УДК 618.145-007.415-089
DOI: https://doi.org/10.17816/JOWD339433

Современные подходы к выполнению органосохраняющих операций при аденомиозе

А.С. Молотков, М.И. Ярмолинская, А.А. Цыпурдеева, М.А. Шалина

Научно-исследовательский институт акушерства, гинекологии и репродуктологии им. Д.О. Отта, Санкт-Петербург, Россия

В настоящее время частота встречаемости аденомиоза у пациенток молодого возраста, не реализовавших репродуктивную функцию, неуклонно растет, а тактика хирургического и медикаментозного лечения содержит много нерешенных аспектов. В клинической практике особое внимание уделено возможностям хирургического лечения аденомиоза с сохранением матки, разрабатываются новые варианты операций и пути оптимизации лечения. В статье обобщены собственный и мировой опыт ведения больных аденомиозом: представлены показания и алгоритм отбора пациенток для хирургического органосохраняющего вмешательства, сделан акцент на технических особенностях оперативного лечения, обсуждена тактика ведения больных, направленная на повышение частоты реализации репродуктивной функции.

Ключевые слова: аденомиоз; хирургическое лечение; органосохраняющие операции.

Как цитировать:
Молотков А.С., Ярмолинская М.И., Цыпурдеева А.А., Шалина М.А. Современные подходы к выполнению органосохраняющих операций при аденомиозе // Журнал акушерства и женских болезней. 2023. Т. 72. № 3. С. 95–103. DOI: https://doi.org/10.17816/JOWD339433

Рукопись получена: 17.04.2023 **Рукопись одобрена:** 25.05.2023 **Опубликована:** 30.06.2023

DOI: https://doi.org/10.17816/JOWD339433

Modern approaches to performing organ-preserving operations in adenomyosis

Arsenii S. Molotkov, Maria I. Yarmolinskaya, Anna A. Tsypurdeeva, Maria A. Shalina

The Research Institute of Obstetrics, Gynecology and Reproductology named after D.O. Ott, Saint Petersburg, Russia

The incidence of adenomyosis in young patients who have not realized their reproductive function is steadily increasing, with the tactics of surgical and drug treatment being an unresolved problem. In clinical practice, special attention is focused on the possibility of surgical treatment of adenomyosis with preservation of the uterus; and a variety of new options for such operations are proposed, as well as ways to optimize the treatment of such patients. This article summarizes our own and world experience in managing such patients. We present current views regarding the selection of patients for such interventions and determining the indications for surgery, and we herein highlight the technical features of such interventions. A particular attention is paid to management tactics being aimed at ensuring reproductive function implementation.

Keywords: adenomyosis; surgical treatment; organ-preserving operations.

To cite this article:
Molotkov AS, Yarmolinskaya MI, Tsypurdeeva AA, Shalina MA. Modern approaches to performing organ-preserving operations in adenomyosis. *Journal of Obstetrics and Women's Diseases.* 2023;72(3):95–103. DOI: https://doi.org/10.17816/JOWD339433

Received: 17.04.2023 **Accepted:** 25.05.2023 **Published:** 30.06.2023

ECO•VECTOR

INTRODUCTION

Currently, researchers are paying increasing attention to the surgical treatment of adenomyosis. This is because of the effectiveness of this approach for correcting the symptoms of the disease and the ability to preserve reproductive function. Hysterectomy was traditionally considered to be the operation of choice for adenomyosis, but taking into account the large number of patients of reproductive age who desire to retain their reproductive function, this operation cannot be considered optimal for either patients or surgeons. This has led to the emergence and significant spread of new approaches for the surgical treatment of adenomyosis, such as organ-preserving surgical interventions.

It is important to keep in mind that organ-preserving surgery does not cure the patient of adenomyosis and is aimed at reducing pain; eliminating abnormal uterine, heavy menstrual, or intermenstrual bleeding; and restoring reproductive function.

When choosing a method of treatment, it is necessary to keep in mind that almost all surgical procedures for endometriosis are technically difficult, may be accompanied by increased blood loss, and may increase the risk of uterine rupture during subsequent pregnancy.

