



ORIGINAL ARTICLE

# Clinical Profile and Histopathological Correlation in Women Undergoing Hysteroscopy: A 5-Year Experience at a Tertiary Center

## Histeroskopi Uygulanan Kadınlarda Klinik Profil ve Histopatolojik Korelasyon: Üçüncü Basamak Bir Merkezde Beş Yıllık Deneyim

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Highlights

- Abnormal uterine bleeding was the most common indication for hysteroscopy (70.7%), followed by infertility (17.3%).
- Endometrial polyps were the most frequent histopathological finding, accounting for 69.2% of evaluated specimens.
- Endometrial adenocarcinoma was identified in 2.3% of patients with available histopathological evaluation.
- Hysteroscopy demonstrated a favorable safety profile, with an overall complication rate of 1.3% and no hospital readmissions.

ABSTRACT

**Aim:** This study aimed to evaluate the clinical indications, diagnostic accuracy, histopathological outcomes, and safety profile of hysteroscopy in women presenting with abnormal uterine bleeding and infertility in the post-pandemic period.

**Materials and Methods:** A retrospective observational study was conducted on 306 patients who underwent either diagnostic or operative hysteroscopy at a tertiary referral center in Türkiye between January 2020 and June 2024. Demographic characteristics, transvaginal ultrasound findings, intraoperative observations, histopathological results, and complication rates were analyzed. All procedures were performed under general or spinal anesthesia using standardized hysteroscopic techniques. Descriptive statistics were used to evaluate the clinical relevance.

**Results:** Abnormal uterine bleeding was the most common indication for hysteroscopy (70.7%), followed by infertility (17.3%). Preoperative ultrasonography identified intrauterine abnormalities in 69.4% of patients, most commonly suspected endometrial polyps (23.4%). Histopathological evaluation confirmed endometrial polyps as the predominant lesion (69.2%), while endometrial adenocarcinoma was detected in 2.3% of cases. The overall complication rate was low (1.3%), with uterine perforation being the only adverse event. Postoperative recovery was uneventful in 98.4% of patients, and no hospital readmissions were recorded.

**Conclusion:** Hysteroscopy is a safe, minimally invasive, and diagnostically superior modality for the evaluation and management of intrauterine pathologies. Its high diagnostic yield and low complication rate highlight its value as a first-line approach in women with abnormal uterine bleeding and infertility. Early implementation of hysteroscopy may facilitate timely diagnosis, improve reproductive outcomes, and enable the detection of endometrial malignancy at an early stage. These findings underscore the importance of integrating hysteroscopy into routine gynecological practice, particularly in the post-pandemic era.

**Keywords:** Abnormal uterine bleeding, endometrial polyp, hysteroscopy, infertility, post-pandemic outcomes

ÖZ

**Amaç:** Bu çalışmanın amacı, post-pandemi döneminde anormal uterin kanama ve infertilite ile başvuran kadınlarda histeroskopin klinik endikasyonlarını, tanısal doğruluğunu, histopatolojik sonuçlarını ve güvenilirlik profilini değerlendirmektir.

**Gereç ve Yöntemler:** Bu retrospektif gözlemsel çalışma, Ocak 2020 ile Haziran 2024 tarihleri arasında Türkiye’de üçüncü basamak bir merkezde tanısal veya operatif histeroskopi uygulanan 306 kadın hastayı kapsamaktadır. Hastaların demografik özellikleri, transvajinal ultrasonografi bulguları, intraoperatif gözlemler, histopatolojik sonuçlar ve komplikasyon oranları analiz edilmiştir. Tüm işlemler genel veya spinal anestezi altında, standart histeroskopik teknikler kullanılarak gerçekleştirilmiştir. Klinik önem tanımlayıcı istatistiklerle değerlendirilmiştir.

