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Bilateral transobturator hysterosuspension using titanium tape-shaped mesh implants in women with apical prolapse of the internal genitalia

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ABSTRACT

BACKGROUND: Pelvic organ prolapse is a common pathology with several relapses of the disease after surgical treatment using exclusively self-tissues, which necessitates the development of new surgical techniques using durable and biological inert materials.

AIM: To evaluate the effectiveness and safety of an original surgical technique for apical prolapse correction in patients of reproductive and pre- and postmenopausal age.

MATERIAL AND METHODS: Twenty-nine patients were examined and operated on using a developed original technique with the use of narrow tape-shaped titanium mesh implants.

RESULTS: Follow-up was conducted at 1, 6, 12, and 24 months postoperatively. Comparison of patient survey indicators in the pre- and postoperative periods showed an improvement in the patients' quality of life and an increase in their social and sexual activity. During the first month, 15 (51.7%) patients reported intermittent pulling pains in the perineal and/or inguinal-femoral folds, and 4 (13.8%) reported frequent urination. Clinical examination revealed complete preservation of the surgical correction of prolapse in all patients. Gynecological and rectal examinations and transperineal and transvaginal echography did not show displacement of pelvic organs or titanium implants. Mesh-associated complications were not noted during the observation period.

CONCLUSION: The developed original technique for surgical correction of second-degree apical prolapse with the use of narrow ribbon-shaped titanium mesh implants is effective and safe. This is evidenced by the normalization of the uterus position in the pelvis, absence of displacement of pelvic organs in the near and distant postoperative periods, and absence of mesh-associated complications during the observation time.

Keywords: pelvic organ prolapse; mesh implants; surgical correction of POP.

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Билатеральная трансобтураторная гистеросуспензия при помощи титановых лентовидных сетчатых имплантатов у женщин с апикальным пролапсом внутренних гениталий

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АННОТАЦИЯ

Обоснование. Пролапс внутренних гениталий — часто встречаемая патология со значительным количеством рецидивов после оперативного лечения с использованием исключительно собственных тканей, что обуславливает необходимость разработки новых хирургических методик с применением прочных и биологически инертных материалов.

Цель. Оценка эффективности и безопасности оригинальной хирургической методики коррекции апикального пролапса у пациенток репродуктивного, пре- и постменопаузального возраста.

Материал и методы. Обследованы и прооперированы по разработанной оригинальной методике с применением узких лентовидных сетчатых титановых имплантатов 29 пациенток 32–76 лет с апикальным пролапсом II степени.

Результаты. Наблюдение проводили через 1, 6, 12 и 24 мес. после операции. Сравнение показателей анкетирования пациенток в до- и послеоперационном периодах показало улучшение качества жизни пациенток, повышение их социальной и сексуальной активности. В течение первого месяца 15 (51,7%) пациенток отмечали тянущие боли непостоянного характера в области промежности и/или пахово-бедренных складках, 4 (13,8%) — учащённое мочеиспускание. Динамическое комплексное клиническое обследование выявило полное сохранение хирургической коррекции пролапса у всех пациенток. При гинекологическом и ректальном исследованиях, трансперинеальной и трансвагинальной эхографии смещения тазовых органов и титановых имплантатов не выявлено, mesh-ассоциированные осложнения за время наблюдения не зарегистрированы.

Заключение. Продемонстрирована эффективность и безопасность разработанной оригинальной методики хирургической коррекции апикального пролапса II степени с применением узких лентовидных сетчатых титановых имплантатов у пациенток различных возрастных групп, о чём свидетельствует нормализация положения матки в малом тазу и отсутствие как смещения тазовых органов в ближайшем и отдалённом послеоперационных периодах, так и mesh-ассоциированных осложнений за время наблюдения.

Ключевые слова: апикальный пролапс; лентовидные сетчатые титановые имплантаты; хирургическая коррекция пролапса.

