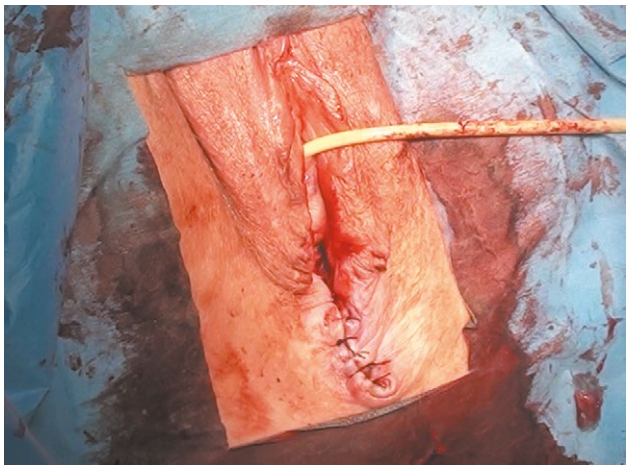

Fig. 8. Skin suturing in the last step of surgery

Рис. 8. Финальный этап операции — ушивание кожи

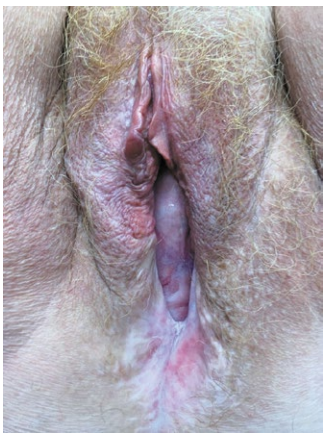

Fig. 9. Nine months after performing surgery

Рис. 9. Спустя 9 мес. после выполнения хирургического лечения

Fig. 10. Patient's condition before surgery

Рис. 10. Состояние пациентки до операции

the abdominal cavity with a purse-string suture, using a technique similar to the first case.

During hysterectomy, when anatomical structures are well visualized, electrosurgical instruments utilization is advisable. The use of the electrosurgical instruments in a vaginal hysterectomy has some clear advantages over traditional ligation (e.g., reduced postoperative pain, little intraoperative blood loss, and shorter surgery time compared with the traditional techniques) [12].

Bowa ARC 400 electrosurgical unit and Bowa TissueSeal PLUS COMFORT reusable sealing clamp for open surgery were used (Fig. 11, 12).

The surgery resulted to a desired clinical effect (Fig. 13).

Fig. 11. Bowa ARC 400 electrosurgical unit and Bowa TissueSeal PLUS COMFORT sealing clamp for open surgery

Рис. 11. Электрохирургический аппарат Bowa ARC 400 и зажим для открытой хирургии Bowa TissueSeal PLUS COMFORT

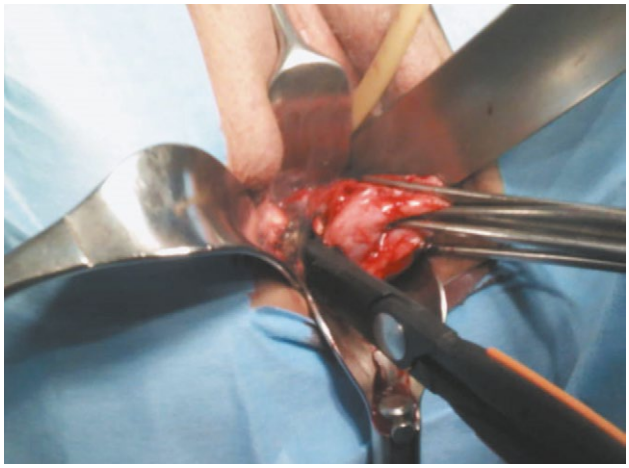

Fig. 12. Use of the Bowa TissueSeal PLUS COMFORT sealing clamp for vaginal hysterectomy

Рис. 12. Применение зажима для открытой хирургии Bowa TissueSeal PLUS COMFORT при проведении влагалищной гистерэктомии

