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Endometrial polyps: impact on reproductive function and clinical aspects

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Endometrial polyps (EP) are among the most common benign intrauterine lesions and may significantly affect female reproductive function. Despite their prevalence, clinical features, impact on fertility, and optimal management strategies remain insufficiently studied, particularly in postmenopausal women.

Aim – to evaluate the influence of EP on reproductive function and to assess their clinical characteristics, localization, and management in women of reproductive and postmenopausal age.

Materials and methods. A prospective comparative clinical study was conducted, involving 114 women aged 20–70 years with histologically confirmed EP. The Control group included 54 healthy women of reproductive age. Diagnostic methods included transvaginal ultrasound (TVUS), sonohysterography, and office hysteroscopy with targeted biopsy. Polypectomy was performed using mechanical or electromechanical resection techniques.

Results. Office hysteroscopy demonstrated high diagnostic and therapeutic efficiency, allowing removal of small EP (<20 mm) in outpatient settings, while larger EP required in-hospital electromechanical resection. Most EP were single (76.8%), small to medium-sized (⩽2 cm, 79.3%), and localized mainly on the posterior and lateral uterine walls. Histologically, EP were predominantly glandular-fibrous (59.8%) or glandular (37.8%), with 2.4% being adenomatous (atypical). The majority of postmenopausal EP were asymptomatic (67.1%). No significant intraoperative complications were reported. Organ-preserving surgical techniques were effective and safe, with polypectomy success rates exceeding 96%.

Conclusions. EP in postmenopausal women are often asymptomatic, highlighting the importance of early detection via TVUS and hysteroscopy. Office hysteroscopy enables minimally invasive, effective treatment of small EP, whereas larger EP require electromechanical resection. A combined imaging and histological evaluation optimize patient management, reduces the risk of recurrence, and supports preservation of reproductive and gynecological health.

The research was carried out in accordance with the principles of the Declaration of Helsinki. The informed consent of the patients was obtained for conducting the studies.

The author declares the absence of conflict of interests.

Keywords: endometrial polyps, infertility, reproductive function, hysteroscopy, hormonal therapy, women of reproductive age.

Поліпи ендометрію: вплив на репродуктивну функцію та клінічні аспекти

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Поліпи ендометрію (ПЕ) є одними з найпоширеніших доброякісних внутрішньоматкових уражень і можуть суттєво впливати на репродуктивну функцію жінок. Попри їхню поширеність, клінічні особливості, вплив на фертильність та оптимальні стратегії лікування залишаються недостатньо вивченими, особливо в жінок у постменопаузі.

Мета – оцінити вплив ПЕ на репродуктивну функцію та оцінити їхні клінічні характеристики, локалізацію та лікування в жінок репродуктивного та постменопаузального віку.

Матеріали та методи. Проспективне порівняльне клінічне дослідження було проведено за участю 114 жінок віком 20–70 років із гістологічно підтвердженими ПЕ. Контрольну групу становили 54 здорові жінки репродуктивного віку. Діагностичні методи охоплювали трансвагінальне ультразвукове дослідження (ТВУЗД), соногістерографію та офісну гістероскопію з цілеспрямованою біопсією. Поліпектомію проводили за допомогою механічних або електромеханічних методів резекції.

Результати. Офісна гістероскопія продемонструвала високу діагностичну та терапевтичну ефективність, даючи змогу видаляти малі ПЕ (<20 мм) в амбулаторних умовах, тоді як більші ПЕ вимагали електромеханічної резекції в лікарні. Більшість ПЕ були поодинокими (76,8%), малими та середніми (⩽2 см, 79,3%) та локалізувалися переважно на задній та бічних стінках матки. Гістологічно ПЕ були переважно залозисто-фіброзними (59,8%) або залозистими (37,8%), причому 2,4% були аденоматозними (атиповими). Більшість ПЕ в постменопаузі були безсимптомними (67,1%). Про значні інтраопераційні ускладнення не було повідомлено. Органозберігаючі хірургічні методи були ефективними та безпечними, а рівень успішності поліпектомії перевищував 96%.