When performing surgery in patients with adenomyosis, the following general recommendations can be considered:

1. When the uterus is large, it is advisable to use anterolateral optics ("angled" or "oblique"), which allows better visualization of small pelvic and retroperitoneal structures. The "high" positioning of the optical and working trocars is also effective. The trocars should be offset vertically at the same distance in proportion to the size of the enlarged uterus.
2. The use of a uterine manipulator allows convenient work in both the Douglas and parametral spaces. Depending on the size of the cervix and uterine cavity, the length of the uterine manipulator nozzle should be chosen. When working with a short nozzle, the manipulator does not fix to the uterus; therefore, it becomes difficult to displace the uterus intraoperatively.
3. The uterine tissue affected by adenomyosis from the abdominal cavity is most often removed by morcellation in a container, according to modern concepts.
4. Other forms of endometrioid disease (ovarian cysts, and deep infiltrative and peritoneal endometriosis), as well as adhesions of abdominal and pelvic organs should be considered.

Currently, in clinical practice, adenomyosis is often divided into the following two phenotypes: external (when the outer layers of the myometrium are affected) and internal (when the muscular wall closer to the endometrium is affected). It has been shown that the manifestations of the disease differ among patients, and external adenomyosis is more often associated with endometriosis, especially with its deep infiltrative form [1].

The most common indications for surgical intervention are as follows:

- Menstrual cycle disorders involving abnormal uterine, heavy menstrual, and intermenstrual bleeding;
- Pain syndrome (dysmenorrhea, chronic pelvic pain, and dyspareunia) with ineffective conservative therapy;
- Infertility associated with adenomyosis;
- Large uterine size (more than 12 weeks) or rapid growth (more than 4 weeks per year).

Before surgical intervention, hormonal therapy for preoperative preparation is indicated in some patients. Gonadotropin-releasing hormone agonists, gestagens, progesterone receptor modulators, and antiprogestagens (mifepristone) are most commonly used. In some cases, antianemic therapy and hemostatic agents are recommended for certain indications.

The goals of such preparation are to improve the outcomes of the planned intervention and reduce the numbers of intraoperative and postoperative complications, and hemotransfusions. Preoperative preparation can help to correct anemia, reduce uterine size, and, consequently, reduce the amount of intraoperative blood loss and the surgical intervention time. It also provides an opportunity to choose the optimal time for the surgical intervention. The planned surgical procedure can be performed using different surgical approaches, such as hysteroscopy, laparoscopy, and laparotomy.

The possibilities of performing the surgery itself and the surgical volume in adenomyosis directly depend on the form of the disease. At present, diffuse, focal, nodular, cystic, and sclerotic disease forms are commonly distinguished [2]. It should be kept in mind that the forms can often be combined.

The most common local forms of adenomyosis involve nodes, cysts, and areas of sclerosis in the myometrium without clear boundaries with the surrounding tissues.

In the cystic form, the diagnosis is mainly made on the basis of the magnetic resonance imaging findings of a cystic structure with an internal diameter of 10 mm or more and hemorrhagic content surrounded by myometrial tissue. The size and localization of the cyst in relation to the uterine cavity can be crucial in the choice of the surgical intervention. In the classification of Brosens et al., three subtypes of adenomyosis cysts were identified based on their locations in the uterine wall [3].

DOI: https://doi.org/10.17816/JOWD339433

HYSTEROSCOPY FOR ADENOMYOSIS

Hysteroscopy for adenomyosis is performed routinely for the following reasons:

1. Visual assessment of the uterine cavity and detection of intrauterine pathology. It should be kept in mind that adenomyosis can reveal different lesion patterns, including visible mouths ("passages" of adenomyosis) (Figure 1), sclerotic changes and synechiae, and diffuse myometrial changes (a "cobblestone sidewalk" appearance).
2. Verification of the diagnosis. For morphological diagnosis, a trepan biopsy of the myometrium in the area of the uterine floor can be performed using a special needle (preferably from 3–5 points to improve diagnosis), or a section of the altered myometrium can be obtained using an electroloop. If the patient has abnormal uterine or heavy menstrual bleeding, hysteroscopy can be supplemented by obligatory histological examination of the endometrium. A targeted biopsy is sufficient to minimize trauma to the uterine walls. Curettage of the uterine cavity is possible only in cases of endometrial hyperplasia.
3. Surgical treatment of the cystic form of adenomyosis. When cysts are close to the uterine cavity, hysteroscopic access allows opening and drainage of cystic cavities and coagulation of their inner walls. Such a surgery can be sufficient to significantly alleviate pain and reduce the volume of menstrual blood loss.