Fig. 13. Operation area on the 7th day of the postoperative period

Рис. 13. Зона операции на 7-е сутки послеоперационного периода

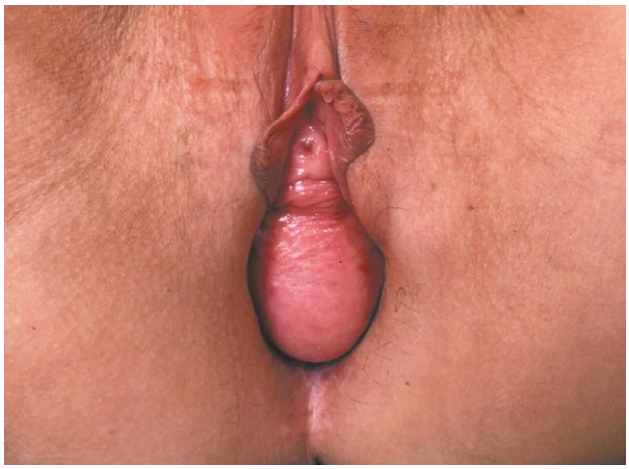

Fig. 14. Patient's condition before surgery

Рис. 14. Состояние пациентки до операции

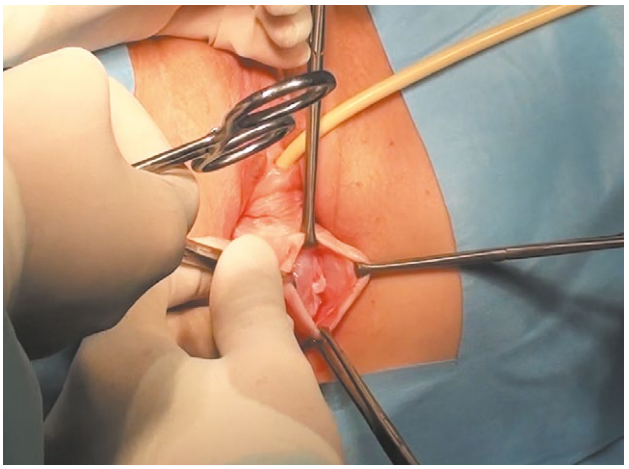

Fig. 15. Bladder dissection

Рис. 15. Диссекция мочевого пузыря

Clinical follow-up 3

A similar disease is often found in young women, which challenges the surgeon to restore their sexual activity.

A 36-year-old patient was diagnosed in 2015 with anal cancer cT4N1M0/urT4N0M0.

Two cycles of polychemotherapy with chemoradiotherapy were performed in 2016. The tumor subsequently progressed and a rectovaginal fistula was formed.

In September 2017, a combined rectal APE with resection of the posterior vaginal wall and a VRAM flap plasty were performed.

During the initial consultation, the patient complained of a foreign body sensation in the perineum and a discomfort during intercourse. Similar to cases described above, the posterior vaginal wall was heavily granulated, but this did not prevent to perform a plastic surgery with a mesh implant since it was only necessary to repair the defect (cystocele) in the anterior vaginal wall, where the vaginal fascia was preserved (Fig. 14).

Given the patient's young age, desire to be sexually active, and absence of concomitant pathology, a plasty using a Vypro mesh implant was performed (Figs. 15–18).

Fixing the implant to the sacrospinal ligaments and levator muscles was impossible because of their absence; therefore, fixation was performed through the obturator foramen and periosteum of the pelvic bones (Fig. 16).

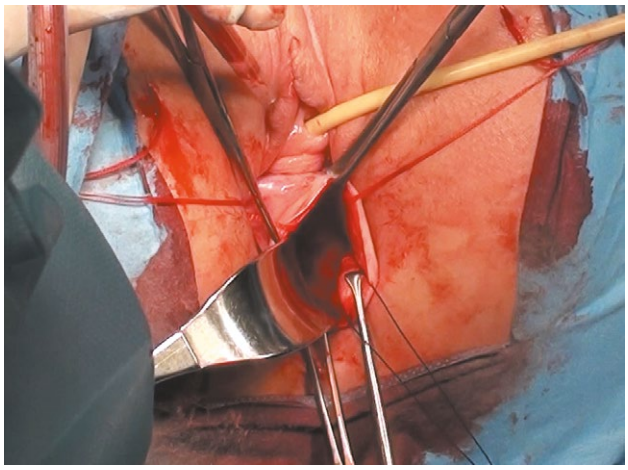

Fig. 16. Introduction of guiding and fixing threads to fix the mesh implant

Рис. 16. Проведение направляющих и фиксирующих нитей для фиксации сетчатого имплантата

