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Delayed Bleeding after Hysteroscopic Polypectomy: Frequency, Risk Factors, and the Cost of Silence

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Abstract

Delayed bleeding after hysteroscopic polypectomy is a recognized complication, but its frequency, risk factors, and impact on patient behavior in real-world clinical practice remain understudied. A multicenter retrospective cohort study was conducted using 480 medical records of women who underwent hysteroscopic polypectomy between 2021 and 2025 in three Russian cities (Makhachkala, Nalchik, and Volgograd). Only women with regular menstrual cycles were included to allow valid assessment of bleeding misinterpretation. Any postoperative vaginal bleeding was documented in 47 patients (9.8% of 480). Of these, 23 cases (4.8%) were normal spotting within the first 3–5 days, while delayed pathological bleeding (primary outcome) occurred in 24 patients (5.0%). Independent risk factors for pathological bleeding included polyp size greater than 2 cm (OR 4.2, 95% CI 1.8–9.8, p<0.01), hot snare polypectomy (OR 3.5, 95% CI 1.5–8.2, p<0.01), and anticoagulant use (OR 5.1, 95% CI 2.0–13.0, p<0.001). Among patients with pathological bleeding, 70.8% mistook the bleeding for early menstruation and delayed seeking care for a median of 3 days. Only 39.0% of all medical records contained documented evidence that the patient had been warned about the possibility of delayed bleeding. These findings suggest that the burden of delayed bleeding after polypectomy is not only clinical but also informational. Simple preoperative counseling with clear criteria for differentiating normal healing from pathological bleeding might prevent delayed presentations.

Keywords: Endometrial polyp, Hysteroscopic polypectomy, Delayed bleeding, Patient education, Postoperative complications, Tranexamic acid

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Introduction

Although most endometrial polyps are benign, their ability to cause abnormal bleeding makes them clinically significant (Berceanu *et al*., 2022). They consist of glands, fibrous stroma, and blood vessels and range from a few millimeters to several centimeters in size (Raz *et al*., 2021; Han & Munro, 2026). Polyps may be single or multiple and can be pedunculated or sessile (Raz *et al*., 2021).

The prevalence of endometrial polyps in the general female population ranges from 7.8% to 34.9% (Ren *et al*., 2022). Among all gynecological pathologies, hyperplastic endometrial processes are diagnosed in approximately 5% of patients (Luo *et al*., 2026). Polyps can occur at any age, but most cases are reported in women aged 40 to 60 years (Xie *et al*., 2025). After age 60, the frequency decreases, while in adolescents before menarche, polyps are extremely rare (Hall *et al*., 2024).

For a long time, endometrial polyps remained outside the scope of active medical intervention. The first successful polyp removal using a hysteroscope was performed by Panteleoni in 1869 in a

patient with postmenopausal bleeding (Moore & Carugno, 2025). He used a Desormeaux endoscope with his own modifications and cauterized the polyp with silver nitrate (Moore & Carugno, 2025). However, the widespread introduction of hysteroscopy into clinical practice began only in 1978, when J. Hamou invented the modern hysteroscope, laying the foundation for reducing the diameter of endoscopic instruments (Tarneja & Duggal, 2002).

Before that, the diagnosis and treatment of polyps were extremely limited. The main removal method was blind dilation and curettage (D&C) of the uterine cavity (Ludwin *et al*., 2020). Using a curette, the doctor scraped the endometrium without seeing what exactly was being removed. This method often missed polyps, especially small ones or those located in hard-to-reach areas — near the tubal ostia or on the posterior uterine wall (Vitale *et al*., 2021). Moreover, D&C did not always remove the base of the polyp, which led to rapid recurrence (Ergenoglu *et al*., 2020). Polyps existed and caused bleeding, but their true nature and prevalence remained unknown.

The situation changed with the development of ultrasound diagnostics. Transvaginal ultrasound made it possible to visualize polyps as hyperechoic structures inside the uterine cavity (Rasekh Jahromi *et al*., 2025). However, ultrasound did not always provide a definitive answer. The next step was hysteroscopy — a method in which a miniature video camera is inserted into the uterine cavity (Bougie *et al*., 2024). The physician sees the polyp with his or her own eyes, assesses its size, location, and the condition of its base, and can remove the polyp in a targeted manner under visual control (Bougie *et al*., 2024). Hysteroscopy turned polyp removal from a blind procedure into a precise, minimally invasive operation (Ning *et al*., 2023).