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在患有顶端内生殖器脱垂的妇女中使用钛带状网状植入物进行双侧经尿道子宫抑制术

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摘要

论证。内生殖器脱垂是一种常见病，仅使用自身组织进行手术治疗后复发率很高，因此有必要开发使用耐久性和生物惰性材料的新手术技术。

目的。评估原始手术方法矫正育龄、绝经前和绝经后患者根尖脱垂的有效性和安全性。

材料和方法。对29名年龄在32–76岁之间、患有II度根尖脱垂的女性患者进行了检查，并根据开发的原创技术，使用窄带形网状钛植入物进行了手术。

结果。术后1个月、6个月、12个月和24个月进行了随访。对患者术前和术后的问卷调查进行比较后发现，患者的生活质量有所提高，社交活动和性活动也有所增加。在术后第一个月，15名（51.7%）患者表示会阴部和/或腹股沟-股骨皱褶处有不稳定的牵拉性疼痛，4名（13.8%）患者有尿频现象。动态综合临床检查显示，所有患者的脱垂手术矫正效果都得到了完全保留。在妇科和直肠检查、经会阴和经阴道超声检查中，未发现盆腔器官和钛植入物移位，随访期间也没有发现与网片相关的并发症。

结论。在不同年龄段的患者中，使用窄带状网状钛植入物手术矫正 II 度宫颈根尖脱垂的独创技术的有效性和安全性已得到证实，具体表现为子宫在骨盆中的位置恢复正常，术后近期和远期没有骨盆器官移位，随访期间没有网状物相关并发症。

关键词：根尖脱垂；带状网钛植入物；手术矫正脱垂。

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BACKGROUND

Pelvic organ prolapse (POP) is a common condition that usually occurs during the reproductive years, progresses with age, affects a woman's quality of life, impairs the anatomy and function of adjacent organs, and causes sexual and reproductive dysfunction, depression, social isolation, and disability [1, 2].

POP accounts for 28.0%–38.9% of gynecological disorders, and 15% of surgeries in gynecological hospitals are performed for this indication [3]. The precise prevalence has not been estimated, but according to the Women's Health Initiative Study, the incidence of uterine prolapse, cystocele, and rectocele in 16,616 perimenopausal women was 14.2%, 34.3%, and 18.6%, respectively [4]. In addition, approximately 30% of women will have clinical signs of POP by the age of 25–45 years.

Currently, POP is most commonly subdivided into anterior, apical, and posterior based on the predominant descending or prolapsing portion of the genitalia.

The POP recurrence rate is quite high and can reach 30%–60%, despite the development and implementation of multiple basic surgical techniques and their modifications (about 500) using native and alloplastic materials to repair pelvic organs and tissues. The use of synthetic implants is often associated with mesh-related complications, requiring the clinical implementation of new surgical techniques and advanced high-tech fixation and support materials [1, 4, 5].

Considering the above, an original surgical technique was developed for grade II apical prolapse using narrow tape titanium mesh implants that provide long-term elevation and support of the uterus in the pelvic cavity. Titanium mesh implants are chosen because titanium is more inert to adjacent tissues than synthetic equivalents such as polypropylene, which increases the risk of mesh-related complications (6.6%–13.4%).

AIM

The efficacy and safety of an original surgical technique for the treatment of apical prolapse using narrow tape titanium implants in reproductive, pre- and postmenopausal women.

MATERIALS AND METHODS

The study included 29 female patients aged 32–76 years with grade II apical prolapse. Of these, 9 (31.1%) were aged between 32 and 45 years, 12 (41.3%) were aged between 46 and 55 years, and 8 (27.6%) were aged between 56 and 76 years.

The study was conducted for 24 months (2022–2024) in gynecological departments of the National Medical Research Center "Treatment and Rehabilitation Center" and the Sechenov Center for Maternal and Child Health, which

are clinical bases of Obstetrics and Gynecology Department No. 1 of the Sklifosovsky Institute of Clinical Medicine of the Sechenov First Moscow State Medical University. The protocol of the study was approved by the local ethics committee of the Sechenov First Moscow State Medical University of the Ministry of Health of Russia (Summary of Meeting Minutes No. 03–22 dated 3 February 2022).