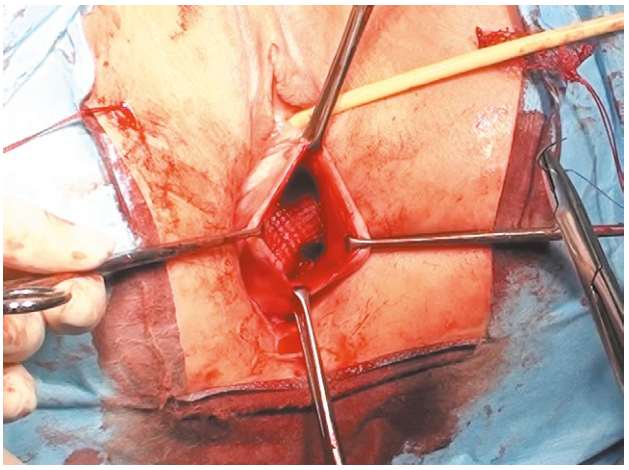

Fig. 17. VYPRO mesh implant fixation

Рис. 17. Фиксация сетчатого имплантата VYPRO

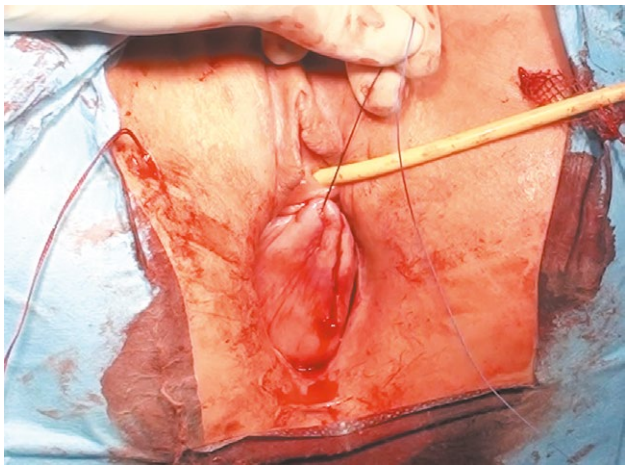

Fig. 18. Suturing the operating wound
Рис. 18. Ушивание операционной раны

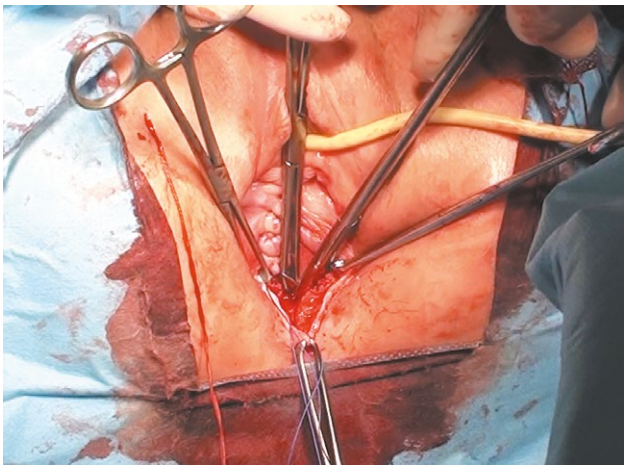

Fig. 19. Plastic surgery of the back of the vagina
Рис. 19. Пластика задней стенки влагалища

