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Analysis of hysteroscopic findings in patients with abnormal uterine bleeding undergoing diagnostic hysteroscopy at a university hospital: a cross-sectional study

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HIGHLIGHTS

What is already known?

- Abnormal uterine bleeding (AUB) has an estimated prevalence of 80%.
- The most common structural causes are polyps, leiomyomas, and malignant lesions.
- Hysteroscopy is the gold standard for the diagnosis and treatment of these pathologies.

What has been shown?

- 60% of the patients were of reproductive age, and 40% were postmenopausal.
- The main finding in the examinations was endometrial polyp, which was statistically significant.
- 68% of the patients reported that bleeding impacts their quality of life.

How can the study contribute to the literature?

- Reinforces the prevalence of uterine pathologies in patients with AUB.
- Assesses the difference in the prevalence of findings across reproductive phases.
- Highlights the impact of AUB on patients' quality of life.

ABSTRACT

Introduction: Abnormal uterine bleeding (AUB) is a frequent complaint in gynecological practice, with a significant negative impact on quality of life. Structural alterations are among its main causes, and hysteroscopy is considered the gold standard procedure for endometrial evaluation. **Objective:** To analyze hysteroscopic findings in patients with AUB undergoing diagnostic hysteroscopy at a university hospital. **Methods:** Cross-sectional observational study based on the medical record review of 125 patients who underwent diagnostic hysteroscopy at a university hospital between 2023 and 2024. **Results:** The sample consisted of 125 patients with a median age of 48 years, of whom 60% were premenopausal. The most prevalent bleeding pattern was menorrhagia (50%). Endometrial polyps were the most frequent hysteroscopic finding, present in 59% of patients and significantly associated with AUB ($p = 0.023$). Submucosal fibroids (19%), endometrial thickening (10%), and endometritis (8.8%) were also observed, the latter showing a significant association with AUB ($p = 0.001$). Lesions suggestive of malignancy were identified exclusively in postmenopausal women (8.2%). **Conclusion:** The study showed a predominance of structural causes of AUB, with endometrial polyps being the primary associated finding, which reinforces the importance of hysteroscopy in diagnosing this condition.

Keywords: Hysteroscopy; Uterine Hemorrhage; Endometrium; Polyps; Postmenopause.

Abbreviations: AUB – Abnormal Uterine Bleeding; ICF – Informed Consent Form; REC – Research Ethics Committee

INTRODUCTION

Abnormal uterine bleeding (AUB) is one of the most prevalent complaints in gynecological practice, affecting women at different stages of the reproductive period. This disorder, characterized by alterations in the amount, duration, or frequency of menstrual flow, has a significant impact on patients' quality of life, affecting physical, sexual, professional, and emotional aspects.¹⁻⁴ It is estimated that approximately 40% of women worldwide report complaints related to AUB, making it responsible for a substantial proportion of gynecological consultations, particularly among women in the perimenopausal and postmenopausal periods.^{5,6}

The etiology of AUB is diverse and may vary according to the reproductive stage. These causes have been systematized by the International Federation of Gynecology and Obstetrics (FIGO) in the PALM-COEIN classification system, which includes structural factors — endometrial polyps, adenomyosis, leiomyomas, and malignancy/hyperplasia (PALM) — and non-structural factors, such as coagulopathies, ovulatory dysfunction, endometrial disorders, iatrogenic causes, and not otherwise classified (COEIN).^{2,5} Among the diagnostic methods available, hysteroscopy stands out as the gold standard for endometrial evaluation, as it provides direct visualization of the uterine cavity and allows not only precise diagnosis but also targeted biopsy and, in some cases, lesion resection, thereby serving as a therapeutic method as well.^{7,8}

Outpatient hysteroscopy, being minimally invasive and not requiring anesthesia, offers advantages such as shorter recovery time, improved productivity, and reduced hospital costs.^{9,10,11} Despite its importance and growing use, further updated studies are needed to describe hysteroscopic findings in patients with AUB, thereby contributing to the understanding of the most frequent structural etiologies in different repro-

ductive stages. Therefore, this cross-sectional study aimed to analyze hysteroscopic findings in women with AUB treated at a university hospital, with emphasis on the prevalence of endometrial polyps and the comparison between premenopausal and postmenopausal patients. Additionally, we sought to describe the main bleeding patterns reported by the patients.