To open cysts of the uterine wall immediately adjacent to the uterine cavity, the scissors in a BiOH or BETTOCCHI hysteroscope, a bipolar cutting hook, or a loop in the case of a hysteroresectoscope can be used.

Technically, the surgery is performed as follows. On the side of the uterine cavity, the uterine wall is dissected under ultrasound guidance at the region closest to the cystic wall. The cystic cavity is widely opened and washed with saline solution. Then, the inner lining of the cyst is coagulated using a bipolar electrode or laser energy.

LAPAROSCOPY AND LAPAROTOMY FOR ADENOMYOSIS

Organ-preserving surgeries are performed for the following:

- Removal of a node of adenomyosis;
- Removal of a cyst (cystic form);
- Adenomyomectomy (partial or complete) for the diffuse form of adenomyosis.

Adenomyosis nodal dissection can be performed by wedge resection or by a technique similar to myomectomy, but with less differentiation of the border between the nodule and intact myometrium (Figure 2). The surgeon should rely on preoperative ultrasound or magnetic resonance imaging and the appearance of the uterine wall for tissue separation.

The uterine incision can be made using ultrasound and monopolar energy, or the uterine wall can be dissected with scissors. After dissecting the myometrium, the adenomyosis node is released from the surrounding tissue (Figure 3). This is the most difficult stage of the operation. In addition to technical difficulties, such as the absence of a clear boundary between the tissues to be separated and difficulties in separating the node from the uterine wall, increased tissue bleeding and associated impaired visualization can occur. Temporary occlusion of the uterine arteries by clipping can be performed to reduce intraoperative blood loss in patients with extensive uterine lesions.

Our own experience shows that ultrasound energy is the most appropriate for this stage of surgery, as it

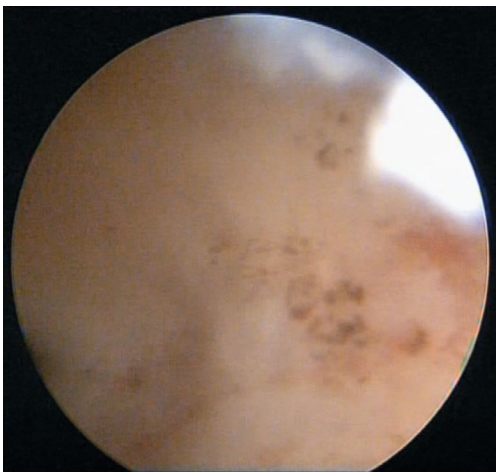

Fig. 1. Uterine cavity with adenomyosis foci
Рис. 1. Вид полости матки с очагами аденомиоза

