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Original Research Article

Correlation of Hysteroscopic Diagnosis with Histopathological Findings in Women Presenting with Abnormal Uterine Bleeding: An Analytical Observational Study

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Abstract:

Background: Abnormal uterine bleeding (AUB) is a common gynecological problem affecting women of reproductive and perimenopausal age and significantly impacts physical, psychological, and social wellbeing. Accurate diagnosis of intrauterine pathology is essential for appropriate management. Hysteroscopy allows direct visualization of the uterine cavity and may provide better diagnostic accuracy when correlated with histopathological examination.

Aim: To evaluate the correlation between hysteroscopic diagnosis and histopathological findings in women presenting with abnormal uterine bleeding.

Methodology: This hospital-based analytical observational study was conducted at Department of Obstetrics and Gynaecology, Shree Narayan Medical Institute and Hospital, Saharsa, Bihar, India over one year among 47 women aged ≥35 years presenting with AUB. All participants underwent diagnostic hysteroscopy followed by histopathological examination of endometrial tissue, which was considered the gold standard. Data were analyzed using SPSS version 23.0, and diagnostic validity parameters were calculated.

Results: Most women belonged to the 35–40 years age group (44.7%), with irregular menstrual cycles (57.4%) and heavy menstrual bleeding (63.8%) being the predominant presentations. Normal endometrium was the most common finding on hysteroscopy (40.4%) and histopathology (46.8%). Overall correlation between hysteroscopic and histopathological findings was observed in 89.4% of cases. Hysteroscopy showed high sensitivity (95.45%), specificity (86.36%), positive predictive value (84%), negative predictive value (95%), and overall diagnostic accuracy (89.36%) with statistically significant association ($p<0.05$).

Conclusion: Hysteroscopy demonstrated excellent correlation with histopathological findings and proved to be a highly sensitive and accurate modality for evaluating endometrial abnormalities in women with AUB. Histopathology remains the gold standard for confirmation of diagnosis.

Keywords: Abnormal Uterine Bleeding, Hysteroscopy, Histopathology, Endometrial Hyperplasia, Endometrial Polyp, Diagnostic Accuracy.

Introduction

Abnormal Uterine Bleeding (AUB) is considered a very prevalent gynecological complaint in women of reproductive and perimenopausal ages. It denotes vaginal bleeding that occurs at frequencies, durations and/or intensities different from the normal menstrual cycle and may occur during or outside of the menstrual cycle. AUB has become a public health crisis due to its affecting women's physical health, psychological well-being, social function and quality of life. Women with AUB often suffer from anaemia, fatigue, decreased productivity, emotional stress and financial strain resulting from frequent hospital visits and investigations. Menstrual dysfunction is a common problem, regardless of socioeconomic status or geographic area in the world, and it can impact women's reproductive health and their daily life [1].

The normal menstrual cycle features cyclic endometrial sloughing, an average of 4.7 days of blood loss, with almost 89.0% of menstrual cycles being 7 days or less. Any other physiological pattern is deemed to be abnormal. AUB in women is a significant condition that occurs at a large rate in the reproductive lifespan. Abnormal uterine bleeding has been reported in about 14–25% of women of reproductive age and almost 50% of women of

perimenopausal age [2] during their lifetime. It is estimated that 17.9% of women in India suffer from AUB and it is one of the major causes for gynecological consultation and hysterectomy [3]. Moreover, AUB is present in almost 9-14% of women between the ages of menarche and menopause and has significant social and economic impact. Normally, the blood loss is approximately 35ml during a normal period and heavy or irregular periods can have a significant impact on the health and nutritional status of women [4].

The International Federation of Gynecology and Obstetrics (FIGO) has developed the PALM-COEIN classification system for AUB. This system divides the causes of AUB into structural and non-structural. PALM stands for Polyp, Adenomyosis, Leiomyoma and Malignancy or hyperplasia, which are structural causes. The non-structural causes are collected together and are classified as COEIN—Coagulopathy, Ovulatory dysfunction, Endometrial causes, Iatrogenic causes and not yet classified causes [5]. This classification has added to the understanding of AUB and lead to a more systematic diagnostic approach.