METHOD

Study design

This was a cross-sectional observational study based on the analysis of medical records of patients from the Brazilian public health system (SUS) presenting with abnormal uterine bleeding (AUB) who underwent diagnostic hysteroscopy at a University Hospital. The study was conducted over six non-consecutive months, between April 2023 and June 2024.

Before data collection, the study was approved by the Research Ethics Committee (CEP) under CAAE nº 72839123.1.0000.5134. Ethical principles were followed in accordance with Resolution 466/12 of the Brazilian National Health Council.

Sample size calculation

Participants were medical students over 18 years of age from a private institution in Belo Horizonte who signed written informed consent. A convenience sampling strategy was adopted, and students who did not fully complete the questionnaire were excluded. Sample size calculation was performed using a one-way ANOVA model, with an effect size of 0.15, a significance level of 0.05, a test power of 0.80, and three group levels, using G*Power software, version 3.1.9.7. The result was a total sample size of 432 participants. Based on the proportional distribution of students across the medical program, the estimated sample was redistributed as follows: 150 (35%) in the preclinical stage, 143 (33%) in the clinical stage, and 139 (32%) in the internship. Since this was a pilot study, data

collection was discontinued once more than 30% of the intended sample size had been reached in each phase of medical training.

PARTICIPANTS

Patients who underwent hysteroscopy with a complaint of AUB at the time of screening and who agreed to participate by signing the informed consent form were included. Exclusion criteria were: inability to complete the procedure due to severe pain, cervical stenosis, active heavy menstrual bleeding, or bleeding directly related to the menstrual period.

To minimize potential selection bias, well-defined inclusion and exclusion criteria were established and applied consistently during screening. This ensured that only women with a complaint of interest and who were eligible for the procedure were included, improving homogeneity of the study population.

Instruments and procedures

Data collection was performed using a pre-exam clinical form, completed during screening, and a specific chart for recording hysteroscopic findings, filled immediately after the procedure by the attending physicians.

The form included relevant variables such as age, reproductive stage (premenopause or postmenopause), parity, delivery history, comorbidities, previous uterine surgeries, and AUB characteristics (type, frequency, duration, number of pads per day, presence of clots, quality of life impact, and reports of staining clothes or bed linen). After the procedure, hysteroscopic findings were documented, including polyps, submucosal and intramural fibroids, endometrial thickening, endometritis, adenomyosis, synechiae, cervical stenosis, suspicious malignant lesions, and uterine cavity size. Subsequent management was also recorded, including referral for operative hysteroscopy, directed biopsy, outpatient follow-up, or scheduling of a second-look hysteroscopy.

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Statistical analysis

After collection via Google Forms, the data were anonymized, logged into "Microsoft Excel" spreadsheets, and analyzed using R software, version 3.2.1. Qualitative variables were presented as absolute and relative frequencies, while quantitative variables were summarized by median and interquartile range. Normality was tested for quantitative variables. Variables with normal distribution were analyzed using Student's *t* test, while those without normal distribution were analyzed using the Mann-Whitney test. Associations between qualitative variables were assessed using the chi-square test or Fisher's exact test. The significance level was set at 5%.

RESULTS

During the study period, 258 patients were evaluated. Of these, 125 met the inclusion criteria and comprised the final sample.

The sociodemographic and clinical characteristics of the included patients are shown in Table 1. Ages ranged from 18 to 82 years, with a median of 48 years. Most patients were premenopausal (60%), while 40% were postmenopausal. Regarding reproductive history, 89% had at least one previous pregnancy, 24% had a history of miscarriage, and 63% reported vaginal delivery.