Висновки. ПЕ в жінок у постменопаузі часто протікають безсимптомно, що підкреслює важливість раннього виявлення за допомогою ТВУЗД та гістероскопії. Офісна гістероскопія дає змогу проводити мінімально інвазивне, ефективне лікування малих ПЕ, тоді як більші ПЕ вимагають електромеханічної резекції. Комбіноване дослідження візуалізації та гістологічного дослідження оптимізує ведення пацієнтів, знижує ризик рецидиву та сприяє збереженню репродуктивного та гінекологічного здоров'я.

Дослідження проводилося відповідно до принципів Гельсінської декларації. Для проведення досліджень було отримано інформовану згоду пацієнток.

Автор заявляє про відсутність конфлікту інтересів.

Ключові слова: поліпи ендометрію, безпліддя, репродуктивна функція, гістероскопія, гормональна терапія, жінки репродуктивного віку.

Endometrial cancer remains the second most common gynecological malignancy. This pathology is most frequently observed in postmenopausal women. It is well-known that endometrial cancer often develops against the background of various pathological changes in the endometrium, which makes timely diagnosis and treatment of benign intrauterine conditions highly relevant. Importantly, 70–80% of postmenopausal patients have significant comorbidities, which complicates the determination of management strategies, particularly regarding hormone therapy and the performance of hysterectomy [2,6].

Endometrial EP (EP) are one of the most common forms of benign intrauterine pathology and can significantly affect female reproductive function. Despite their wide prevalence across different age groups, their clinical characteristics, diagnostic approaches, and impact on fertility remain insufficiently studied, particularly in women of late reproductive age. Modern imaging techniques and hysteroscopy allow not only for the detection of EP but also for minimally invasive treatment. However, to date, there are no systematic data on the impact of EP on infertility and the effectiveness of various removal methods [5,12]. EP occupy a leading position among intrauterine pathologies across different age groups. Their prevalence ranges from 21.7–27.3% in women of reproductive age, increasing to 45% in postmenopausal women [9,10]. It is believed that the majority of postmenopausal EP are benign, while a small proportion are malignant: 4.47% in patients with symptomatic EP and 1.51% in those with asymptomatic EP. Risk factors for malignant transformation of EP include age over 60 years, postmenopausal status, abnormal uterine bleeding, diabetes mellitus, arterial hypertension, obesity, and the use of tamoxifen [1,4].

Infertility remains a significant concern in modern gynecology and society, drawing the attention of specialists in obstetrics and gynecology, reproductive medicine, and andrology. Imaging methods, such as ultrasonography and hysteroscopy, play a leading role in diagnosing the causes of female infertility, providing sufficient information to detect various uterine pathologies, including endometrial hyperplasia, intrauterine adhesions, EP, myomas, adenomyosis, and congenital uterine anomalies [3,7,8,11].

Thus, the study of the clinical and reproductive aspects of EP is particularly relevant, as it allows for the optimization of diagnostic and treatment strategies, reduction of recurrence risk, and improvement of women's reproductive health outcomes. Considering the possibility of asymptomatic EP, questions arise regarding the prevalence of asymptomatic EP in postmenopausal patients and the potential development of asymptomatic malignancy, which formed the basis of the present study.

The aim of the study was to investigate the impact of EP on women's reproductive function and to evaluate the clinical characteristics of their course and management.

Material and methods of the study

This study was conducted within the framework of the scientific program of the Department of Obstetrics and Gynecology at the II Azerbaijan Medical University in 2024–2025. A prospective comparative clinical study was carried out at the above-mentioned department and the laboratory of the Educational-Surgical Clinic of AMU. The study included 114 patients aged 20 to 70 years (mean age: 46.0±1.7 years) with diagnosed EP, who comprised the Main group. The mean body mass index (BMI) was 23.5±3.4 kg/m^{2,} and the median parity was 2 (range: 0–6).