Several hysteroscopic techniques exist for polyp removal, including mechanical polypectomy (scissors or forceps), electrosurgical polypectomy (hot snare with electrocautery), and morcellation (Franchini *et al*., 2018; Baikpour & Hurd, 2019; Hiratsuka *et al*., 2024; Gong *et al*., 2025). Each method has advantages and specific risks, including thermal damage to surrounding tissues with electrocautery and potential for incomplete removal with morcellation (Franchini *et al*., 2018; Hiratsuka *et al*., 2024). Current clinical guidelines consider hysteroscopic polypectomy the gold standard of treatment (Tanos *et al*., 2017). Interest in plant-derived bioactive compounds with anti-inflammatory and tissue-healing properties has increased in many fields of medicine, and several natural products continue to be investigated for potential therapeutic applications (Hamad *et al*., 2018; Ahmed *et al*., 2020; Ahmed *et al*., 2023).

Despite its apparent simplicity and safety, polypectomy can be associated with complications (Martire *et al*., 2025). Among these, delayed uterine bleeding occupies a special place. According to the literature, the rate of intraoperative bleeding during polypectomy ranges from 3.9% to 4.6% (Clark & Stevenson, 2017). The rate of delayed bleeding, which occurs not during surgery but several days later, is lower — 1.1% to 1.4% (Clark & Stevenson, 2017). However, even these relatively small numbers become clinically significant considering how many women undergo polypectomy each year (Spadoto-Dias *et al*., 2016). Given the prevalence of polyps, the absolute number of patients with post-polypectomy bleeding may be substantial (Vahdat *et al*., 2022).

The problem is compounded by the fact that delayed bleeding often occurs not immediately but 5 to 14 days after surgery (Okoshi *et al*., 2023). By this time, the patient has already been discharged from the hospital or has left the outpatient department. She is at home and may not be able to properly assess her condition (Yao *et al*., 2024). The bleeding may be mistaken for an early onset of menstruation, especially since the first period after polypectomy is often heavier than usual (Yao *et al*., 2024). The patient may endure for several days, losing blood and not seeking help. As a result, anemia, weakness, and, in severe cases, hemorrhagic shock develop (Leal *et al*., 2024).

Thus, the problem of delayed bleeding after polypectomy has two dimensions. The first is clinical: frequency, risk factors, treatment methods, and differential diagnosis between a normal reaction and pathological bleeding (Nijkamp *et al*., 2019). The second is communicative: how well physicians inform patients about possible complications and when to seek help (Marnach & Laughlin-Tommaso, 2019). Data on how often patients receive adequate preoperative counseling are lacking (Achanna & Nanda, 2022). Data on how often women mistakenly take post-polypectomy bleeding for menstruation and delay seeking medical help are also absent (Achanna & Nanda, 2022).

This study aims to assess the frequency, structure, and risk factors of delayed uterine bleeding after hysteroscopic polypectomy. Special attention is paid to the differentiation between a normal physiological reaction to surgery and pathological bleeding requiring medical intervention. The management strategy, depending on the severity of bleeding, is also analyzed.

Materials and Methods

Study Design

A retrospective, multicenter cohort study was conducted. Patients were recruited from the gynecology departments of outpatient clinics and hospitals in the cities of Makhachkala, Nalchik, and Volgograd. The study was approved by the local ethics committees of all participating institutions. Due to the retrospective nature of the work and the use of anonymized data, informed consent from patients was not required ("Federal Law No. 323-FZ of 21 November 2011 "On the Fundamentals of Health Protection of Citizens in the Russian Federation"," 2011).

Medical records of patients who underwent hysteroscopic polypectomy between January 2021 and December 2025 were included in the analysis. The total sample size was 480 cases. Selection was performed using a consecutive sampling method: all operations during the specified period were analyzed, provided they met the inclusion criteria ("Federal Law No. 323-FZ of 21 November 2011 "On the Fundamentals of Health Protection of Citizens in the Russian Federation"," 2011).