Associated complaints with abnormal uterine bleeding included pelvic pain (43%), abnormal vaginal discharge (3.2%), and infertility (0.8%). The most frequent bleeding patterns were menorrhagia (50%) and postmenopausal bleeding (36%). Other patterns included intermenstrual bleeding (22%), spotting (9.6%), and postcoital bleeding (8%). Additional bleeding-related characteristics, such as frequency, duration, number of pads used, presence of clots, and impact on quality of life, are detailed in Table 1.

Table 1. Sociodemographic, obstetric, clinical characteristics and hysteroscopic findings of the patients included in the study

Characteristics	N = 1251
Age	48 (41, 58)
Age range	
From 18 - 37	20 (16%)
From 38 - 47	40 (32%)
From 48 - 57	32 (26%)
From 58 - 67	22 (18%)
Greater than 67	11 (8.8%)
Reproductive phase	
Reproductive age	75 (60%)
Postmenopause	49 (40%)
Obstetric History	

Previous pregnancy	109 (89%)
Abortion	31 (25%)
Vaginal delivery	77 (63%)
Cesarean delivery	46 (37%)
Associated complaints	
Pelvic pain	54 (43%)
Abnormal Running	4 (3,2%)
Infertility	1 (0,8%)
Bleeding pattern	
Menorrhagia	62 (50%)
Intermenstrual	27 (22%)
Postcoitus	10 (8. 0%)
Spotting	12 (9. 6%)
Postmenopause	45 (36%)
Frequency of bleeding	
Frequent < 24 days	58 (47%)
Normal 24 a 38 dias	23 (19%)
Infrequent > 38 days	34 (27%)
Duration of bleeding (By Track)	
1-8 days	58 (47%)
9-15 days	19 (15%)
Continuous	30 (24%)
Pad/day	
0-4	37 (30%)
5-8	45 (37%)
>8	14 (11%)
Diaper	7 (5. 7%)
Additional features	
Presence of clots	88 (72%)
Dirty clothes or bedding?	69 (56%)
Bleeding impacts quality of life	84 (68%)
HYSTEROSCOPIC FINDINGS	
Polyp	74 (59%)
Submucosal fibroid	24 (19%)
Endometrial thickening	13 (10%)
Endometritis	11 (8. 8%)
Adenomyosis	5 (4%)
Intramural fibroid	4 (3,2%)

Lesion suggestive of malignancy	4 (3. 2%)
Synechiae	4 (3. 2%)
Uterine Cervical Stenosis	13 (10%)
Cavity without alterations	13 (10%)
Size of the uterine cavity	
Increased	15 (12%)
Decreased	10 (8. 0%)
Not informed	13 (10%)
Normal	87 (70%)

1Medium (Q1, Q3);n (%)

The most prevalent hysteroscopic findings were endometrial polyps (59%), submucosal fibroids (19%), endometrial thickening (10%), and endometritis (8.8%). Polyps were significantly associated with AUB ($p = 0.023$), as was endometritis, which was identified only among patients with AUB ($p = 0.001$). Adenomyosis was present in 4% of patients, while intramural fibroids and suspicious malignant lesions were observed in 3.2% each. Notably, all patients with suspicious malignant lesions presented with AUB. Cervical stenosis was found in 10% of women and was significantly more frequent in patients without AUB (34%) compared with those with AUB (14%).

Regarding the uterine cavity aspect, 10% of patients showed no alterations, reinforcing the relevance of structural etiologies in this complaint. Regarding uterine cavity size, 70% were normal, 12% enlarged, and 8% reduced. In 10% of cases, the cavity size was not reported.

Among the 20 patients who either did not undergo or had their hysteroscopy interrupted, the main reasons were cervical stenosis (37%), active bleeding (21%),

and discomfort during the procedure (21%). These patients were excluded from the final analysis, and the reasons for exclusion were documented for transparency.

Subsequent management included referral for operative hysteroscopy (37%), biopsy (26%), outpatient follow-up (10%), and second-look hysteroscopy (2.8%).