To provide treatment that avoids unnecessary surgery, the underlying pathology that causes AUB needs to be diagnosed accurately for proper treatment planning. There are several different means of diagnosis that can be used for women with AUB. The use of ultrasonography, particularly transvaginal ultrasonography, is commonly used as the first imaging modality due to its non-invasive nature, widespread availability, low cost, and ability to detect uterine and adnexal abnormalities including fibroids and ovarian cysts. There are, however, some limitations in the use of ultrasonography to assess the endometrium, and lesions within the endometrial cavity like endometrial polyps, submucous fibroids, intrauterine adhesions, and focal endometrial abnormalities may not be detected. In these cases, other diagnostic tests like saline infusion sonography or hysteroscopy are used to obtain a clearer view of the uterine cavity.

In the past, dilatation and curettage (D&C) was considered to be the standard procedure for endometrial sampling in cases of AUB. But there are some drawbacks to this blind procedure. Diagnostic errors associated with D&C have been reported to be anywhere in the range of 10.0% to 25.0% [6]. The procedure doesn't involve direct inspection of the uterine cavity so it can overlook the presence of lesions and may not sample the cavity sufficiently. Research has revealed that only half or less of the endometrial cavity is sampled in almost 60.0% of patients who have curettage. The diagnostic usefulness of D&C for structural abnormalities, like polyps, submucosal fibroids, congenital abnormalities, and intrauterine adhesions, is therefore relatively poor in comparison to hysteroscopy [7].

The direct visualization of the endometrial cavity by hysteroscopy has been a revolution in the way the cause of abnormal uterine bleeding is evaluated. These days, it is considered as the gold standard in the diagnosis of intrauterine pathology. Hysteroscopy also allows the clinician to obtain more precise diagnosis as the ability to biopsy regions of interest in the suspect endometrial tissue allows for the accurate identification of focal lesions. Hysteroscopy has been reported to be very accurate at diagnosing endometrial carcinoma, with a failure rate of as low as 0.9% [8]. Furthermore, lesions which are often not discovered with blind curettage, such as endometrial polyps or submucous fibroids, can easily be recognized during hysteroscopic examination. Endoscopic gynecological procedures have improved, and endometrial sampling has become an integral part of the evaluation of AUB when performed hysteroscopically [9]. The facility to have biopsy specimens taken directly under vision in abnormal areas leads to better correlation of clinical and histopathological diagnosis. So, hysteroscopy with pathological examination has become an improved diagnostic procedure than the conventional D&C and has been used more and more in modern gynecological practice in place of blind curettage [10].

Abnormal uterine bleeding (AUB) is a well-established gynecological issue among women attending tertiary care centers in a resource deficit and densely populated state like Bihar. Timely diagnosis is very important to minimize morbidity, prevent unnecessary hysterectomy and promote reproductive health. Though hysteroscopy is being increasingly performed in clinical practice, scarce data are available on the correlation between hysteroscopic impressions and the histopathology in women with AUB from the eastern part of India. This analytical observational study was therefore carried out to assess the correlation of hysteroscopic diagnosis with histopathology in women presented with AUB in Bihar, India. Findings of this study could be a part of a better approach to the diagnosis and management of AUB in clinical practice.

Methodology

Study Design: The present study was conducted as a hospital-based analytical observational study aimed at evaluating the correlation between hysteroscopic diagnosis and histopathological findings in women presenting with abnormal uterine bleeding (AUB). Histopathological examination of endometrial tissue was considered the gold standard for confirmation of endometrial pathology. The study was designed to assess the diagnostic accuracy

of hysteroscopy in detecting intrauterine abnormalities in women with AUB.

Study Area: The study was carried out in the Department of Obstetrics and Gynaecology, Shree Narayan Medical Institute and Hospital, Saharsa, Bihar, India

Study Duration: The study was conducted over a period of one year.

Sample Size: A total of 47 women presenting with abnormal uterine bleeding were included in the study. The sample size comprised patients who fulfilled the eligibility criteria and underwent hysteroscopic evaluation followed by histopathological examination of endometrial tissue.

Sample Population: The study population included women aged 35 years and above who attended the gynecology outpatient department and inpatient services with complaints of abnormal uterine bleeding. Abnormal uterine bleeding included heavy menstrual bleeding, intermenstrual bleeding, infrequent menstrual cycles, frequent cycles, and irregular menstrual bleeding. All selected participants underwent detailed clinical assessment and further diagnostic evaluation.