**Bulgular:** Histeroskopi endikasyonları arasında en sık görülen durum anormal uterin kanama olup olguların %70,7’sini oluşturmuş, bunu infertilite (%17,3) izlemiştir. Preoperatif ultrasonografide hastaların %69,4’ünde intrauterin patoloji saptanmış olup, en yaygın bulgu endometrial polip şüphesi (%23,4) olarak belirlenmiştir. Histopatolojik incelemeye alınan 221 hastada endometrial polipler %69,2 ile en sık lezyon olarak tespit edilmiş, %2,3 hastada endometrial adenokarsinom saptanmıştır. Toplam komplikasyon oranı %1,3 olup komplikasyonların tamamı uterin perforasyon şeklinde gerçekleşmiştir. Hastaların %98,4’ünde postoperatif iyileşme sorunsuz seyrederken hiçbir hastada yeniden yatış gereksinimi olmamıştır.

**Sonuçlar:** Histeroskopi, intrauterin patolojilerin değerlendirilmesi ve tedavisinde güvenli, minimal invaziv ve tanısal doğruluğu yüksek bir yöntemdir. Yüksek tanısal verimliliği ve düşük komplikasyon oranı, özellikle anormal uterin kanama ve infertilite ile başvuran kadınlarda birinci basamak yaklaşım olarak uygulanmasını desteklemektedir. Histeroskopin erken uygulanması tanıda gecikmeleri önleyebilir, üreme sonuçlarını iyileştirebilir ve endometrial malignitenin erken dönemde saptanmasına katkıda bulunabilir. Bu bulgular, post-pandemi döneminde histeroskopin modern jinekolojik pratiğin vazgeçilmez bir bileşeni olduğunu göstermektedir.

**Anahtar Kelimeler:** Anormal uterin kanama, endometrial polip, histeroskopi, infertilite, post-pandemi sonuçları.

## Introduction

**H**ysteroscopy is the gold-standard modality for direct evaluation and treatment of intrauterine pathology, permitting same-session diagnosis and intervention. Contemporary innovations—high-definition optics, bipolar energy systems, and optimized distension media—have improved precision and safety while broadening clinical indications in routine gynecologic practice [1, 2]. Current guidance underscores hysteroscopy as a first-line approach, particularly when noninvasive imaging is inconclusive, in the evaluation of abnormal uterine bleeding (AUB) and infertility [3, 4].

Following the COVID-19 pandemic, delayed presentations and deferred management have been associated with a greater burden of symptomatic AUB in real-world cohorts [5, 6]. Recent studies (2023–2024) consistently report endometrial polyps, submucosal leiomyomas, and hyperplastic lesions among the most frequent findings in women undergoing hysteroscopy for AUB [1, 6]. Beyond diagnosis, hysteroscopy is integral to reproductive medicine: intrauterine adhesions, septa, and polyps adversely affect implantation, and hysteroscopic correction has been linked to improved clinical pregnancy outcomes—especially in assisted reproduction settings [7, 8].

Globally, practice has shifted toward office-based (outpatient) hysteroscopy owing to reduced anesthesia exposure, shorter length of stay, and favorable health-economic profiles [2, 4, 9, 10]. However, in many tertiary referral centers in Türkiye, procedures are still predominantly performed under operating-room conditions, a contextual difference that may influence complication rates, therapeutic success, and costs—supporting the need for region-specific evidence.

Despite widespread clinical adoption, there remains a paucity of post-pandemic, large-scale national data from Türkiye. Available hospital-based series either predate the pandemic or include limited samples, and few report comprehensive distributions of indications, intraoperative findings, histopathology, and complications in tertiary centers [11, 12]. This represents a critical research gap for national practice and resource planning.

We hypothesized that hysteroscopy performed in a high-volume tertiary referral center in Türkiye during the post-pandemic era (2020–2024) would demonstrate high diagnostic yield and low complication rates, supporting its continued role as a first-line modality in contemporary gynecologic care. Accordingly, we retrospectively evaluated clinical indications, intraoperative findings, histopathological outcomes, therapeutic interventions, and complication rates in 306 consecutive patients undergoing hysteroscopy at a tertiary center over 2020–2024.