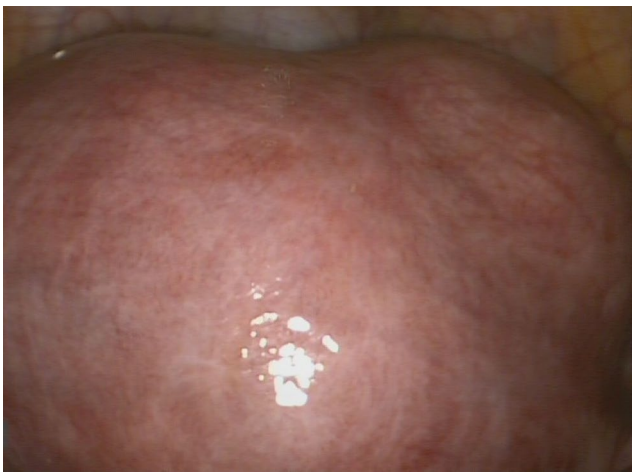

Fig. 2. Uterus with adenomyosis
Рис. 2. Вид матки, пораженной аденомиозом

DOI: https://doi.org/10.17816/JOWD339433

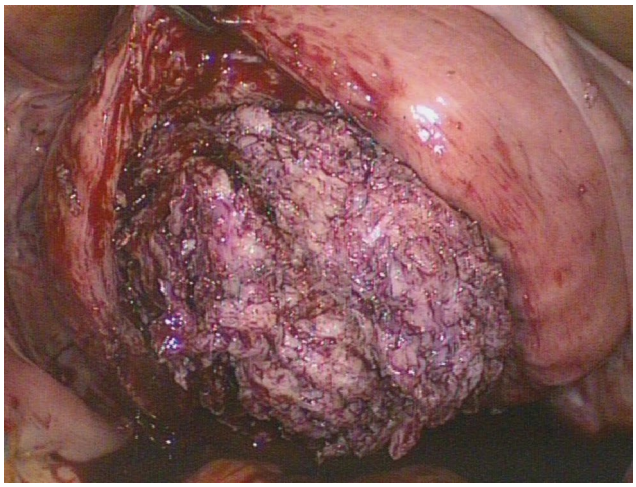

Fig. 3. Removal of the adenomyosis node
Рис. 3. Удаление узла аденомиоза

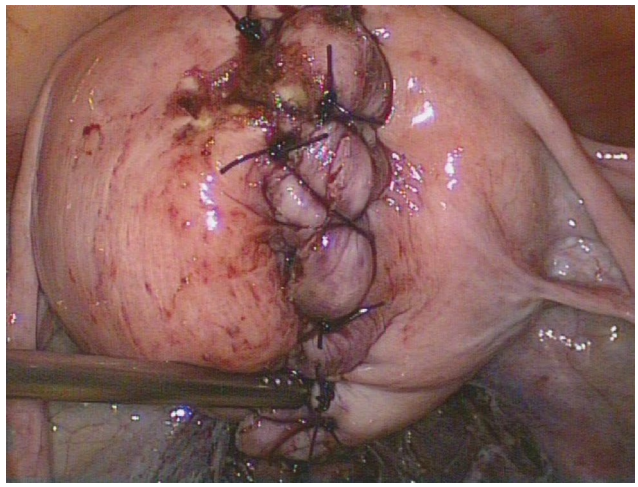

Fig. 4. Uterus after removal of the adenomyosis node and suturing
Рис. 4. Вид ушитой матки после удаления узла аденомиоза

minimizes charring, thermal trauma to surrounding tissues, and smoke in the abdominal cavity. The node is seized with a rigid clamp or forceps and pulled from the surrounding tissues, and the vessels and bundles of connective tissue and muscle fibers going to the node are coagulated and crossed with an ultrasound scalpel and bipolar clamp. The node is removed, and subsequently, the large bleeding vessels in the node bed are coagulated. There is no need to coagulate the entire surface of the node bed, as the vessels in this area will provide vascularization and aid in the complete repair of the forming uterine scar.

The uterine wall defect is then sutured with absorbable suture material. For this purpose, separate Vicryl and Monocryl sutures are used to suture the uterine wound in several rows, with the deepest sutures being muscular-muscular and the superficial ones being muscular-serous, which coincides with the technique described by Tjkgoz et al. [4].

Accurate suturing of the uterine wound is essential for the formation of a complete scar (Figure 4). Care must be taken to suture the very "bottom" of the uterine wound and the entire myometrial defect. The cavities left behind can cause hematoma formation in the uterine wall, with subsequent uterine wall pseudocyst formation in the remote postoperative period. After suturing the uterine wall, it is advisable to place an antispastic barrier on the uterus.

The adenomyosis node is morcellated, removed from the abdominal cavity, and sent for histological examination.