Inclusion and Exclusion Criteria

Inclusion criteria were: patient age 18 years or older, hysteroscopic polypectomy regardless of the removal method, histological

confirmation of endometrial polyp, and the presence of complete data in the medical record regarding the postoperative course for at least 30 days (Céspedes Martínez *et al*., 2022). An additional inclusion criterion was the presence of a regular menstrual cycle before surgery. This condition was necessary for valid assessment of the main phenomenon under study — the patient's mistaken identification of delayed bleeding as early menstruation (Céspedes Martínez *et al*., 2022).

Exclusion criteria were: concomitant myomectomy or endometrial ablation, performance of other intrauterine procedures simultaneously with polypectomy, histologically confirmed malignancy (endometrial cancer or atypical hyperplasia), and a documented history of coagulopathies (hemophilia, von Willebrand disease, and others) (Męczekalski *et al*., 2024). In addition, records with incomplete data that did not allow unambiguous assessment of the presence or absence of postoperative bleeding were excluded. Women with amenorrhea or irregular cycles (including those in perimenopause) were also excluded from the analysis because they lacked a reference point for comparison with menstruation (Męczekalski *et al*., 2024).

Variables and Data Collection

Data were extracted from paper and electronic medical records. A standardized form was developed to unify data collection. The list of collected variables is presented in **Table 1** (Burns *et al*., 2020).

Table 1. List of variables collected from medical records

Category	Variables
Demographic data	Age at surgery, year of intervention
Clinical history	Anthropometric data, diabetes mellitus, use of anticoagulants or antiplatelet agents, history of previous polypectomies
Polyp characteristics	- Size (<1 cm / 1–2 cm / >2 cm); - Type (pedunculated/sessile); - Number (single/multiple)
Procedure parameters	- Removal method (cold snare / hot snare with electrocautery/morcellation); - Presence of intraoperative bleeding (according to procedure protocol)
Delayed bleeding	- Day of onset, character (spotting / bright red blood/clots); - Intensity (scant/moderate/heavy); - Actions taken (observation / outpatient visit / emergency call / hospitalization); - Prescribed treatment (observation / tranexamic acid / NSAIDs / hormones / reoperation)
Communication	Presence of a warning about the possibility of delayed bleeding in the discharge summary or preoperative discussion (yes/no / not documented)

Outcome Definitions

The following criteria were used to differentiate between normal and pathological bleeding. Normal was defined as serosanguinous or brownish spotting that occurred during the first 3–5 days after surgery, decreased in volume day by day, and was not accompanied by worsening of general well-being (Munro *et al*., 2018). Pathological bleeding was defined as the presence of bright red blood with clots larger than 1 cm, blood loss exceeding normal menstruation (more than two pads per hour or more than 80 milliliters per day), bleeding that occurred or suddenly worsened on days 5–14 after surgery, as well as any bleeding accompanied by weakness, dizziness, decreased blood pressure or a documented drop in hemoglobin of more than 10% from baseline (Munro *et al*., 2018). Bleeding that required medication or re-intervention was automatically classified as pathological (Munro *et al*., 2018). For this analysis, the term "delayed bleeding" refers exclusively to pathological bleeding; normal spotting within the first 3–5 days was not considered a delayed bleeding event.

Statistical Analysis

Statistical data processing was performed using IBM SPSS Statistics and Jamovi software (Hoyt *et al*., 2016). Categorical variables are presented as absolute frequencies and percentages. Continuous variables were tested for normal distribution using the Kolmogorov–Smirnov test. For normally distributed data, values are presented as mean and standard deviation; for non-normally distributed data, as median and interquartile range (Hoyt *et al*., 2016). To compare frequencies between groups, the chi-square test or Fisher's exact test (for small expected frequencies) was used. To compare continuous variables between two groups, Student's t-test (for normal distribution) or the Mann–Whitney U test (for non-normal distribution) was applied. To identify risk factors for pathological delayed bleeding, multivariate logistic regression analysis with stepwise variable inclusion was performed (Mishra *et al*., 2019). Variables with a significance level of $p < 0.2$ in univariate analysis were entered into the model. Results are presented as odds ratios (OR) with 95% confidence intervals. The critical significance level was set at 0.05 (Mishra *et al*., 2019).

Results and Discussion

Sample Characteristics

The study included 480 medical records of patients who underwent hysteroscopic polypectomy between 2021 and 2025. The records were provided by women's health clinics and gynecology departments of three cities: 172 records from Makhachkala, 224 records from Volgograd, and 84 records from Nalchik. All records met the inclusion criteria (including the presence of a regular menstrual cycle before surgery) and were fully analyzed.