## Materials and Methods

This retrospective observational study was conducted at the Department of Obstetrics and Gynecology, Konya City Hospital, Türkiye, and included 306 patients who underwent diagnostic or operative

hysteroscopy between January 2020 and June 2024. Only patients who underwent hysteroscopy as the primary procedure were included. Patients who had concurrent surgical interventions (e.g., laparoscopy or myomectomy), those diagnosed with gynecologic malignancies prior to the procedure, those with active pelvic infections, or those with incomplete medical records were excluded from the analysis.

Data were collected from the hospital's electronic medical record system and patient archives. The following variables were recorded: age, clinical indications for hysteroscopy, preoperative transvaginal ultrasonography findings, hysteroscopic intraoperative observations, histopathological examination results, and postoperative complications. All procedures were performed by experienced gynecologic surgeons using a 10 mm diameter rigid hysteroscope under general or spinal anesthesia, in accordance with international clinical guidelines.

A post-hoc power analysis was performed using GPower software (version 3.1.9.7), which confirmed that a minimum sample size of 258 patients would provide 80% statistical power at an alpha level of 0.05 to detect clinically significant differences in histopathological outcomes. With 306 patients included, the statistical power of the present study was confirmed as adequate.

Surgical techniques were standardized across all procedures. Normal saline was used as the distension medium, and intrauterine pressure was maintained between 80–100 mmHg. Operative hysteroscopy was performed using bipolar electrosurgical systems for polypectomy, adhesiolysis, septum resection, and myomectomy when indicated. Tissue samples were obtained when intrauterine lesions were visualized and were subsequently analyzed in the pathology department.

Statistical analysis was conducted using the Jamovi software (version 2.5.6). Continuous variables were presented as mean  $\pm$  standard deviation (SD), while categorical variables were expressed as frequencies (n) and percentages (%). Since the primary aim of this study was descriptive, inferential statistical tests were not applied. However, the clinical relevance of findings was interpreted based on reported frequencies and previously published benchmarks in the literature.

Ethical approval for this study was obtained from the Konya City Hospital Ethics Committee (Approval No: 2025/139). As this was a retrospective study based on anonymized patient records, the requirement for informed consent was waived by the committee. All procedures were conducted in full accordance with the ethical principles outlined in the Declaration of Helsinki and its subsequent amendments, ensuring the protection of patient rights, confidentiality, and data integrity throughout the research process.

## Results

A total of 306 patients were included in the analysis. The most common indication for hysteroscopy was

abnormal uterine bleeding, which accounted for 70.7% of all procedures, followed by infertility in 17.3% of cases. Less frequent indications included pelvic pain (8.1%), missing or displaced intrauterine device (IUD) (3.3%), and retained placenta (0.6%). These findings are detailed in Table 1.

**Table 1:** Indications for Hysteroscopy in the Study Population

| Indication                | n (%)       |
|---------------------------|-------------|
| Abnormal Uterine Bleeding | 206 (70.7%) |
| Infertility               | 53 (17.3%)  |
| Pelvic Pain               | 25 (8.1%)   |
| Missing/Displaced IUD*    | 13 (3.3%)   |
| Retained Placenta         | 2 (0.6%)    |

\*Intrauterine Device

Preoperative transvaginal ultrasonography detected intrauterine abnormalities in 69.4% of patients. The most common ultrasonographic finding was suspected endometrial polyps (23.4%), followed by thickened endometrium (21.4%) and displaced intrauterine devices (13.2%). Only 31.6% of patients had normal ultrasound findings. These data are presented in Table 2.