Data Collection: Data were collected using a structured and predesigned proforma after obtaining written informed consent from the participants. Detailed demographic information, menstrual history, obstetric history, and relevant medical and surgical history were recorded. General physical examination and systemic examination were performed in all patients. Routine investigations including complete blood count, urine examination, and transvaginal sonography were carried out prior to hysteroscopy. The hysteroscopic findings and histopathological reports were documented systematically for further comparison and analysis.

Inclusion Criteria

The study included:

- Women aged 35 years and above
- Women presenting with abnormal uterine bleeding, including:
    - Heavy menstrual bleeding
    - Intermenstrual bleeding
    - Infrequent menstrual cycles
    - Frequent cycles
    - Irregular menstrual bleeding

Exclusion Criteria

The following patients were excluded from the study:

- Pregnant women
- Lactating women
- Women using intrauterine contraceptive devices (IUCDs)
- Patients with cervical malignancy
- Patients on oral contraceptive pills
- Patients receiving antipsychotic medications
- Patients on anticoagulant therapy
- Women with thyroid disorders
- Women with hyperprolactinemia
- Women with systemic disorders such as liver disease and renal disease

Procedure: All eligible patients underwent detailed clinical evaluation and baseline investigations before the procedure. Diagnostic hysteroscopy was performed in the operating room under sedation and aseptic precautions. The patient was placed in the dorsal lithotomy position, and after bimanual examination, the cervix was cleaned with 10% povidone-iodine solution. The anterior lip of the cervix was grasped with a single-toothed tenaculum, and local anesthetic was administered when necessary. Uterine sounding was done to determine the size and position of the uterus, followed by gradual cervical dilatation according to the diameter of the hysteroscope used. A 4 mm rigid Storz hysteroscope with a 5 mm sheath and 30° oblique lens was introduced into the uterine cavity using 0.9% normal saline as the distension medium while maintaining intrauterine pressure between 70 and 100 mmHg. The endocervical canal, uterine cavity, uterine fundus, and bilateral tubal ostia were systematically visualized. Suspicious lesions identified during hysteroscopy were subjected to directed endometrial biopsy or curettage. The obtained tissue samples were preserved in 10% neutral buffered formalin and sent for histopathological examination. Patients were monitored in the recovery room for approximately two hours after the procedure and discharged on the same day or the following day depending on their clinical condition.

Statistical Analysis: The collected data were entered into Microsoft Excel and analyzed using Statistical Package for Social Sciences (SPSS) version 23.0. Categorical variables were expressed as frequencies and percentages, while continuous variables were presented as mean and standard deviation. The association between hysteroscopic findings and histopathological diagnosis was evaluated using the Chi-square test or Fisher's exact test wherever applicable. Diagnostic validity parameters including sensitivity, specificity, positive predictive value, negative predictive value, and overall diagnostic accuracy of hysteroscopy were calculated by considering histopathological examination as the gold standard. A p-value of less than 0.05 was considered statistically significant."

Result

Table 1 presents the demographic and menstrual characteristics of the 47 study participants. The majority of women belonged to the 35–40 years age

group (44.7%, n=21), followed by 41–50 years (38.3%, n=18), while only 4.2% (n=2) were aged 61–70 years. Regarding menstrual pattern, irregular cycles were more common, reported by 57.4% (n=27) of participants, compared to regular cycles in 42.6% (n=20). Most participants had a normal frequency of menses (66%, n=31), whereas 19.1% (n=9) experienced infrequent cycles and 14.9% (n=7) had frequent cycles. In terms of duration of flow, normal duration was observed in 63.8% (n=30) of women, while prolonged and shortened durations were noted in 25.5% (n=12) and 10.7% (n=5), respectively. Heavy menstrual bleeding was the most common finding, affecting 63.8% (n=30) of participants, whereas only 23.4% (n=11) reported normal blood loss and 12.8% (n=6) experienced light blood loss.