The mean age of patients in the overall sample was 41.3 years, with an age range from 22 to 49 years (reproductive period). The mean number of pregnancies per woman was 2.1, and the mean number of deliveries was 1.6. Among women younger than 35 years, 15% had a history of three or more deliveries, which may be considered a risk factor for endometrial trauma. Comparison between centers showed comparable age and reproductive characteristics ($p > 0.05$

for all intergroup comparisons). Demographic data are detailed in **Table 2.**

Table 2. Demographic and clinical characteristics of patients (n=480)

Characteristic	Overall (n=480)	Makhachkala (n=172)	Volgograd (n=224)	Nalchik (n=84)
Mean age, years (M ± SD)	41.3 ± 9.5	41.8 ± 9.7	41.0 ± 9.3	41.2 ± 9.6
Mean number of pregnancies (M ± SD)	2.1 ± 1.2	2.0 ± 1.1	2.1 ± 1.2	2.2 ± 1.3
Mean number of deliveries (M ± SD)	1.6 ± 0.8	1.5 ± 0.7	1.6 ± 0.8	1.7 ± 0.9
Arterial hypertension, n (%)	119 (24.8%)	42 (24.4%)	56 (25.0%)	21 (25.0%)
Diabetes mellitus, n (%)	36 (7.5%)	13 (7.6%)	17 (7.6%)	6 (7.1%)
Anticoagulant use, n (%)	24 (5.0%)	9 (5.2%)	11 (4.9%)	4 (4.8%)
Body mass index, kg/m² (M ± SD)	27.5 ± 4.5	27.8 ± 4.7	27.3 ± 4.3	27.4 ± 4.6
Previous polypectomies, n (%)	61 (12.7%)	22 (12.8%)	28 (12.5%)	11 (13.1%)

Polyp and procedure characteristics. Among removed polyps, lesions sized 1 to 2 cm predominated (55.4%). The most common removal method was hot snare with electrocautery (54.6%). Intraoperative bleeding was recorded in 4.2% of cases (20 patients). Data are presented in **Table 3**.

Table 3. Polyp characteristics and surgical methods (n=480)

Characteristic	Category	n	%
Polyp size	<1 cm	119	24.8%
	1–2 cm	266	55.4%
	>2 cm	95	19.8%
Polyp type	Pedunculated	335	69.8%
	Sessile	145	30.2%
Number	Single	361	75.2%
	Multiple	119	24.8%
Removal method	Cold snare	169	35.2%
	Hot snare (electrocautery)	262	54.6%
	Morcellation	49	10.2%
Intraoperative bleeding	Recorded	20	4.2%

Frequency and Characteristics of Delayed Bleeding

Postoperative vaginal spotting within the first 3–5 days (defined as normal healing) was documented in 23 patients (4.8% of 480). Delayed pathological bleeding, meeting the predefined criteria for severity or timing (onset or sudden worsening on days 5–14), occurred in 24 patients (5.0%). Thus, the overall frequency of any postoperative bleeding episode was 9.8%, but only 5.0% of cases with pathological features were classified as delayed bleeding. The peak of pathological delayed bleeding was observed on days 5–14 after surgery. Detailed characteristics are presented in **Table 4**.

Table 4. Characteristics of postoperative bleeding episodes after polypectomy (n=47)

Characteristic	Category	n	% of all bleeding
Any postoperative bleeding episode	—	47	100%
Normal spotting (≤5 days)	Spotting for up to 5 days	23	48.9%
Delayed pathological bleeding (primary outcome)	Total	24	51.1%
	Of which 17 occurred on days 5–14	17	70.8%*
	Of which bright red blood with clots	19	79.2%*

Note: *Percentage of pathological bleeding cases (n=24)

Treatment of Pathological Bleeding

Among the 24 patients with pathological bleeding, 18 (75.0%) received outpatient treatment, while 6 (25.0%) required hospitalization. The structure of therapy and hospitalization outcomes is presented in **Figure 1**.