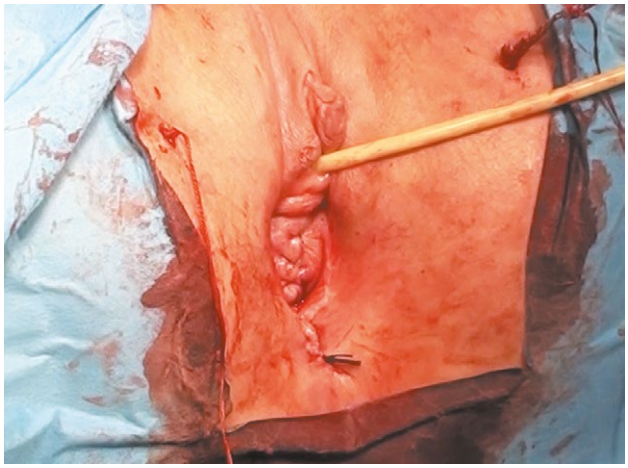

Fig. 20. Skin suturing in the last step of surgery
Рис. 20. Финальный этап операции — ушивание кожи

Fig. 21. Four months after the first stage of surgery
Рис. 21. Спустя четыре месяца после первого этапа хирургического лечения

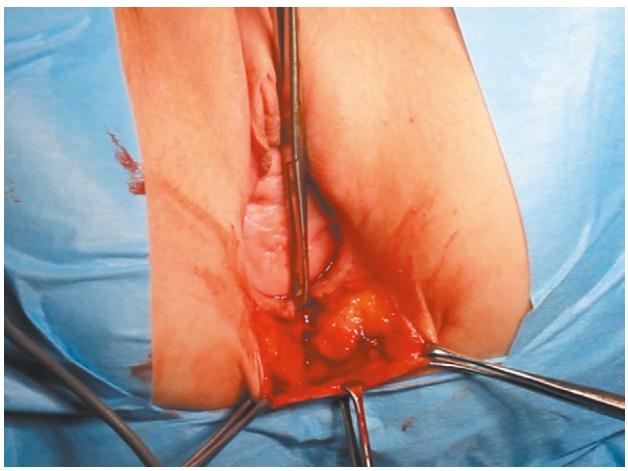

Fig. 22. Posterior vaginal wall dissection
Рис. 22. Диссекция тканей задней стенки влагалища

Fig. 23. Posterior vaginal wall reconstruction
Рис. 23. Реконструкция задней стенки влагалища

Fig. 24. Skin suturing in the last step of surgery

Рис. 24. Финальный этап операции — ушивание кожи

Fig. 25. One month after the second stage of surgery

Рис. 25. Спустя месяц после второго этапа хирургического лечения

In the final step, the patient underwent a posterior vaginoplasty. Due to granulations, high tissue tension, and absence of levators, as well as high risks of surgical suture failure, it was impossible to perform a sufficient single-stage correction (Fig. 19).

After four months (Fig. 21), the second step of surgical treatment was performed upon patient's request, which consisted of posterior vaginoplasty to increase the depth of the vagina and reduce the size of vaginal vestibule (Figs. 22–25).

The reconstruction of the posterior vaginal wall in this case can only be performed with fat tissue and skin (Fig. 23). Main difficulties of plastic surgery here are the absence of levator muscles and presence of granulations in the area of previous ELAPE.

The patient was satisfied with the surgical outcomes one month after the intervention, and currently, she is under the supervision of the operating surgeon.

Discussion and conclusion

Despite the limited experience in treating these patients, a conclusion has been made that a single universal approach for choosing a particular surgical treatment strategy is impossible. The surgical approach must be chosen carefully in each case according to various factors, such as the extent of previous surgery, patient's age, concomitant somatic pathology, and desire to be sexually active, taking into account the risks of mesh implant erosion and other complications associated with its use. Good treatment outcomes without using mesh implants should be noted. It is worth considering whether hysterectomy should be performed in these patients. Hysterectomy is preferred when a modified Le Fort surgery is the method of choice; however, if it is impossible to be performed due to high risks associated with the absence of anatomical landmarks, injuries to adjacent organs, patient's age, and concomitant somatic pathology, a surgical treatment with uterine preservation is possible. In addition, these patients should be monitored subsequently by a gynecologist.

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