All patients underwent comprehensive clinical evaluation, surgical treatment with the newly developed technique, and outpatient follow-up in the early and late postoperative periods.

Patients were evaluated according to standards of care for POP, including analysis of symptoms, medical history, physical examination, gynecological and rectal examinations, imaging tests (transvaginal and transperitoneal ultrasound examinations, colposcopy) and laboratory tests (complete blood count and blood chemistry, hemostasis, urinalysis, bacterioscopy and bacteriology of vaginal and cervical smears, ecto- and endocervical cytology). Depending on individual clinical symptoms, medical history, and necessary preoperative examinations (ECG, chest X-ray, pulmonary function tests, Doppler ultrasound of lower extremity vessels, etc.), other examination methods were used together with consultations with specialists (general practitioner, endocrinologist, pulmonologist, urologist, proctologist, etc.).

Type and time of onset of signs and symptoms, stages of underlying disease, heredity, extragenital diseases, menstrual and reproductive function parameters were determined based on medical history data. Previous gynecological diseases and surgeries were considered.

The clinical examination included evaluation of the external genitalia, perineum, vagina, and cervix, followed by the gynecological examination, which was used to diagnose POP.

Rectal examination clarified the severity of posterior vaginal wall prolapse and differentiated rectocele from enterocele.

The international Pelvic Organ Prolapse Quantification System was used to determine the severity of prolapse [6].

Carl Zeiss 170F (Germany) was used for extended colposcopy.

Voluson P8 (General Electric, USA) with transvaginal and convex transducers was used for transvaginal and transperineal ultrasound examinations.

An original technique of permanent cervical suspension with non-absorbable narrow tape mesh titanium implants was used for the surgical treatment of grade II apical prolapse. These implants are durable, highly flexible and inert to adjacent biological structures, unlike their synthetic equivalents [7].

Study design

This was a multicenter, randomized, controlled, prospective study.

Eligibility criteria

Inclusion criteria:

- Grade II apical prolapse in patients of reproductive, pre- and postmenopausal age,
- Consent to proposed scope of surgery,
- Consent to titanium tape implant placement, and
- Voluntarily signed consent form.

Non-inclusion criteria:

- Grade III-IV vaginal wall prolapse,
- Current indications for hysterectomy,
- Pelvic and/or abdominal inflammatory disease,
- Severe extragenital conditions that do not allow adequate anesthesia,
- Decubital cervical ulcers, or
- Congenital or acquired pelvic and/or hip deformities contraindicating transvaginal surgery.

Exclusion criteria:

- Refusal to participate in the study, or
- Malignant female genital neoplasms.

Study setting

Federal State Autonomous Educational Institution of Higher Education Sechenov First Moscow State Medical University, Ministry of Health of Russia, Moscow, Russia.

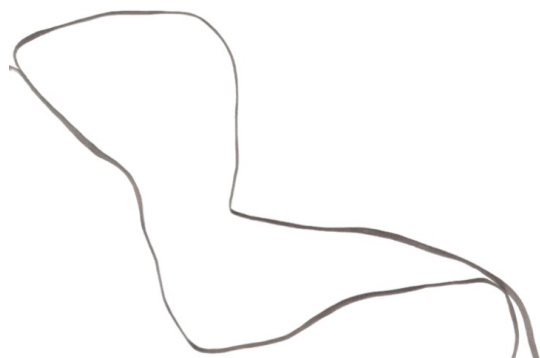


Fig. 1. Narrow tape-shaped mesh titanium implants.

Treatment and Rehabilitation Center of the Ministry of Health of Russia, Moscow, Russia.

Study duration

The study was conducted from 2022 to 2024.