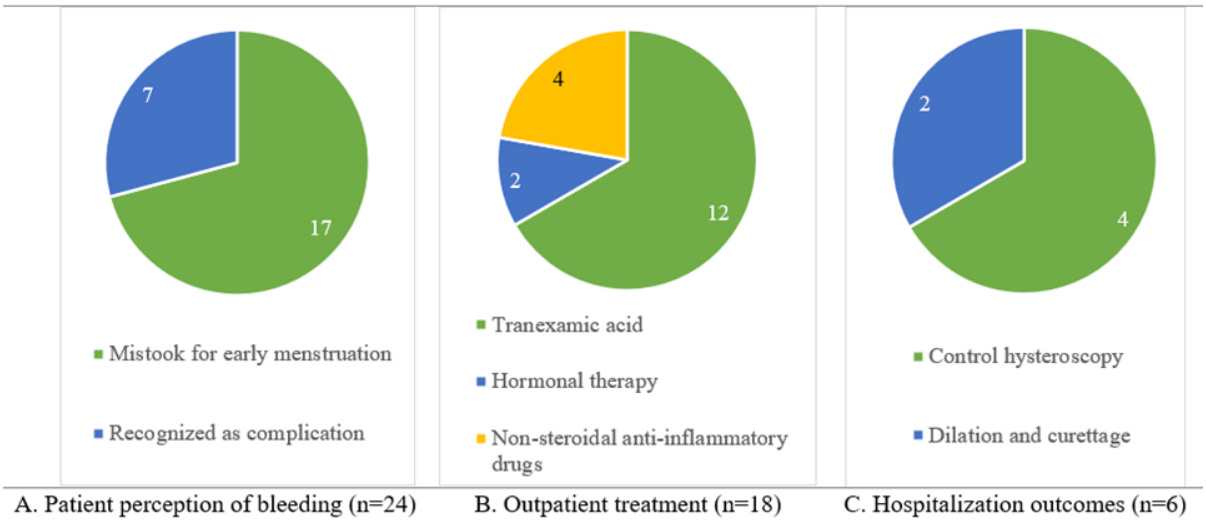

Figure 1. Management and perception of delayed bleeding after hysteroscopic polypectomy:

A. Patient perception of delayed bleeding among those who developed pathological bleeding (n=24). Seventeen patients (70.8%) mistook the bleeding for early menstruation, while only 7 patients (29.2%) recognized it as a complication.

B. Outpatient treatment among patients with pathological delayed bleeding who did not require hospitalization (n=18). Tranexamic acid was prescribed in 12 cases (66.7%), non-steroidal anti-inflammatory drugs (NSAIDs) in 4 cases (22.2%), and hormonal therapy in 2 cases (11.1%).

C. Hospitalization outcomes among patients with pathological delayed bleeding who required inpatient care (n=6). Control hysteroscopy was performed in 4 patients (66.7%), and dilation and curettage (D&C) in 2 patients (33.3%). No blood transfusions were required.

Risk Factors for Pathological Delayed Bleeding

Multivariate logistic regression analysis identified polyp size greater than 2 cm, hot snare polypectomy, and anticoagulant use as independent risk factors for pathological delayed bleeding. The results are presented in **Table 5**.

Table 5. Risk factors for pathological delayed bleeding (multivariate analysis)

Factor	Odds ratio (OR)	95% confidence interval	p
Polyp size >2 cm	4.2	1.8 – 9.8	<0.01
Hot snare polypectomy	3.5	1.5 – 8.2	<0.01
Anticoagulant use	5.1	2.0 – 13.0	<0.001

Communication: Patient Warning

Documentation of a warning to the patient about the possibility of delayed bleeding was found in 187 medical records (39.0%). In 293 records (61.0%), no such information was present. Among the 24 patients with pathological bleeding, a warning was documented in only 4 cases (16.7%). Among the 23 patients with normal spotting, 11 (47.8%) had received a warning. Of the 24 patients with pathological bleeding, 17 (70.8%) initially mistook the bleeding for early menstruation and delayed seeking medical help for an average of 3.2 days (median 3 days, range 1–7 days).

Any vaginal bleeding following polypectomy was recorded in 9.8% of patients, but only 5.0% met the predefined criteria for delayed pathological bleeding. This rate of 5.0% is higher than the 1.1–2.5% reported in major meta-analyses for delayed bleeding (Clark & Stevenson, 2017). This discrepancy may be explained by differences in study design. Most Western studies include patients from high-resource clinics with clear postoperative management protocols and active telemonitoring (Hashemi *et al*., 2024). In contrast, our study reflects real-world clinical practice in three Russian regions, where patients often remain without systematic follow-up after discharge.