In cavity surgeries for the cystic form of adenomyosis, a similar intervention technique is used. It should be noted that it is almost never possible to remove an adenomyosis cyst without opening its cavity. This is because of the dense ingrowth of the cyst wall into intact myometrium and the thin wall of the cyst itself [5]. The cyst should be slowly and carefully extracted from the surrounding tissues, trying to maintain the integrity of the cyst as long as possible. This technique not only prevents the entry of endometrioid cells into healthy tissues, but also makes it technically easier to remove the tumor. When the cavity is opened, the cavity and surrounding tissues should be thoroughly washed and the surgery should be continued. Particular attention should be paid to the complete excision of all cystic walls. Leaving altered tissue is a significant risk factor for recurrence of the disease.

When performing adenomyomectomy for the nodular form of adenomyosis, it is advisable to use double-flap suturing to close the defect to avoid tissue tension and to achieve sufficient thickness of the uterine wall.

In the diffuse form of adenomyosis and extensive adenomyosis, adenomyomectomy with three-flap metaplasty proposed by Osada can be used with laparotomy access [6].

The surgical procedure consists of radical adenomyosis removal, leaving 1 cm of tissue above the endometrium and 1 cm of tissue below the serous membrane, followed by reconstruction of the uterus with a triple flap. To prevent bleeding during the procedure, a turnstile in the form of a 6 mm wide rubber tube placed around the proximal part of the cervix is used. The uterus is first dissected in half in the mid-sagittal direction until the uterine cavity is reached. Adenomyotic tissue is removed, and the myometrium is 10 mm away from the serous layer and the endometrium. The endometrium is closed. On one side of the uterus, the muscular and serous membranes are sutured anteriorly and posteriorly. The serosacral-muscular layer of the opposite side of the uterus is then brought in. The advantage of this method is the possibility of a wider and more thorough excision of the affected tissue and accessibility for any uterine size. After a wide excision of the affected area, the use of three layers of myometrium allows the reconstruction of the uterine wall with sufficient thickness to reduce the risk of uterine rupture in a future pregnancy.

Although adenomyosis is a chronic and progressive disease, relapse is rare with this technique.

The literature describes surgeries involving two- and three-lobed methods of suturing the uterine wall defect, but at present, they are more of historical interest.

For the diffuse form of adenomyosis, surgery involving a four-flap technique using laparoscopic access is also widespread. A cruciform incision is made in the fundus of the uterus and the uterine wall is dissected in the longitudinal and transverse directions. These incisions are made as deep as the uterine cavity, but without opening it. The depth of the incision is planned in advance based on ultrasound or pelvic magnetic resonance imaging findings and is controlled visually during surgery [7]. Next, the isolated flap is grasped with a rigid clamp by the outer part of the wall and serous membrane, and the affected myometrium is excised from the serous membrane of the uterus, leaving smooth muscle tissue on the serosa with a thickness of about 5 mm. This technique is performed consecutively with each of the flaps. After this, the intact uterine cavity, myometrium with a thickness of about 5 mm on the endometrium, and serous membrane dissected with a cruciform incision are left. To suture the defects and form the uterine wall, the most expedient approach is to place individual sutures with capture of the bottom of the wound.

The external and internal parts of the uterine wall are well matched so that they fit tightly together. Sutures are not inserted into the uterine cavity, and it remains intact in relation to the myometrium.

In order to minimize intraoperative blood loss during laparoscopic access, temporary uterine artery clipping can be performed. The final results of the surgery include the removal of pathologically altered tissues and a significant reduction in uterine volume.

The clinical effects of these surgeries are manifested by a decrease in pain and a decrease in menstrual blood loss, and in some cases, fertility is restored.

After surgery, a number of authors recommend the use of gonadotropin-releasing hormone agonists for 3 months.

PREGNANCIES AFTER ORGAN-PRESERVING SURGERY FOR ADENOMYOSIS

The pregnancy rate in patients with stage III–IV adenomyosis does not exceed 10%–15%, since none of the treatments can create favorable conditions for embryo implantation [8].