The Control group consisted of 54 practically healthy women of reproductive age with regular ovulatory menstrual cycles and no history of gynecological diseases. The Control group was comparable to the Main group in terms of age and BMI.

Inclusion criteria. Patients aged 20–70 years with an EP detected by pelvic ultrasound and morphologically confirmed after hysteroscopy were included in the study. At the time of inclusion, all participants had no acute or exacerbated chronic somatic or gynecological conditions and provided written informed consent for participation.

Exclusion criteria included: menstruation less than 12 months prior; presence of ovarian masses on ultrasound; use of medications affecting lipid or carbohydrate metabolism; use of weight-loss agents; detection of malignant tumors of the reproductive organs or other sites; presence of hormone-producing ovarian neoplasms; age under 20 or over 70 years; and refusal to participate in the study.

The clinical evaluation of patients included analysis of complaints, obstetric and gynecological as well as somatic history, and menstrual cycle characteristics. Transvaginal ultrasonography (TVUS) was used as the primary diagnostic method. To im-

prove diagnostic accuracy, sonohysterography and office hysteroscopy were additionally performed, allowing for targeted endometrial biopsy. The odds ratio (OR) was calculated as the ratio of the probability of an event occurring in the Main group to that in the Control group.

For polypectomy, a Karl Storz hysteroscope with 12° optics and 4 mm diameter was used. A loop electrode (for resection) or ball electrode (for coagulation) served as the active electrode. Fluid instillation (5% glucose solution) was performed using a Hysteromat device (Karl Storz) at a flow rate of up to 400 ml/min. A combined resection-coagulation technique was employed. The electrosurgical unit operated with a maximum power of 200 W in cutting mode and 120 W in coagulation mode. The EP and endometrial biopsy samples were sent for histopathological examination.

Infertility was diagnosed according to World Health Organization criteria as the absence of a clinical pregnancy during regular sexual activity without contraception for 12 months (or 6 months for women over 35 years of age). Based on the patient's history, primary and secondary infertility were distinguished. Male factor infertility was excluded based on partner evaluation, including semen analysis. Tubal factor infertility was excluded using instrumental methods (hysterosalpingography, sonohysterosalpingoscopy) or based on clinical data and medical history.

Statistical analysis. Data were processed using Microsoft Excel 2010 (Microsoft, USA), Statistica 6.0 (StatSoft Inc., USA), and SPSS Statistics version 22.0 (IBM, USA). Quantitative variables with a normal distribution are presented as mean ± standard error of the mean. Categorical variables are presented as proportions with 95% confidence intervals (CI). Differences between groups in the frequency of characteristics were assessed using the χ^2 (chi-square) test. Differences were considered statistically significant at $p<0.05$. The sample size was determined by the availability of clinical material during the study period.

Ethical aspects of the study/ethics statement. The study was conducted in accordance with the principles of the Declaration of Helsinki of the World Medical Association (2013 revision). The study protocol was approved by the local Ethics Committee of Azerbaijan Medical University. All participants were informed about the aims, methods, and potential risks of the study and provided written informed consent to participate.

Results of the study and discussion

Hysteroscopy followed by morphological examination remained the most informative method for diagnosing EP. Office hysteroscopy allowed both diagnostic and therapeutic interventions, including polypectomy, lysis of adhesion, and removal of small submucosal fibroid nodules. For patients with adhesions of grades I–II, the procedures were performed on an outpatient basis, whereas for grades III–IV, interventions were conducted in the operating room under anesthesia. EP measuring less than 20 mm in length and less than 5 mm in width were removed in office settings, while larger EP were excised in a hospital operating room.

Office hysteroscopy demonstrated high informativeness, minimally invasive nature, and low trauma, which allowed for a reduction in both the scope and duration of the examination and helped avoid unnecessary hospitalization. The method combines diagnostic and surgical value, enabling polypectomy within both the cervical canal and the uterine cavity, as well as the removal of adhesions and small submucosal nodules, provided the surgeon has the appropriate qualifications.