Age, Parity, and Risk of Polyps

The age composition of our sample (mean age 41.3 years) is consistent with data on the peak incidence of endometrial polyps in the late reproductive and early perimenopausal periods (Xie *et al*., 2025). However, during detailed analysis, we found an interesting pattern requiring further study. In women with high parity (three or more deliveries), polyps were diagnosed at a younger age compared to women who had one or two children or were nulliparous (Okamura *et al*., 2021). The mean age of patients with three or more deliveries was 36.2 years, whereas in the group with one or two deliveries, it was 43.1 years, and among nulliparous women, it was 45.4 years.

We hypothesize that this is related to the cumulative effect of endometrial trauma. Each pregnancy (especially if it ended in delivery, curettage, or complications) triggers an intensive process

of regeneration of the uterine mucosa (Zhao *et al*., 2026). Repeated cycles of "trauma-regeneration" may contribute to the formation of local hyperplastic foci, including polyps (Nikitina *et al*., 2021). Thus, high reproductive load acts as a risk factor that shifts the age incidence curve to the left. This hypothesis is consistent with studies on the association between the number of pregnancies and the risk of hyperplastic endometrial processes, although most work focuses on the link with endometrial cancer rather than benign polyps (Kanthi *et al*., 2016).

Risk Factors for Delayed Bleeding

Our data confirm that polyp size greater than 2 cm, hot snare polypectomy (electrocautery), and anticoagulant use are independent risk factors for pathological delayed bleeding (Zhao *et al*., 2023). Large polyps have a more developed vascular network in the stalk or base (Biela *et al*., 2022). Electrocautery creates a zone of thermal damage, tissue necrosis, and subsequent eschar detachment, which occurs exactly on days 5–14 (Bhagat *et al*., 2022). This explains our peak of pathological bleeding during this period (70.8% of all pathological cases). Interestingly, multiple polyps did not show a significant association with bleeding risk after adjustment for other factors. Probably, the decisive factor is not the number of polyps, but the total area of the base requiring coagulation.

Communication Failure Is a Key Problem

The most alarming result of our study is not the clinical numbers, but the data on communication (Lebduska *et al*., 2023). Only 39.0% of records contained a documented warning to the patient about the possibility of delayed bleeding. Among those who developed pathological bleeding, only 16.7% had received a warning. Moreover, 70.8% of these women mistook the bleeding for early menstruation and delayed seeking help by an average of 3.2 days (Jain *et al*., 2023).

This pattern — no documented warning, followed by patient misinterpretation and delayed care — repeated across all three centers and affected patients regardless of age or parity. Studies show that even when physicians formally warn patients, they rarely use specific wording ("bright red blood", "clots", "shaking", "weakness") (Middelkoop *et al*., 2023). The most common warning — "spotting may occur" — does not help the patient distinguish normal from threatening symptoms. Our results argue that standard discharge instructions are insufficient. Patients require a concrete, color-coded algorithm with visual and quantitative criteria for alarm (Habiba *et al*., 2024).

Limitations of the Study

Our study has several limitations. The retrospective design means that we relied on the quality of records in medical charts. The absence of documented warning does not necessarily mean that no warning was given (Samuelson Bannow, 2024). However, from a practical point of view, if the warning is not documented, it does not protect either the patient or the physician in the event of a complication (Chaudhry *et al*., 2023; Lee *et al*., 2023; Ncube *et al*., 2023; Savva *et al*., 2023; Szklener *et al*., 2023; Thazha *et al*., 2023; Tsvetkova *et al*., 2023; Vogel *et al*., 2023; Weerasinghe *et al*., 2023; Bandi *et al*., 2024; Wolderslund *et al*., 2024).

The second limitation is the lack of routine postoperative ultrasound control. We cannot be certain that all pathological bleeding was associated with eschar detachment rather than polyp remnants (Vygivska *et al*., 2024). The third limitation is the relatively small sample of patients with pathological bleeding (n=24), which reduces statistical power for some secondary hypotheses (Casini *et al*., 2024).

The fourth limitation relates to the inclusion criteria. We deliberately excluded women with irregular menstrual cycles and amenorrhea to study the phenomenon of mistaken identification of bleeding as menstruation (Brookhart & Naroji, 2025). This means that our results cannot be directly extrapolated to perimenopausal and postmenopausal patients, in whom any bleeding from the genital tract should be considered a potentially dangerous symptom requiring immediate attention (Selander-Han *et al*., 2024).