Intervention description

A three-step, organ sparing surgery was developed for this group of patients using a single transvaginal approach:

Step I: preparation of the implant site,

Step II: bilateral transabdominal hysterosuspension using narrow tape titanium mesh implants,

Step III: pelvic floor repair.

Spinal anesthesia was used.

Surgical technique

Step I. Under aseptic conditions, after fixation of the cervix with bullet forceps, a transverse incision of the mucosa was made over a length of 2.0–2.5 cm in the transition zone from the cervix to the posterior fornix of the vagina. The mucosa was then separated and the posterior surface of the cervix was exposed. After aquadissection of the anterior vaginal wall, its mucosa was dissected longitudinally, starting 1.0–1.5 cm from the external orifice of the urethra and ending 1.0–1.5 cm above the external os of the cervix. The anterior vaginal wall mucosa was peeled bilaterally and upward using sharp and blunt techniques, exposing the cardinal ligaments of the uterus bilaterally. The bladder was separated towards the pubic symphysis using sharp and blunt techniques, and the right and left canals were created up to obturator canals.

Step II. The obturator membranes in the upper internal sections were perforated sequentially on both sides with a guide needle with attached 150 mm long and 4 mm wide narrow band titanium mesh implants (Figures 1, 2). The peripheral ends of implants were brought out into the area of the right and left femoroinguinal folds. The other ends of the

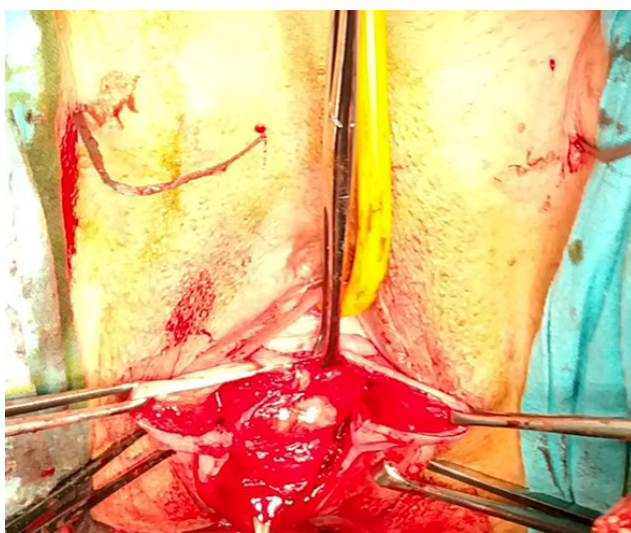
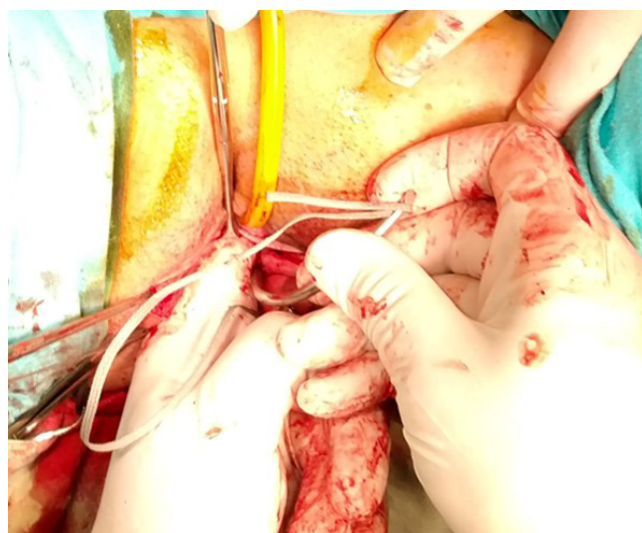


Fig. 2. Transobturator placement of narrow tape-shaped mesh titanium implants.

tape implants, located in the vagina, were placed bilaterally under the cardinal ligaments in an anterior-posterior direction with a guide needle and fixed to the posterior wall of the cervix with non-absorbable ligatures. Then, the peripheral ends of the narrow tape titanium mesh implants were pulled up until physiological elevation of the cervix was achieved. Then, anterior colporrhaphy was performed. The level of cervical elevation was confirmed, and the excess portion of the peripheral ends of the tape implants was cut off at the skin level bilaterally in the area of the femoroinguinal folds (Figure 3).