In the studied cohort, hysteroscopic polypectomy was performed in 82 (71.9%) patients with peri- and postmenopausal EP. The patients' ages ranged from 46 to 70 years, with a mean age of 58.21±4.24 years (Table 1).

Based on anamnesis data, menopause in patients with EP occurred timely in all cases, with a mean age at menopause onset of 48.26±3.68 years. The duration of postmenopause among the examined women ranged from 1.5 to 22 years, with a mean of 12.32±5.36 years. Among patients with EP, there was a twofold predominance of women in late postmenopause (duration ≥7 years) compared to early postmenopause (duration 1–6 years). The majority of the examined patients, 55 (67.1%), had asymptomatic EP detected during TVUS of the pelvic organs and were referred to the gynecology department for subsequent polypectomy (Table 2).

The average size of individual EP was calculated using grouped data with the midpoint of size

Table 1

Age characteristics of menopause in patients with endometrial EP (n=82)

Age, years	M±m
Mean age of women	58.21±4.24
Mean age at menopause onset	48.26±3.68
Duration of postmenopause	12.32±5.36

Table 2

Characteristics of postmenopausal patients with endometrial EP (n=82); n (%)

Characteristic	Number of patients, n (%)
Early postmenopause	28 (34.14)
Late postmenopause	54 (65.86)
Endometrial polyp with uterine bleeding	26 (31.7)
Asymptomatic endometrial polyp	55 (67.1)
Primary endometrial polyp	68 (82.9)
Recurrent endometrial polyp	14 (17.1)
Tamoxifen-induced endometrial polyp	4 (4.87)

intervals; for the category of EP larger than 3 cm, a conventional average value of 3.5 cm was used. The mean size of single EP in postmenopausal patients was 1.34 cm, with small and medium-sized EP predominating. Uterine bleeding associated with EP occurred in 31.7% of cases. In the vast majority of cases, the EP were primary, while recurrence was noted in 17.1% of cases: a single recurrence was observed in 12 (14.6%) women, and 2–3 episodes of recurrence in the medical history were recorded in 2 (2.43%) women. EP associated with tamoxifen/anastrozole therapy in the adjuvant treatment of breast cancer (tamoxifen-induced EP) were observed in 4 (4.87%) cases.

Analysis of the sizes of individual EP in postmenopausal patients (n=63) showed that small EP were the most frequently detected. EP less than 1 cm in diameter were diagnosed in 29 patients, accounting for 46.0% of all cases. EP measuring 1–2 cm were found in 21 (33.3%) patients, ranking second in frequency. EP measuring 2–3 cm were much less common and were detected in 7 (11.2%) patients (Fig. 1).

The smallest proportion consisted of large EP (over 3 cm) – 6 (9.5%) cases. Thus, 79.3% of individual EP measured up to 2 cm, indicating a predominance of small and medium-sized EP in postmenopausal patients.

Analysis of the localization of individual EP in postmenopausal patients (n=63) showed that EP could be located in various regions of the uterine cavity, with an uneven distribution across anatomical zones. EP were most frequently located on the posterior wall of the uterus – in 18 patients, accounting for 28.6% of observations. EP on the lateral walls were found in 15 (23.8%) patients, ranking second in frequency. EP located in the uterine fundus were observed in 13 (20.6%) patients. EP on the anterior wall were detected in 9 (14.3%) cases, while localization near the tubal angles occurred in 8 (12.7%) patients (Fig. 2).

Thus, the most frequent site of individual EP was the posterior uterine wall, while the least frequent localization was in the tubal angles. This may reflect specific morphofunctional features of the endometrium in the postmenopausal period (Table 3).