Practical Recommendations

Based on our data, we propose a practical algorithm that can be used by physicians at patient discharge and by the patient herself to assess her condition **(Figure 2)** (Tsolova *et al*., 2022). In the Russian healthcare system, where the ability to quickly contact the attending physician is limited, the algorithm should offer clear, measurable criteria for decision-making: whether to call an emergency ambulance or to visit a clinic on a routine basis.

The key difference of the proposed algorithm is the rejection of general phrases in favor of specific threshold values. Normal is scanty, spotting discharge that decreases day by day. A reason for an unscheduled visit to a gynecologist is bright red blood with clots or bleeding that occurs on days 5–14 after surgery. An indication for calling an emergency ambulance is massive bleeding (more than two pads per hour) accompanied by weakness, dizziness, hypotension, or syncope. The algorithm also formalizes medical tactics: for alarming symptoms without hemodynamic compromise, tranexamic acid is prescribed on an outpatient basis; if ineffective or with severe bleeding, hospitalization for control hysteroscopy is indicated.

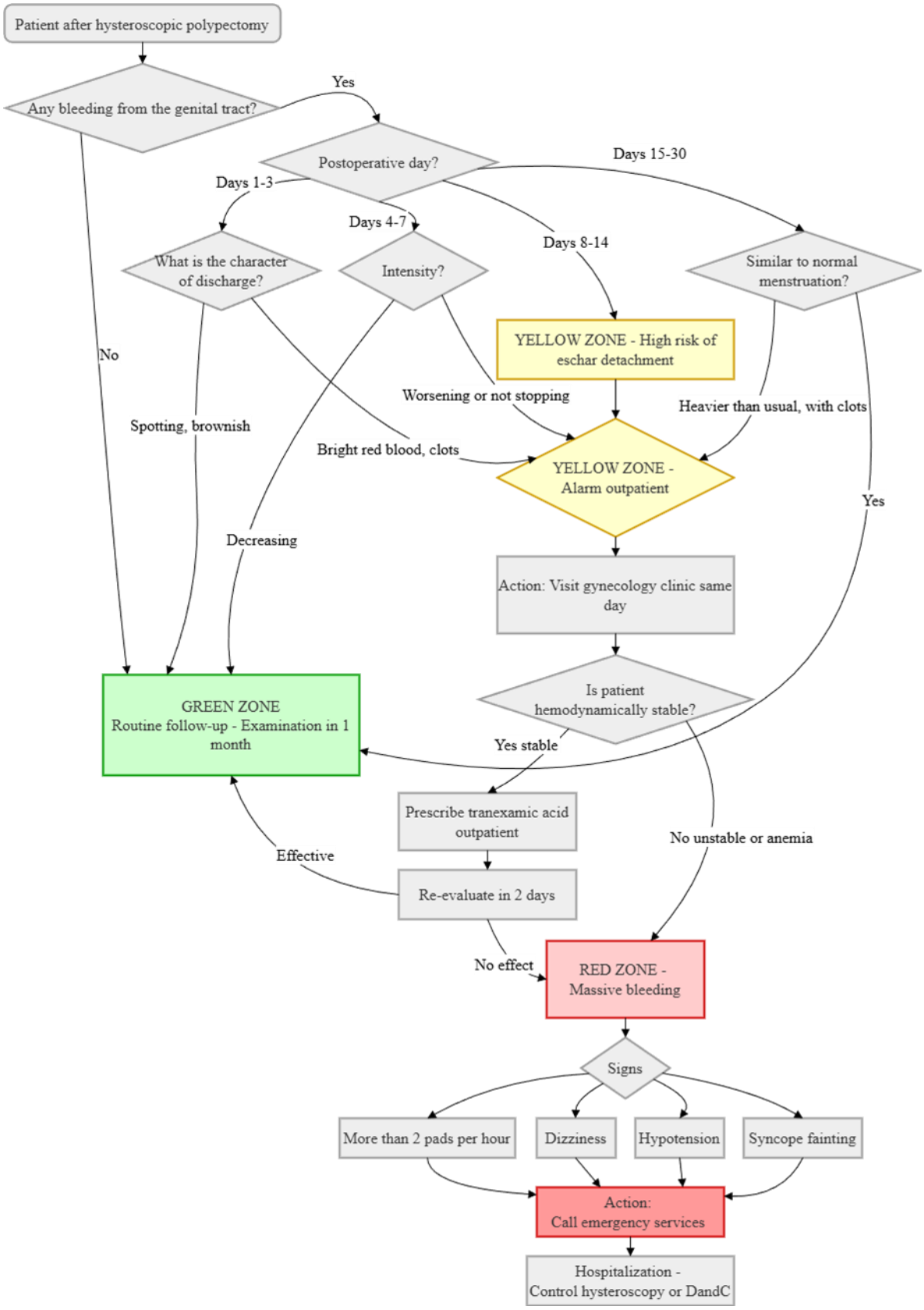

Figure 2. Clinical algorithm for patient management after hysteroscopic polypectomy**.**

The algorithm uses a color-coded triage system (Green/Yellow/Red) to guide decision-making for both patients and physicians. The Green zone indicates a normal postoperative course (spotting, decreasing intensity) requiring routine follow-up in one month. The Yellow zone defines alarming symptoms (bright red blood, clots, onset on days 5–14 after surgery) that warrant a same-day outpatient visit and consideration of tranexamic acid. The Red zone describes massive bleeding (more than two pads per hour) with hemodynamic compromise (dizziness, hypotension, syncope) requiring emergency medical services and hospitalization for control hysteroscopy or dilation and curettage (D&C).

Conclusion

Postoperative vaginal bleeding was documented in 9.8% of the 480 patients, of whom 5.0% developed delayed pathological bleeding that required medical intervention. Independent risk factors included polyp size >2 cm, hot snare polypectomy, and anticoagulant use, and the peak of bleeding occurred on days 5–14, consistent with eschar detachment after thermal injury. An important result of the study was the discovery of an association between high parity (three or more deliveries) and a younger age of patients with endometrial polyps. Women with three or more deliveries developed polyps on average 7–9 years earlier than nulliparous women or those with one or two children (Al Abadie *et al*., 2023; Guzek *et al*., 2023). This