Reproductive function was evaluated in 137 patients with diffuse adenomyosis who underwent adenomyomectomy with double-flap metroplasty from January 2011 to December 2019 [9, 10]. The indications for the surgery were infertility and severe dysmenorrhea. After the surgery, 56 patients (40.9%) became pregnant (62 pregnancies, including 35 natural pregnancies and 27 pregnancies with the use of assisted reproductive technologies).

The data from a study of Korean surgeons that presented the pregnancy outcomes in 22 patients are also noteworthy. The women underwent adenomyomectomy with transient uterine artery occlusion. The mean age of the pregnant women was 37.0 years (standard deviation [SD], 3.1 years; range, 32–45 years; median, 37 years). All patients underwent cesarean section for delivery. The mean gestational age was 36.2 weeks (SD, 3.6 weeks; range, 27.4–39.4 weeks; median, 37.3 weeks), and the mean birth weight was 2560.9 g (SD, 771.8 g; range, 1100–3920 g; median, 2550 g). In 7 cases (31.8%), delivery was preterm. Moreover, 2 cases involved placenta accretions and 2 cases involved placenta previa. However, in none of the cases, the detected pathology was an indication for hysterectomy. There was 1 case (4.5%) of uterine rupture in the 27th week of pregnancy.

CONCLUSION

Surgery for advanced adenomyosis presents a significant technical challenge, with the need to prepare the entire surgical team. However, if such an intervention is performed correctly, significant regression or even disappearance of the disease symptoms can be expected, which is certainly associated with an improvement in the quality of life of patients.

Organ-preserving surgery for adenomyosis has limitations and is not a panacea. Such a surgery may be indicated in young patients who desire to retain their reproductive function. If adenomyomectomy is indicated, it is important to follow the surgical technique, have a surgeon experienced in performing such an intervention, and use modern surgical equipment (including surgical energies, suture material, and antispasmodic barriers). The condition of the scar or scars on the uterus can be evaluated 4–6 months after surgery prior to pregnancy planning (according to magnetic resonance imaging and ultrasound investigations). It should be kept in mind that pregnancy and delivery after adenomyomectomy often have a complicated course, with cesarean section performed for delivery. When managing pregnancy and preparing a birth plan among patients with adenomyosis who have undergone organ-preserving uterine surgery, it is necessary to take into account the data in the surgical protocol and the recommendations of the surgeon who performed the surgery.

DOI: https://doi.org/10.17816/JOWD339433

ADDITIONAL INFORMATION

Funding. The work was prepared within the framework of the theme of the fundamental scientific research "Strategy for maintaining the health of women with gynecological and endocrine diseases in different age periods: pathogenetic rationale for medical rehabilitation and the development of new areas of organ-preserving surgical interventions" (state registration number 122041500063-2).

Conflict of interest. The authors declare no conflict of interest related to the publication of this article.

Author contributions. *A.S. Molotkov, M.I. Yarmolinskaya, A.A. Tsypurdeeva, M.A. Shalina* — study concept and design, collection and processing of material, statistical data processing, writing the text, editing.

All authors made a significant contribution to the study and preparation of the article, read and approved the final version before its publication.

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ

Источник финансирования. Работа подготовлена в рамках темы фундаментального научного исследования «Стратегия сохранения здоровья женщин с гинекологическими и эндокринными заболеваниями в разные возрастные периоды: патогенетическое обоснование медикаментозной реабилитации и разработка новых направлений органосохраняющих оперативных вмешательств» (номер государственной регистрации 122041500063-2).

Конфликт интересов. Авторы декларируют отсутствие явных и потенциальных конфликтов интересов, связанных с публикацией настоящей статьи.

Вклад авторов. *А.С. Молотков, М.И. Ярмолинская, А.А. Цыпурдеева, М.А. Шалина* — концепция и дизайн исследования, сбор и обработка материала, статистическая обработка данных, написание текста, редактирование.

Все авторы внесли существенный вклад в проведение исследования и подготовку статьи, прочли и одобрили финальную версию перед публикацией.