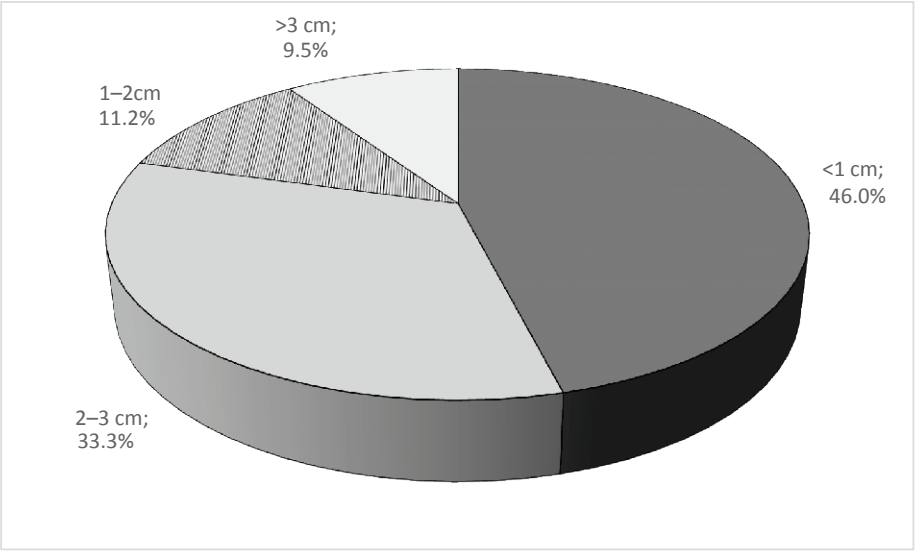
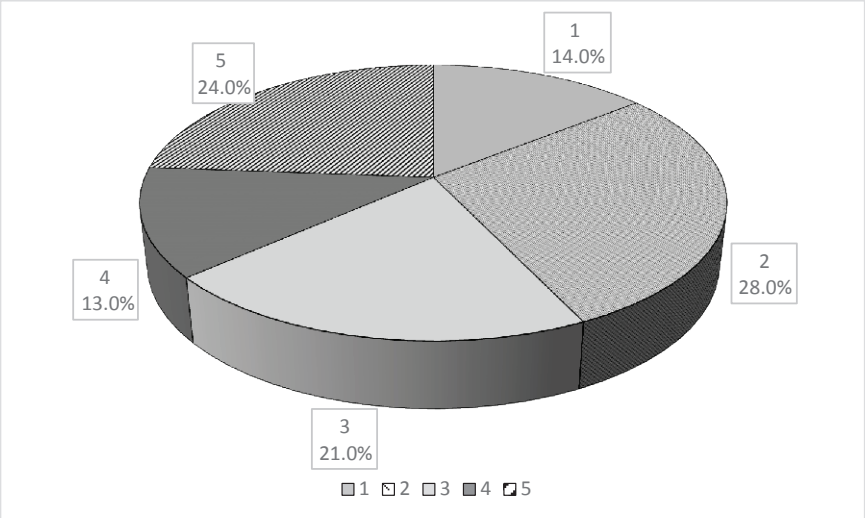


Fig. 1. Pie chart showing the distribution of individual endometrial EP by size in postmenopausal patients (n=63)



Notes: 1 – anterior uterine wall; 2 – posterior uterine wall; 3 – uterine fundus; 4 – tubal ostial (cornual) region; 5 – lateral uterine walls.

Fig.2. Pie chart showing the distribution of the localization of individual endometrial EP in postmenopausal patients (n=63)

In one out of four patients, EP were multiple. The size of EP at the time of removal ranged from 0.5 to 6 cm (13.4±4.4 mm) against the background of thin atrophic, and less frequently, thickened endometrium. The most common were EP ≤1 cm (46.0%) and ≤2 cm (33.0%).

According to histological examination, the majority of cases were verified as glandular-fibrous EP (59.8%), while glandular EP, including glandular-cystic EP, were found in 37.8% of women. Two (2.4%) adenomatous (atypical) EP were identified, one of which (1.2%) showed signs of malignancy against the background of uterine bleeding. The surrounding endometrium showed atrophic changes in 27 (32.9%) cases and cystic atrophy in 52 (63.4%) cases. In three cases, pathology of the surrounding endometrium was detected: simple endometrial hyperplasia without atypia and atypical endometrial hyperplasia (AEH).