suggests that repeated cycles of endometrial "trauma-regeneration" associated with pregnancies and deliveries accelerate the development of hyperplastic processes (Constantin *et al*., 2022; Mojsak *et al*., 2022; Genc *et al*., 2023; Ku *et al*., 2023; Oran & Azer, 2023; Simonyan *et al*., 2023; Tam *et al*., 2023; Tsiganock *et al*., 2023; Delcea *et al*., 2024; Essah *et al*., 2024; Frost *et al*., 2024; Kajanova & Badrov, 2024; Lee & Ferreira, 2024; Ribeiro *et al*., 2024; Rosellini *et al*., 2024; Sanlier & Yasan, 2024; Umarova *et al*., 2024; Uneno *et al*., 2024).

The key problem identified in the study was a communication gap between physicians and patients. Only 39.0% of medical records contained a documented warning about the possibility of delayed bleeding. Among patients who developed pathological bleeding, 70.8% mistook it for early menstruation and delayed seeking help by an average of 3.2 days. This led to the development of anemia and, in some cases, the need for hospitalization.

Based on the obtained data, a practical algorithm was proposed that divides postoperative bleeding into three zones: green (normal, routine follow-up), yellow (alarm, same-day clinic visit, prescription of tranexamic acid), and red (massive bleeding, emergency ambulance call, hospitalization). The algorithm is adapted to the conditions of the Russian healthcare system, where there is no practice of telephone access to the attending physician.

Limitations of the study include the retrospective design, the lack of routine postoperative ultrasound control, and the exclusion of women with irregular menstrual cycles and amenorrhea from the analysis, which does not allow extrapolation of the results to the peri- and postmenopausal population.

Future prospective studies should focus on evaluating the effectiveness of the proposed algorithm in real clinical practice, as well as on developing standardized forms of informed consent and discharge recommendations that include clear criteria for patients to independently assess their condition.

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Conflict of interest: None

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Ethics statement: This study was conducted in accordance with the ethical standards of the institutional research committees of their universities and with the principles of the Declaration of Helsinki (2013 revision). Due to the retrospective nature of the study and the use of anonymized data, informed consent from patients was waived by the ethics committees. Patient confidentiality was maintained throughout the study by anonymizing all clinical data, with removal of all personal identifiers before analysis and publication.

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