REFERENCES

1. Bourdon M, Oliveira J, Marcellin L, et al. Adenomyosis of the inner and outer myometrium are associated with different clinical profiles. *Hum Reprod.* 2021;36(2):349–357. DOI: 10.1093/humrep/deaa307

2. Yarmolinskaya MI, Ailamazyan EK, Arutyunyan AF, et al. Sclerotic adenomyosis: a case report. *Journal of Obstetrics and Women's Diseases.* 2018;67(6):119–123. (In Russ.) DOI: 10.17816/JOWD676119-123

3. Brosens I, Gordts S, Habiba M, et al. Uterine cystic adenomyosis: a disease of younger women. *J Pediatr Adolesc Gynecol.* 2015;28(6):420–426. DOI: 10.1016/j.jpag.2014.05.008

4. Tokgoz VY, Tekin AB. A rare case of the new entity of müllerian anomalies mimicking the noncommunicating rudimentary cavity with hemi-uterus: accessory cavitated uterine mass. *Fertil Steril.* 2022;117(3):646–648. DOI: 10.1016/j.fertnstert.2021.11.028

5. Kiyak H, Seckin KD, Karakis L, et al. Decidualized juvenile cystic adenomyoma mimicking a cornual pregnancy. *Fertil Steril.* 2020;113(2):463–465. DOI: 10.1016/j.fertnstert.2019.10.026

6. Osada H, Silber S, Kakinuma T, et al. Surgical procedure to conserve the uterus for future pregnancy in patients suffering from massive adenomyosis. *Reprod Biomed Online.* 2011;22(1):94–99. DOI: 10.1016/j.rbmo.2010.09.014

7. Kuo HH, Weng CH, Jaiswal A, et al. Performing laparoscopic adenomyomectomy with the four-petal method. *Fertil Steril.* 2020;114(6):1352–1354. DOI: 10.1016/j.fertnstert.2020.07.032

8. Rossiyskoe obshchestvo akusherov-ginekologov (ROAG). Endometrioz. Klinicheskie rekomendatsii. 2020 [cited 2023 May 25]. Available from: https://roag-portal.ru/recommendations_gynecology

9. Zhou Y, Shen L, Wang Y, et al. Long-term pregnancy outcomes of patients with diffuse adenomyosis after double-flap adenomyomectomy. *J Clin Med.* 2022;11(12). DOI: 10.3390/jcm11123489

10. Kwack JY, Lee SJ, Kwon YS. Pregnancy and delivery outcomes in the women who have received adenomyomectomy: Performed by a single surgeon by a uniform surgical technique. *Taiwan J Obstet Gynecol.* 2021;60(1):99–102. DOI: 10.1016/j.tjog.2020.11.015

СПИСОК ЛИТЕРАТУРЫ

1. Bourdon M., Oliveira J., Marcellin L., et al. Adenomyosis of the inner and outer myometrium are associated with different clinical profiles // Hum. Reprod. 2021. Vol. 36. No. 2. P. 349–357. DOI: 10.1093/humrep/deaa307

2. Ярмолинская М.И., Айламазян Э.К., Арутюнян А.Ф., и др. Склеротическая форма аденомиоза (описание клинического случая) // Журнал акушерства и женских болезней. 2018. Т. 67. № 6. С. 119–123. DOI: 10.17816/JOWD676119-123

3. Brosens I., Gordts S., Habiba M., et al. Uterine cystic adenomyosis: a disease of younger women // J. Pediatr. Adolesc. Gynecol. 2015. Vol. 28. No. 6. P. 420–426. DOI: 10.1016/j.jpag.2014.05.008

4. Tokgoz V.Y., Tekin A.B. A rare case of the new entity of müllerian anomalies mimicking the noncommunicating rudimentary cavity with hemi-uterus: accessory cavitated uterine mass // Fertil Steril. 2022. Vol. 117. No. 3. P. 646–648. DOI: 10.1016/j.fertnstert.2021.11.028

5. Kiyak H., Seckin K.D., Karakis L., et al. Decidualized juvenile cystic adenomyoma mimicking a cornual pregnancy // Fertil Steril. 2020. Vol. 113. No. 2. P. 463–465. DOI: 10.1016/j.fertnstert.2019.10.026