In subgroup analysis, hysteroscopic findings were compared between premenopausal and postmenopausal women (Table 2). In both groups, endometrial polyps were the most frequent finding (59%). In premenopausal women, submucosal fibroids were more prevalent (25%), whereas in postmenopausal women, endometrial thickening (12%) and suspicious malignant lesions (8.2%) were more common.

Table 2. Hysteroscopic findings in patients with abnormal uterine bleeding according to the reproductive phase

Hysteroscopy findings	Reproductive age (n=75)	Postmenopause (n=49)
Polyp	44 (59%)	29 (59%)
Submucosal fibroid	19 (25%)	5 (10%)
Intramural fibroid	2 (2,7%)	1 (2%)
Endometrial thickening	7 (9,3%)	6 (12%)
Endometritis	6 (8%)	5 (10%)
Adenomyosis	3 (4%)	2 (4,1%)
Lesion suggestive of malignancy	0 (0%)	4 (8. 2%)
Synechiae	0 (0%)	4 (8. 2%)
Cervical stenosis	4 (5,3%)	9 (18%)
Cavity without alterations	9 (12%)	4 (8,2%)

1n (%)

DISCUSSION

In this study, endometrial polyps were the most prevalent hysteroscopic finding (59%) and were significantly associated with abnormal uterine bleeding (AUB) ($p=0.023$). Endometritis, although less frequent (8.8%), was also associated with AUB ($p=0.001$), underscoring its clinical relevance given that this association remains underexplored in the literature. Other noteworthy findings included submucosal fibroids (19%), endometrial thickening (10%), and suspicious malignant lesions restricted to postmenopausal patients (8.2%). Regarding bleeding patterns, menorrhagia was most frequent (50%), followed by postmenopausal bleeding (36%); moreover, 68% of women reported a negative impact on quality of life. Collectively, these results reinforce the predominance of structural causes in AUB and highlight the clinical value of hysteroscopic evaluation, adding contemporary data from a Brazilian cohort to the evidence base.

Endometrial polyps are often asymptomatic; when symptoms occur, AUB is the most common presentation—reported in approximately 68% of cases.¹² Hysteroscopy is a safe and effective diagnostic and therapeutic approach for polyps, enabling targeted biopsy and, when indicated, removal in the same setting with a low complication rate.¹ In a meta-analysis assessing diagnostic accuracy of hysteroscopy for intrauterine pathology in AUB, sensitivity and specificity for endometrial polyps reached 95.4% (95% CI 87.4–98.4) and 96.4% (95% CI 93.7–98.0), respectively.¹³

The predominance of polyps in our sample (59%) aligns with national and international reports identifying this lesion as the leading structural cause associated with AUB. In a retrospective study conducted at the same university hospital, Machado et al.¹⁴ found polyps in 50% of women undergoing hysteroscopy—values close to ours. Similarly, in a Brazilian series from a Northeastern hospital, Costa et al.¹⁵ reported polyps in 47% of procedures, supporting the high prevalence of this lesion across different settings.

Internationally, similar data have been reported. Malik and Zeb¹⁶, in a 2022 study composed of 249 women undergoing diagnostic hysteroscopy in Pakistan, found polyps in 30% of patients with irregular uterine bleeding or endometrial thickening. Herkiloğlu et al.¹⁷ confirmed, through hysteroscopy, the presence of polyps in 76% of patients with ultrasound suspicion, a rate that was higher especially in women over 35 years old with AUB. Reinforcing the clinical relevance of endometrial polyps, Salim et al.¹ highlighted this lesion as the main structural cause of AUB in different age groups, while Nijkang et al.¹⁸ observed prevalences between 20% and 60%, depending on the profile of the studied population — values consistent with the 59% found in the present study.

In addition to endometrial polyps, other relevant hysteroscopic findings were observed in this study, such as submucosal myoma (19%) and endometrial thickening (10%). In the retrospective study by Machado et al.¹⁴, submucosal myoma was identified in 19% of the examinations and endometrial thickening in 12%, values similar to those observed in the present work. On the other hand, in the study by Silva et al.¹⁹, conducted in Porto Alegre in 2021 with approximately 1,952 women undergoing hysteroscopy, submucosal myoma was identified in 6.5% of patients and endometrial thickening in 7.8%.