Based on the above, the following conclusions can be drawn:

1. Postmenopausal EP have the following characteristics: they are predominantly asymptomatic (55 (67.1%) cases); associated with uterine bleeding in 26 (31.7%) cases; recurrent in 17.1% of cases; mostly solitary (76.8%) with multiple EP in 23.2% of cases; the average polyp size was 13.4±4.4 mm. The types of postmenopausal EP were glandular-fibrous (59.8%), glandular (37.8%), and adenomatous (2.4%).

2. In postmenopausal patients with asymptomatic EP or EP associated with postmenopausal bleeding, the disease occurred against a precancerous background (atypical hyperplasia)

Table 3

Data from hysteroscopy and histological examination of the endometrium in postmenopausal patients with endometrial EP (n=82); n (%)

Characteristic	Number of patients, n, (%)
Hysteroscopy results	
Single endometrial polyp	63 (76.8)
Multiple endometrial EP	19 (23.2)
Histological examination results	
Type of endometrial polyp:	
glandular	31 (37.8)
glandular-fibrous	49 (59.8)
adenomatous polyp	2 (2.4)
Endometrium:	
cystic atrophy	52 (63.4)
simple atrophy	27 (32.9)
endometrial hyperplasia	2 (2.4)
atypical hyperplasia	1 (1.3)

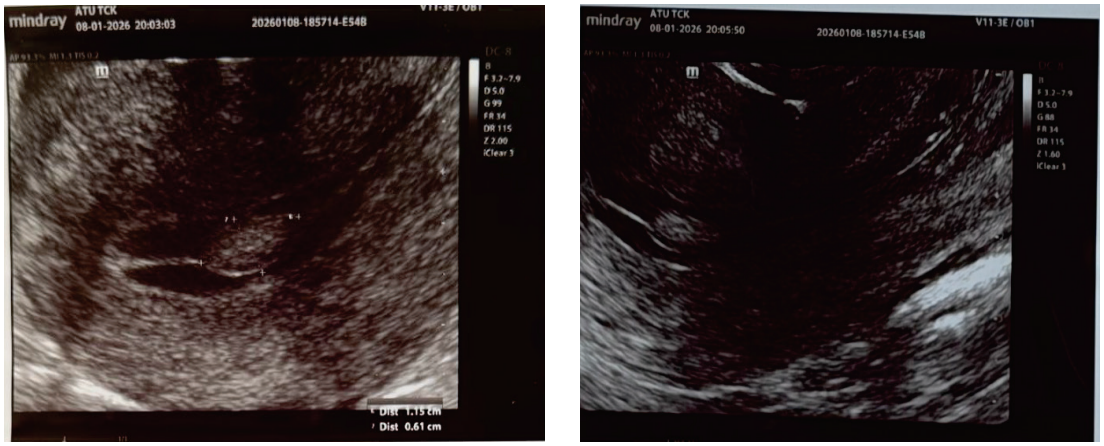


Fig. 3. Transvaginal ultrasound. Ultrasound image of an endometrial polyp measuring 11.5×6.1 mm, visualized in the middle third of the uterine cavity from the anterior wall

in 3.36% of observations. This underscores the need for histological verification when proliferative endometrial changes are detected in postmenopause by ultrasound, regardless of their size or the absence of clinical manifestations.

Transvaginal ultrasound is the primary non-invasive method for initial diagnosis of intrauterine pathology in postmenopausal patients. It allows detection of pathological formations, their size, location, and endometrial echostructure, which is important for selecting the method of further treatment. Figure 3 shows a typical ultrasound image of a solitary endometrial polyp detected in a patient, demonstrating a solid formation with clear contours and a homogeneous structure, consistent with a benign nature. This image illustrates the possibility of timely polyp detection and planning organ-preserving intrauterine intervention.