**Table 2:** Preoperative Transvaginal Ultrasound Findings

| Finding               | n (%)      |
|-----------------------|------------|
| Normal                | 97 (31.6%) |
| Suspected Polyp       | 72 (23.4%) |
| Thickened Endometrium | 69 (21.4%) |
| Displaced IUD*        | 43 (13.2%) |
| Suspected Myoma       | 14 (6.0%)  |
| Retained Placenta     | 2 (0.6%)   |

\*Intrauterine Device

Histopathological evaluation was available for 221 patients. Endometrial polyps were confirmed as the most prevalent pathology, accounting for 69.2% of all cases, which correlates well with the preoperative ultrasound findings. Notably, endometrial adenocarcinoma was detected in 2.3% of patients, underscoring the importance of hysteroscopy for early cancer detection. The histopathological distribution is presented in Table 3.

**Table 3:** Histopathological Findings (n = 221)

| Histopathology                    | n (%)       |
|-----------------------------------|-------------|
| Endometrial Polyp                 | 153 (69.2%) |
| Cycle-Related Endometrial Changes | 29 (13.1%)  |
| Myoma                             | 21 (9.5%)   |
| Simple Hyperplasia                | 5 (2.3%)    |
| Endometrial Adenocarcinoma        | 5 (2.3%)    |
| Necrotic Placenta                 | 5 (2.3%)    |
| Complex Atypical Hyperplasia      | 2 (0.9%)    |

As detailed in Table 3, endometrial polyps constituted the majority of histopathological diagnoses, reinforcing the diagnostic accuracy of hysteroscopy. The detection of endometrial adenocarcinoma in a subset of patients further emphasizes the pivotal role

of hysteroscopy in identifying malignancy at an early stage.

Malignancy was identified in 6 of the 221 patients (2.7%) who had available histopathological evaluation. The malignancy rate—defined as endometrial adenocarcinoma or complex atypical hyperplasia—was 3.0% among patients presenting with abnormal uterine bleeding (AUB), whereas no malignancy was detected in the infertility group. This difference was not statistically significant (Fisher's exact test,  $p = 0.58$ ).

Intraoperative complications occurred in four patients (1.3%), all of which were cases of uterine perforation. The complication rate was 1.6% in the AUB group and 0% in the infertility group, with no statistically significant difference between the groups (Fisher's exact test,  $p = 0.42$ ). No additional intraprocedural complications such as fluid overload, hemorrhage, infection, or adjacent organ injury were observed. Postoperative recovery was uneventful in 98.4% of patients, and no hospital readmissions were recorded.

## Discussion

This study demonstrated that hysteroscopy is a highly effective and safe diagnostic and therapeutic modality for the evaluation of intrauterine pathologies, particularly in women presenting with abnormal uterine bleeding (AUB) and infertility. The overall diagnostic yield observed in our cohort aligns with previous large-scale studies, confirming hysteroscopy as the most accurate method for detecting focal endometrial lesions compared to noninvasive imaging techniques such as transvaginal ultrasonography (13,14). Endometrial polyps were the most common histopathological finding in our population, detected in 69.2% of cases, which is consistent with the prevalence range of 60–72% reported in the literature (13–15). This trend appears to have intensified in the post-pandemic era due to delays in clinical presentation and increased progression of intrauterine lesions, as reported in recent studies following the COVID-19 pandemic (20,21).

Abnormal uterine bleeding was the primary indication for hysteroscopy in our study (70.7%), corroborating previous research demonstrating that hysteroscopy offers superior diagnostic accuracy compared with ultrasonography in identifying benign, premalignant, and malignant endometrial lesions (15). The detection of endometrial adenocarcinoma in 2.3% of our cases highlights the clinical importance of hysteroscopy in early cancer detection and timely intervention, particularly in the post-pandemic context where delays in healthcare access have been associated with increased rates of endometrial malignancy (20,21). These findings confirm hysteroscopy as a first-line diagnostic tool in women presenting with persistent AUB.