Endometritis was identified in 8.8% of the patients in this study, being significantly more prevalent among patients with AUB ($p=0.001$). Despite its clinical relevance, few prevalence studies of hysteroscopic findings in large samples specifically describe endometritis as a diagnosis, limiting the possibilities for direct comparison. Both national and international studies have focused mainly on polyps, myomas, and endometrial thickening. In this context, the present study contributes by highlighting endometritis as a possible etiology of AUB, suggesting that this inflammatory condition may be underestimated in previous analyses and reinforcing the importance of future investigations correlating it with histopathological findings and broader clinical implications.

Lesions suggestive of malignancy were identified in 3.2% of the patients in this study, all in postmenopausal women, which represents 8.2% of the patients in this subgroup. This finding reinforces the importance of considering the reproductive cycle phase in the diagnostic approach, since, although they share some etiologies with women of reproductive age, postmenopausal patients have a higher risk of malignant or premalignant changes.^{9,4,10,13} In the study by Machado et al.¹⁴, conducted in the same university hospital, a higher prevalence (15%) of lesions suggestive of malignancy was observed, a difference possibly related to the larger number of patients evaluated and the broader data collection period. In a Brazilian cohort of 4,054 women with AUB undergoing hysteroscopy with biopsy, Lasmar et al.¹⁰ identified endometrial cancer in 2.6% of cases. Similarly, in the study by Patrizi et al.²¹, in a sample of 1,020 women undergoing operative hysteroscopy for suspected endometrial pathology, a rate of 3.33% of malignant or premalignant lesions was reported.

The role of hysteroscopy in the investigation of these lesions has been widely documented. A meta-analysis published in 2014, involving 17 studies and 9,460 women with AUB in different phases of the reproductive cycle, evaluated the accuracy of hysteroscopy in diagnosing endometrial cancer, hyperplasia, polyps, and submucosal myomas. The sensitivity of hysteroscopy for endometrial cancer was 82.6% (95% CI: 66.9–91.7%) and specificity was 99.7% (95% CI: 98.1–99.9%), evidencing its high effectiveness, especially for diagnostic exclusion.¹³ These data highlight hysteroscopy as a fundamental tool in the evaluation of patients with AUB in postmenopause.

In the present study, the most prevalent alterations in bleeding patterns were menorrhagia (50%), followed by postmenopausal bleeding (36%) and intermenstrual bleeding (22%). Maia et al.⁶, in a study conducted in the Amazon region, identified menorrhagia in 50% of patients with AUB, in addition to 66.7% reporting the elimination of large clots, a figure close to that observed in our sample (72%). Furthermore, Schoep et al.²², in an American cohort of 42,879 women, described menorrhagia as the most common complaint, present in 53.7% of participants. According to Wouk and Helton²³, menorrhagia represents the most common clinical complaint in reproductive-age women with AUB, reinforcing its relevance as a predominant clinical manifestation.

Postmenopausal bleeding, which accounted for more than one-third of the patients evaluated, also deserves attention for representing an important warning sign of malignant or premalignant endometrial neoplasms. This finding was comparable to that reported in a retrospective epidemiological study conducted in Greece, which identified a prevalence of 38% of AUB in postmenopausal women undergoing hysteroscopy.²⁴

These results reinforce the heterogeneity of AUB, which may vary in clinical presentation according to the

phase of the reproductive cycle. The detailed characterization of bleeding patterns contributes to guiding diagnostic investigation and the formulation of more precise clinical hypotheses, in addition to serving as an important parameter for comparison with other populations.

It is fundamental to highlight that the true impact of abnormal uterine bleeding (AUB) lies in the harm it causes to affected women. In a systematic review by Liu et al.²⁵, published in 2007, it was found that mortality and serious complications of AUB are extremely uncommon, with the greatest effect of this condition being its impact on Health-Related Quality of Life (HRQoL), as well as the costs it imposes on the health-care system, the financial market, and on the women themselves, for example, due to loss of productivity at work.