Transvaginal US showed an endometrium 10 mm thick with a three-layer structure corresponding to the proliferative phase. A EP measuring 11.5×6.1 mm was visualized in the middle third of the uterine cavity from the anterior wall.

Since all 114 patients in our study had EP, it was considered appropriate to evaluate the commonly used parameters for performing surgery in this patient group. All intraoperative characteristics were within acceptable ranges, and no complications occurred during the operations in any of the patients. Evaluating the duration of surgery for all methods used, we found that the time required for polypectomy ranged from 16 to 34 minutes and was significantly longer in patients who underwent total electrosurgical endometrial resection. The duration of polypectomy according to the surgical method used is presented in Table 4.

Patients were discharged on the 2nd day after surgery in satisfactory condition and were able to immediately resume their usual daily activities. For prophylactic purposes, all patients received outpatient antibacterial, anti-inflammatory, and desensitizing therapy during the first 5 days after the procedure.

After obtaining histological results, hormonal therapy with progestins (Norethisterone) in mandatory combination with acetylsalicylic acid was recommended for patients who underwent mechanical or electromechanical removal of EP with glandular histology, as well as for patients with endometrial hyperplasia without atypia. The therapy was administered continuously for 6 months to prevent the recurrence of intrauterine pathology.

Treatment effectiveness was assessed comprehensively using clinical, hysteroscopic, and ultrasound criteria. Clinical criteria included the ab-

Table 4

Duration of polypectomy depending on the surgical method used

Polyp size	Operation duration, min			
	mechanical removal	electromechanical removal	local resection	total resection
EP (2–10 mm)	17±2.2	–	16±2.1	28±2.8*
EP (10–20 mm)	18±2.4	15±2.0	17±2.2	30±2.8*
EP (20–65 mm	22±2.6	16±2.1	17±2.2	34±2.9*

Notes: * – statistically significant increase in the duration of total endometrial resection compared to local removal of the pathological focus ($p<0.05$).

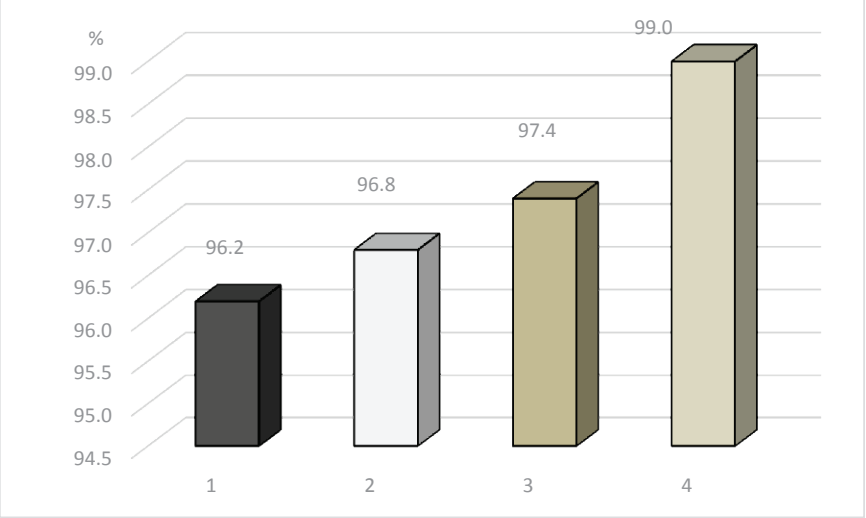


Fig.4. Effectiveness of the applied treatment methods for benign intrauterine pathologies in postmenopause: 1 – mechanical removal of the pathological focus; 2 – electromechanical removal of the pathological focus; 3 – local resection; 4 – total resection

sence of vaginal bleeding, while ultrasound criteria involved M-echo indicators showing no evidence of hyperplastic pathological processes. The effectiveness of all applied methods was high (Figure 4).