Step III. The pelvic floor was repaired using the classical technique (colpoperineorrhaphy with levatoroplasty).

The duration of surgery ranged from 40 to 60 minutes (mean: 54.0 ± 5.6 minutes). Blood loss ranged from 50 to 100 mL (60.0 ± 9.2 mL).

Antibacterial, anti-inflammatory, analgesic, desensitizing, and anticoagulant treatments were used after surgery.

The length of hospital stay was 6.2 ± 1.8 days.

Main study outcome

All 29 women reported discomfort and feeling of a foreign body in the vagina. One third reported pulling lower abdominal and lumbosacral pain and tenderness, 17 (58.6%) sexually active women experienced embarrassment and discomfort during sex, 11 (37.9%) reported frequent urination, 5 (17.2%) complained of constipation.

Slight vaginal discomfort first appeared approximately 15 years ago in 3 patients, 10–12 years ago in 8 patients, 5–6 years ago in 12 patients, and 1–2 years ago in 6 patients. The severity of the symptoms increased with the age of the patients.

The family history revealed a hereditary nature of the identified condition, with POP in the patients' mothers in one in four to five cases and in the maternal grandmothers in one in six to seven cases.

Analysis of physical diseases showed the presence of cardiovascular disease in 34.5% of patients, chronic bronchitis in 13.8%, chronic gastritis in 17.2%, chronic cholecystitis and cholelithiasis in 24.1%, hernias in 10.3%, varicose veins in 37.9%, hypermobility and dislocation of joints in 13.8%, arthrosis of large joints and osteochondrosis of various segments of the spine in 34.4%, which may indicate congenital structural disorders of connective tissues.

Menstrual function and onset of menopause were normal. The mean age of menarche was 13.4 ± 1.6 years and the mean age of menopause onset was 52.6 ± 3.8 years.

Twenty-four (82.8%) patients had one or two previous full-term deliveries and 5 (17.2%) patients had three full-term vaginal deliveries. In 21 women (72.4%), delivery was complicated by cervical, perineal, and/or vaginal injuries. A history of induced abortion and spontaneous miscarriage was reported in 14 (48.2%) and 4 (13.8%) patients, respectively.

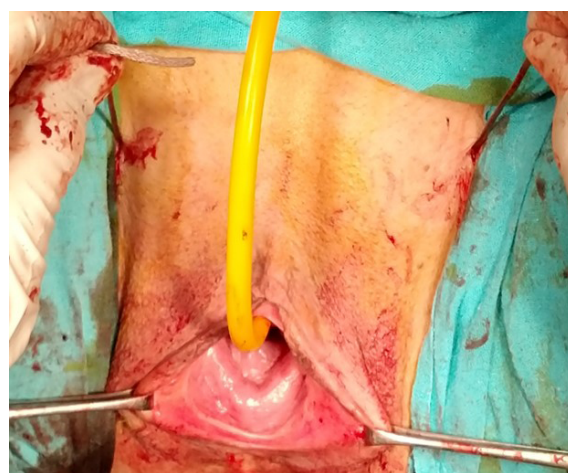


Fig. 3. Hysterosuspension using narrow tape-shaped mesh implants fixed to the posterior wall of the cervix.

The literature indicates that both connective tissue dysplasia and vaginal delivery, birth trauma, and gynecological surgery are risk factors for POP [1–2].