In a 2021 study conducted in the Amazon region by Maia et al.⁶, the significant repercussions of AUB, both direct and indirect, on women's quality of life were addressed. Examples of this negative impact include the need for frequent use and changing of sanitary products, interference with sexual activity and physical exercise, and anxiety caused by the possibility of embarrassment in public situations. It was shown that 56.7% of patients with AUB rated their quality of life as fair to very poor, 46.7% reported that bleeding always directly interfered with daily life and social interactions, and 65% stated that this condition had a direct impact on their professional activities. In the systematic review by Liu et al.²⁵, the SF-36, a questionnaire assessing health-related quality of life, revealed that six domains related to quality of life were below the 25th percentile in the female population with AUB, with the condition primarily affecting domains linked to work productivity and daily activities. In the present study, 68% of women evaluated reported that AUB had a detrimental impact on their quality of

life. The finding that the majority of women reported impaired quality of life highlights the need for a multidimensional approach in the management of AUB, considering not only the identification of etiology and clinical control of bleeding but also interventions aimed at minimizing its psychosocial consequences.

LIMITATIONS

The present study has limitations and potential biases that must be considered. The characterization of abnormal uterine bleeding (AUB) was based on subjective reporting, which makes it impossible to confirm the accuracy of the information provided by patients. Furthermore, many participants, due to low educational level or lack of attention to details of their bleeding pattern, had difficulty answering certain questions in the questionnaire. In some cases, this led the authors to formulate more directed questions, which may have influenced part of the responses. Additionally, poorly formulated reports made it challenging to convert subjective information into objective data for entry into the data collection spreadsheet.

It is also important to note that the study included a limited sample of 125 patients and was conducted at a single referral center, which may restrict the applicability of the results to other contexts. These factors must be taken into account when interpreting the findings, as they limit the generalizability to different settings and populations. Moreover, no longitudinal follow-up of patients was performed, which restricted the evaluation of clinical outcomes after the hysteroscopic findings. Finally, no correlation between hysteroscopic and histopathological findings was carried out, since this was not the aim of the study. Nevertheless, we recognize that such an association is fundamental for the clinical interpretation of some diagnoses.

CONCLUSION

In this study, abnormal uterine bleeding (AUB) was more prevalent among women in the reproductive period, with menorrhagia being the main clinical manifestation. Among the hysteroscopic findings, endometrial polyps were the most frequent structural etiology and showed a statistically significant association with the presence of AUB. Additionally, endometritis also demonstrated a significant association, indicating that, although less prevalent, it should be considered a relevant diagnostic hypothesis in patients with AUB.

In the subgroup analysis, polyps remained the most prevalent finding both in reproductive-age women and in postmenopausal women, demonstrating the consistency of this result across different reproductive phases. Moreover, it is noteworthy that lesions suggestive of malignancy were identified exclusively in postmenopausal women, which has important practical implications, since this phase requires careful diagnostic investigation to rule out malignant neoplasms.

Another relevant point is that only 10% of patients presented a uterine cavity without abnormalities, reinforcing the predominance of structural etiologies as the main cause of AUB. It was also observed that 68% of women reported a negative impact of bleeding on their quality of life, highlighting the clinical importance of recognizing and properly managing this condition.

Despite providing relevant contributions to clinical practice, this study highlights knowledge gaps that need to be addressed in future research, particularly the need for multicenter studies with larger samples and histopathological correlation, in order to enhance the applicability and diagnostic accuracy of hysteroscopic findings.

Conflict of interest

The authors declare that there are no known financial or personal conflicts of interest that could have influenced the work reported in this article.

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FIGURE AND TABLE LEGENDS

Table 1. Sociodemographic, obstetric, clinical characteristics and hysteroscopic findings of the patients included in the study

Table 2. Hysteroscopic findings in patients with abnormal uterine bleeding according to reproductive phase