Infertility was the second most common indication in our study, accounting for 17.3% of cases. This aligns with current evidence that intrauterine abnormalities—including adhesions, septa, and

endometrial polyps—can impair implantation and negatively impact fertility outcomes (16). A systematic review by Shankar and Singh demonstrated that operative hysteroscopy significantly improves clinical pregnancy rates in women undergoing assisted reproductive technologies by restoring normal endometrial receptivity (17). Furthermore, recent post-pandemic studies have shown a rise in hysteroscopic findings among infertile patients, likely due to delayed diagnosis and treatment during the COVID-19 pandemic (22). Our findings therefore support the recommendation that hysteroscopy should be routinely incorporated into the infertility workup, particularly in cases of unexplained infertility and recurrent implantation failure.

In this study, the overall complication rate was 1.3%, which is within the range reported in the literature (0.1–1.6%) (16,18). Consistent with earlier findings, uterine perforation was the most commonly encountered complication, while hemorrhage, fluid overload, and infection were exceedingly rare (18). These low complication rates may be attributed to advancements in hysteroscopic technology, adherence to standardized protocols, and the performance of all procedures by experienced surgeons in a tertiary care setting. Internationally, there has been a progressive shift toward office-based hysteroscopy due to its cost-effectiveness and reduced anesthesia requirements (22,23). However, in Türkiye, hysteroscopy is still predominantly performed under operating room conditions. While this practice may increase procedural costs, it may also contribute to lower complication rates and improved procedural safety, as reflected in our outcomes (24).

The findings of this study are consistent with those reported by Atlihan et al. (2024), who identified endometrial polyps as the most common pathology among Turkish women undergoing hysteroscopy for AUB (16). Furthermore, the malignancy rate in our cohort (2.3%) aligns with previously published studies documenting malignancy rates between 1% and 3% among reproductive-aged women (18,25). Unlike earlier Turkish studies with limited sample sizes and pre-pandemic data, our research provides comprehensive post-COVID national evidence based on 306 cases, representing one of the largest series reported from a tertiary referral center in Türkiye.

Beyond its diagnostic effectiveness, hysteroscopy also offers significant cost-effectiveness by enabling a “see-and-treat” approach, thereby reducing the need for multiple imaging modalities or repeat surgical procedures (22,23). This single-session management approach is particularly beneficial in tertiary healthcare systems, where optimizing resource utilization is crucial. A key strength of this study is its large sample size and inclusion of both diagnostic and operative hysteroscopy cases, enhancing the generalizability of the findings. Additionally, all procedures were performed using standardized protocols, minimizing variability in practice.

However, this study is not without limitations. The

retrospective design may have introduced selection bias, and the lack of long-term follow-up data limits the assessment of recurrence and pregnancy outcomes. Furthermore, as this was a single-center study conducted in a tertiary referral setting, the findings may not be generalizable to outpatient clinics or primary care institutions. Despite these limitations, the study provides valuable and timely insights into real-world hysteroscopy outcomes in the post-pandemic era in Türkiye.

Overall, the findings of this study reinforce hysteroscopy as a first-line diagnostic and therapeutic procedure for intrauterine pathologies. The high diagnostic yield, low complication rate, and ability to provide immediate treatment during the same session contribute to improved patient outcomes and reduced healthcare costs. Moreover, the identification of endometrial malignancy in a subset of patients emphasizes the critical role of hysteroscopy in early cancer detection. Given the paucity of post-pandemic national data, this study makes an important contribution to the existing literature and supports the integration of hysteroscopy as an essential component of modern gynecological practice in Türkiye. Prospective multicenter studies with long-term follow-up are warranted to further evaluate reproductive outcomes, long-term diagnostic outcomes, and the cost-effectiveness of office-based versus operating-room hysteroscopy.

## Conclusion

Hysteroscopy remains a safe, minimally invasive, and highly valuable diagnostic modality for evaluating intrauterine pathologies. In this retrospective study, it demonstrated a high diagnostic yield, particularly among patients presenting with abnormal uterine bleeding and infertility, with endometrial polyps identified as the most common pathology. The very low complication rate observed further supports the reliability of hysteroscopy in routine gynecologic practice.

## Conflict Of Interest

The author declares that there are no conflicts of interest regarding the publication of this article.

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