As for gynecological diseases, 6 (20.7%) patients had previous benign cervical diseases (cervical polyps, endometriosis), 2 (6.9%) had previous salpingo-oophoritis, 5 (17.2%) had previous polyps and endometrial hyperplasia, 5 (17.2%) had previous uterine fibroids, and 3 (10.3%) had previous benign ovarian tumors.

Abdominal myomectomy was performed in 3 (10.3%) patients, laparocystectomy was performed in 3 (10.3%) patients, and one to three diagnostic and therapeutic procedures (hysteroscopy, separate diagnostic curettage of endocervix and endometrium) were performed in 5 (17.2%) patients.

Physical, gynecological, and rectal examinations revealed signs of pelvic floor failure as evidenced by a gaping genital slit on straining (due to separation of anus-lifting muscles), a thinned, hypotonic, and shortened perineum, and a grade II apical prolapse that was visually indicated by cervical descent without signs of cervical elongation. In addition, all patients had clinical signs of grade I (82.8%) and grade II (17.2%) anterior and/or posterior vaginal wall prolapse.

Transperineal echography showed typical signs of pelvic floor failure, including the decreased height of the perineal body, muscle diastasis in the area of the perineal body, and the decreased width of the bulbocavernosus muscle bundles. Signs of grade II cervical prolapse and grade I–II anterior and/or posterior vaginal wall were observed.

Two (6.9%) patients had uterine fibroids with 1 to 4 interstitial and subserous nodes of 1.0 to 2.0 cm in diameter.

All patients underwent surgery for grade II apical prolapse combined with grade I–II vaginal wall prolapse, resulting in decreased quality of life.

Currently, abdominal, laparoscopic, or transvaginal approaches are used to surgically treat apical prolapse. However, some surgeons prefer radical surgery, while others focus on organ-sparing procedures using only the

patient's native tissue or synthetic materials to suspend or strengthen biological structures and/or improve fascial defects, resulting in higher frequency of general surgical and mesh-related complications, with a total of 22.4% for genital prolapse treatment cases in a multicenter study [8]. This fact contributed to the development of an original surgical technique for the treatment of grade II apical prolapse in different age groups using narrow tape titanium implants which are more durable, more biologically inert, have a more pronounced fuse effect, do not cause structural changes during long-term follow-up, and also contribute to the formation of mature connective tissue and a dense scar due to the deposition of type I collagen on titanium, etc. [9].

Methods for registration of outcomes

The efficacy of surgical treatment was comprehensively evaluated at 1, 6, 12, 24 months using a Prolapse Quality of Life questionnaire (P-QoL), a validated tool for assessing pelvic floor function and quality of life in patients with POP, as well as objective examination methods (physical examination, gynecological examination with functional tests, transperineal and transvaginal echography) [10].

Statistical analysis

GraphPad Prism version 9.5.0 (GraphPad Software, Inc., USA) was used for data analysis.

RESULTS

Patients were followed on an outpatient basis for 24 months. In the first month after surgery, 16 (55.1%) women reported intermittent pulling pain in the perineum and femoroinguinal folds, and 6 (20.7%) reported frequent urination.

The survey showed that patients were satisfied with the surgical treatment, which improved their quality of life and mood, as well as their social life and sexual activity.

A comprehensive dynamic study showed positive results of the performed surgical procedures in the early and late postoperative period, which was confirmed by gynecological and rectal examinations, transperineal and transvaginal echography at 1, 6, 12, 24 months after surgery. There was no evidence of pelvic organ displacement or mesh-related complications.

DISCUSSION

The rate of postoperative POP recurrence reaches 30%–60%, despite the significant number of basic surgeries and their modification. In this case, both the patient's native tissues and alloplastic materials are used to repair pelvic tissues and organs and to treat defects in the pelvic fascia. However, the use of synthetic implants increases the

rate of general surgical and mesh-related complications, necessitating the development and implementation of new surgical techniques employing high-tech and biologically inert titanium materials [7].