The effectiveness of mechanical removal of the pathological focus was 96.3%, electromechanical removal – 96.5%, local electrosurgical endometrial resection – 97.4%, and total electrosurgical endometrial resection – 99.0%.

Indications for the use of organ-preserving intrauterine surgical methods are determined by the nature of the intrauterine pathology. Electrosurgical and mechanical removal of intrauterine pathological formations under hysteroscopic control is indicated for benign uterine cavity diseases in postmenopausal patients. For large EPs, the method of choice is electromechanical morcellation. Organ-preserving intrauterine surgical methods are contraindicated in cases of endometrial hyperplasia (with or without atypia) as well as in endometrial adenocarcinoma.

The results of the present study confirm that EP in postmenopausal women are often asymptomatic, which complicates their timely detection without instrumental diagnostic methods. In our cohort, 67.1% of patients with EP did not report clinical complaints, which is consistent with data from other authors reporting a high prevalence of asymptomatic EP in postmenopausal women [10,12].

The frequency of abnormal uterine bleeding associated with EP was 31.7%, comparable to published data indicating that abnormal bleeding is one of the main clinical manifestations of EP in postmenopausal women [3,4].

Our study demonstrated a predominance of single EP (76.8%) over multiple EP (23.2%), which is also reflected in the literature: a large review reported a similar frequency of solitary lesions in older women [1,7]. The mean size of EP in our group was 13.4±4.4 mm, with a predominance of EP up to 2 cm, consistent with findings from previous studies [3,4].

Histological examination revealed a predominance of glandular-fibrous EP (59.8%) and glandular variants (37.8%), which is consistent with observations from other authors reporting that these morphological types constitute the majority of benign EP [7,8]. The proportion of adenomatous (atypical) EP (2.4%) and cases with signs of malignancy was low, yet comparable with literature data, where the frequency of precancerous and malignant changes in EP ranges from 1% to 4% [11]. This underscores the importance of mandatory histological verification of all removed EP, especially in patients with risk factors (age >60 years, postmenopausal bleeding, comorbidities).

Analysis of EP localization showed a predominance of the posterior uterine wall, which partially agrees with data from other studies reporting variability in EP localization, but with a tendency for more frequent placement on the posterior or lateral walls [9,12].

Evaluation of surgical treatment methods demonstrated that office hysteroscopy is a highly informative, minimally invasive, and safe tool, allowing not only the diagnosis but also effective treatment of intrauterine pathology. These findings are consistent with current guidelines recommending hysteroscopy as the gold standard for intrauterine lesions.

In contrast to conventional resection performed in inpatient settings, office hysteroscopy reduces procedure time, minimizes trauma, and lowers costs, as supported by studies from S.G. Vitale et al. [12] and S. Bensouda et al. [1].

Comparative analysis of operative time showed that local resection and mechanical removal of pathological foci required less time than total endometrial resection, which aligns with the described advantages of conservative techniques in endoscopic surgery [4,8]. Moreover, the complication rate in our cohort was extremely low, confirming the safety of modern hysteroscopic technologies.

Thus, our data confirm that the combination of TVUS and hysteroscopy with mandatory morphological verification provides high diagnostic accuracy and allows for the optimization of management strategies in postmenopausal patients with EP. The obtained results are consistent with current clinical guidelines and international research findings, highlighting the relevance and clinical significance of our study.

Conclusions

Endometrial EP in postmenopausal women are often asymptomatic, which emphasizes the need for early diagnosis using TVUS and hysteroscopy. Solitary EP of small to medium size predominate, most commonly located on the posterior and lateral walls of the uterus, with glandular-fibrous or glandular histology. Office hysteroscopy enables effective and minimally invasive removal of small EP, whereas larger EP require electromechanical resection in an inpatient setting. A comprehensive approach, including imaging and morphological verification, ensures optimization of patient management, reduces the risk of recurrence, and improves reproductive and gynecological health outcomes.

The author declares the absence of conflict of interests.

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