6. Osada H., Silber S., Kakinuma T., et al. Surgical procedure to conserve the uterus for future pregnancy in patients suffering from massive adenomyosis // Reprod. Biomed. Online. 2011. Vol. 22. No. 1. P. 94–99. DOI: 10.1016/j.rbmo.2010.09.014

7. Kuo H.H., Weng C.H., Jaiswal A., et al. Performing laparoscopic adenomyomectomy with the four-petal method // Fertil Steril. 2020. Vol. 114. No. 6. P. 1352–1354. DOI: 10.1016/j.fertnstert.2020.07.032
8. Российское общество акушеров-гинекологов (РОАГ). Эндометриоз. Клинические рекомендации. 2020 [дата обращения: 21.03.2023]. Доступ по ссылке: https://roag-portal.ru/recommendations_gynecology
9. Zhou Y., Shen L., Wang Y., et al. Long-term pregnancy outcomes of patients with diffuse adenomyosis after double-flap adenomyomectomy // J. Clin. Med. 2022. Vol. 11. No. 12. DOI: 10.3390/jcm11123489
10. Kwack J.Y., Lee S.J., Kwon Y.S. Pregnancy and delivery outcomes in the women who have received adenomyomectomy: performed by a single surgeon by a uniform surgical technique // Taiwan J. Obstet. Gynecol. 2021. Vol. 60. No. 1. P. 99–102. DOI: 10.1016/j.tjog.2020.11.015

AUTHORS INFO

*** Arsenii S. Molotkov**, MD, Cand. Sci. (Med.);
address: 3 Mendeleevskaya Line, Saint Petersburg, 199034, Russia;
ORCID: https://orcid.org/0000-0003-3433-3092;
Scopus Author ID: 56058571100;
eLibrary SPIN: 6359-6472;
e-mail: arseny.molotkov@gmail.com

Maria I. Yarmolinskaya, MD, Dr. Sci. (Med.), Professor, Professor of the Russian Academy of Sciences;
ORCID: https://orcid.org/0000-0002-6551-4147;
ResearcherID: P-2183-2014;
Scopus Author ID: 7801562649;
eLibrary SPIN: 3686-3605;
e-mail: m.yarmolinskaya@gmail.com

ОБ АВТОРАХ

*** Арсений Сергеевич Молотков**, канд. мед. наук, доцент;
адрес: Россия, 199034, Санкт-Петербург, Менделеевская линия, д. 3;
ORCID: https://orcid.org/0000-0003-3433-3092;
Scopus Author ID: 56058571100;
eLibrary SPIN: 6359-6472;
e-mail: arseny.molotkov@gmail.com

Мария Игоревна Ярмолинская, д-р мед. наук, профессор, профессор РАН;
ORCID: https://orcid.org/0000-0002-6551-4147;
ResearcherID: P-2183-2014;
Scopus Author ID: 7801562649;
eLibrary SPIN: 3686-3605;
e-mail: m.yarmolinskaya@gmail.com

* Corresponding author / Автор, ответственный за переписку

Anna A. Tsypurdeeva, MD, Cand. Sci. (Med.);
ORCID: https://orcid.org/0000-0001-7774-2094;
eLibrary SPIN: 5208-9707;
e-mail: tsypurdeevan@mail.ru

Maria A. Shalina, MD, Cand. Sci. (Med.);
ORCID: https://orcid.org/0000-0002-5921-3217;
Researcher ID: A-7180-2019;
Scopus Author ID: 57200072308;
eLibrary SPIN: 6673-2660;
e-mail: amarus@inbox.ru

Анна Алексеевна Цыпурдеева, канд. мед. наук;
ORCID: https://orcid.org/0000-0001-7774-2094;
eLibrary SPIN: 5208-9707;
e-mail: tsypurdeevan@mail.ru

Мария Александровна Шалина, канд. мед. наук;
ORCID: https://orcid.org/0000-0002-5921-3217;
Researcher ID: A-7180-2019;
Scopus Author ID: 57200072308;
eLibrary SPIN: 6673-2660;
e-mail: amarus@inbox.ru