In the study group of patients with grade II apical prolapse, surgical treatment was performed using an original technique which was developed using narrow tape mesh titanium implants that act as artificial uterine suspension ligaments. Early and late post-operative dynamic monitoring showed patient satisfaction with results of the surgery, absence of mesh-related complications and pelvic displacement during the follow-up period (24 months), which improved patients' quality of life and increased social and sexual activity.

CONCLUSION

This study demonstrated the efficacy and safety of the originally developed surgical technique (bilateral transobturator hysteroposition using narrow tape titanium mesh implants) in patients of different age groups, as evidenced by normalization of the uterus position in the pelvis, absence of mesh-related complications and displacement of pelvic organs in the immediate and late postoperative periods. The advantage of this technique is minimization of the parameters and number of implants, as well as permanent hysteroposition. This is achieved by the bilateral formation of additional artificial ligaments in the fascial and ligamentous system of the pelvis.

ADDITIONAL INFO

Authors' contributions. A.I. Ishchenko — author of the idea, surgical treatment of patients (15%); A.A. Ishchenko — surgical treatment of patients (15%); I.D. Khokhlova — article writing (15%); T.A. Dzhibladze — article editing (6%); A. D. Komarova — article writing (6%); L.S. Alexandrov — article editing (6%); E.A. Svidinskaya — article editing (6%); O.Yu. Gorbenko — collection of literature (6%); Yu.V. Chushkov — collection of literature (6%); E.G. Malyuta — surgical treatment of patients (7%); A.P. Moskvicheva — collection of literature (6%); A. D. Koryagina — analysis of literary sources (6%). All authors confirm that their authorship meets the international ICMJE criteria (all authors made a substantial contribution to the conception of the work, acquisition, analysis, interpretation of data for the work, drafting and revising the work, final approval of the version to be published and agree to be accountable for all aspects of the work).

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Competing interests. The authors declare that there are no obvious and potential conflicts of interest associated with the publication of this article.

Consent for publication. The patients who participated in the study signed an informed consent to participate in the study and publish medical data.

REFERENCES

1. Buyanova SN, Shchukina NA, Zubova ES, et al. Genital prolapse. *Russian Bulletin of Obstetrician-Gynecologist*. 2017;17(1):37–45. EDN: YFQBKD doi: 10.17116/rosakush201717137-45
2. Ishchenko AI, Aleksandrov LS, Ishchenko AA, et al. Surgical correction of prolapse of anterior wall of the vagina and cervix using titanium mesh implants. *Annals of the Russian Academy of Medical Sciences*. 2020;75(1):18–26. EDN: XHWXGZ doi: 10.15690/vramn1123
3. Malkhasian VA, Kasian GR, Sumerova NM. The anatomic and functional results of surgical correction of pelvic organ prolapse, by transvaginally implanting a synthetic mesh prosthesis: a prospective study in 105 patients. *Russian Bulletin of Obstetrician-Gynecologist*. 2012;12(1):70–74. EDN: PEJSBR
4. Tjink MM, Vierhout ME, Heesakkers JP, Withagen MI. Surgical management of mesh-related complications after prior pelvic floor reconstructive surgery with mesh. *Int Urogynecol J*. 2011;22(11):1395–1404. doi: 10.1007/s00192-011-1476-2
5. De Tayrac R, Sentilhes L. Complications of pelvic organ prolapse surgery and methods of prevention. *Int Urogynecol J*. 2013;24(11):1859–1872. doi: 10.1007/s00192-013-2177-9
6. Persu C, Chapple CR, Cauni V, et al. Pelvic organ prolapse quantification system (POP-Q) — a new era in pelvic prolapse staging. *J Med Life*. 2011;4(1):75–81.
7. Kazantsev AA, Parshikov VV, Shemyatovsky KA, et al. The titanium-containing mesh as a perspective group of implants for abdominal wall repair. *Pirogov Russian Journal of Surgery*. 2016;4(4):86–95. EDN: WANEWN doi: 10.17116/hirurgia2016486-95
8. Chechneva MA, Barto RA, Budykina TS, et al. Current view of pathogenesis, diagnosis and management of genital prolapse and its complications. *Pathogenesis*. 2014;12(4):4–9. EDN: UJGAUT
9. Abramyan KN. *Prevention and treatment of complications of extraperitoneal vaginopexy (Prolift operation)* [dissertation]. Moscow; 2011. Available from: https://new-disser.ru/_avtoreferats/01005084780.pdf (In Russ.) EDN: QFKFXZ
10. Korshunov MYu, Sazykina EI. PD-QL Questionnaire — validates instrument for symptoms and quality of life assessment in patients with pelvic organ prolapse. *Journal of Obstetrics and Womens Diseases*. 2008;57(3):86–93. EDN: JVZIER

СПИСОК ЛИТЕРАТУРЫ

1. Буянова С.Н., Щукина Н.А., Зубова Е.С., и др. Проплапс гениталий // Российский вестник акушера-гинеколога. 2017. Т. 17, № 1. С. 37–45. EDN: YFQBKD doi: 10.17116/rosakush201717137-45
2. Ищенко А.И., Александров Л.С., Ищенко А.А., и др. Хирургическая коррекция опущения передней стенки влагалища и шейки матки при помощи сетчатых титановых имплантатов // Вестник РАМН. 2020. Т. 75, № 1. С. 18–26. EDN: XHWXGZ doi: 10.15690/vramn1123
3. Малхасян В.А., Касян Г.Р., Сумерова Н.М. Анатомические и функциональные результаты хирургической коррекции пролапса тазовых органов с помощью трансвагинальной имплантации синтетического сетчатого протеза: проспективное исследование у 105 пациенток // Российский вестник акушера-гинеколога. 2012. Т. 12 № 1. С. 70–74. EDN: PEJSBR
4. Tjink M.M., Vierhout M.E., Heesakkers J.P., Withagen M.I. Surgical management of mesh-related complications after prior pelvic floor reconstructive surgery with mesh // *Int Urogynecol J*. 2011. Vol. 22, N 11. P. 1395–1404. doi: 10.1007/s00192-011-1476-2
5. De Tayrac R., Sentilhes L. Complications of pelvic organ prolapse surgery and methods of prevention // *Int Urogynecol J*. 2013. Vol. 24, N 11. P. 1859–1872. doi: 10.1007/s00192-013-2177-9
6. Persu C., Chapple C.R., Cauni V., et al. Pelvic organ prolapse quantification system (POP-Q) — a new era in pelvic prolapse staging // *J Med Life*. 2011. Vol. 4, N 1. P. 75–81.
7. Казанцев А.А., Паршиков В.В., Шемятовский К.А., и др. Титансодержащие сетчатые эндопротезы как перспективная группа имплантатов для пластики брюшной стенки // Хирургия. Журнал им. Н.И. Пирогова. 2016. № 4. С. 86–95. EDN: WANEWN doi: 10.17116/hirurgia2016486-95
8. Чечнева М.А., Барто Р.А., Будыкина Т.С., и др. Современные представления о патогенезе, диагностике и способах коррекции пролапса гениталий и его осложнений // Патогенез. 2014. Т. 12, № 4. С. 4–9. EDN: UJGAUT
9. Абрамян К.Н. Профилактика и лечение осложнений экстраперитонеальной вагинопексии (операции Prolift): дис. ... канд. мед. наук. Москва, 2011. Режим доступа: https://new-disser.ru/_avtoreferats/01005084780.pdf EDN: QFKFXZ
10. Коршунов М.Ю., Сазыкина Е.И. Опросник ПД-КЖ — валидированный способ оценки симптомов дисфункций тазового дна и качества жизни у пациенток с пролапсом тазовых органов // Журнал акушерства и женских болезней. 2008. Т. 57, № 3. С. 86–93. EDN: JVZIER

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