Table 1: Demographic and Menstrual Characteristics of Study Participants (N=47)

Variables	Number of Patients (n)	Percentage (%)
Age Distribution		
35–40 years	21	44.7
41–50 years	18	38.3
51–60 years	6	12.8
61–70 years	2	4.2
Menstrual Pattern		
Regular cycles	20	42.6
Irregular cycles	27	57.4
Frequency of Menses		
Normal frequency	31	66
Frequent cycles	7	14.9
Infrequent cycles	9	19.1
Duration of Flow		
Normal duration	30	63.8
Prolonged duration	12	25.5
Shortened duration	5	10.7
Amount of Blood Loss		
Normal blood loss	11	23.4
Heavy menstrual bleeding	30	63.8
Light blood loss	6	12.8

Table 2 compares the hysteroscopic and histopathological findings among the 47 study participants. Normal endometrium was the most commonly observed finding in both hysteroscopy and histopathology, identified in 40.4% (n=19) and 46.8% (n=22) of cases, respectively. Endometrial hyperplasia was detected in 27.7% (n=13) of participants on hysteroscopy and in 23.4% (n=11) on histopathological examination. Endometrial polyps showed equal detection rates with both methods, accounting for 19.1% (n=9) of cases. Submucous fibroid/myoma was identified in 4.3% (n=2) of participants by both modalities, while endometritis was observed in 2.1% (n=1) of cases consistently. Atrophic endometrium was reported in 4.3% (n=2) on hysteroscopy but only 2.1% (n=1) on histopathology. Adhesions were identified only through hysteroscopy in 2.1% (n=1) of cases, whereas disordered proliferative endometrium was detected only on histopathology in 2.1% (n=1) of participants. Overall, the findings demonstrate a close correlation between hysteroscopic and histopathological diagnoses.

Table 2: Comparison of Hysteroscopic and Histopathological Findings among Study Participants (N=47)

Findings	Hysteroscopy n (%)	Histopathology n (%)
Normal endometrium	19 (40.4)	22 (46.8)
Endometrial hyperplasia	13 (27.7)	11 (23.4)*
Endometrial polyp	9 (19.1)	9 (19.1)
Submucous fibroid/Myoma	2 (4.3)	2 (4.3)
Endometritis	1 (2.1)	1 (2.1)
Atrophic endometrium	2 (4.3)	1 (2.1)
Adhesions	1 (2.1)	—
Disordered proliferative endometrium	—	1 (2.1)
Total	47 (100)	47 (100)

Table 3 shows the correlation between hysteroscopic and histopathological findings among the 47 study participants. Overall, hysteroscopic diagnosis demonstrated a high correlation with histopathological results, with concordance observed in 89.4% (n=42) of cases and non-correlation in only 10.6% (n=5). Endometrial polyps, endometritis, and adhesions showed complete correlation with histopathology, each demonstrating 100% agreement. Endometrial hyperplasia also showed a high correlation rate of 92.3% (n=12), while normal endometrium correlated in 89.5% (n=17) of cases. In contrast, submucous fibroid and atrophic endometrium each showed a lower correlation rate of 50% (n=1). These findings indicate that hysteroscopy is highly reliable in diagnosing intrauterine pathologies when compared with histopathological examination.

Table 3: Correlation between Hysteroscopic and Histopathological Findings (N=47)

Hysteroscopic Diagnosis	Correlated with Histopathology n (%)	Not Correlated n (%)	Total
Normal endometrium	17 (89.5)	2 (10.5)	19
Endometrial hyperplasia	12 (92.3)	1 (7.7)	13
Endometrial polyp	9 (100)	0 (0.0)	9
Submucous fibroid	1 (50.0)	1 (50.0)	2
Endometritis	1 (100)	0 (0.0)	1
Atrophic endometrium	1 (50.0)	1 (50.0)	2
Adhesions	1 (100)	0 (0.0)	1
Total	42 (89.4)	5 (10.6)	47 (100)

Table 4 illustrates the diagnostic validity of hysteroscopy in detecting endometrial pathology among the study participants. Hysteroscopy demonstrated a high sensitivity of 95.45%, indicating its strong ability to correctly identify patients with endometrial pathology. The specificity was 86.36%, showing good accuracy in ruling out disease among healthy individuals. The positive predictive value (PPV) was 84%, suggesting that a large proportion of positive hysteroscopic findings were confirmed on histopathology, while the negative predictive value (NPV) of 95% indicated excellent reliability of a negative hysteroscopic result. The overall diagnostic accuracy of hysteroscopy was 89.36%, reflecting its effectiveness as a diagnostic tool for evaluating endometrial abnormalities. Furthermore, the p-value of <0.05 indicates that the association between hysteroscopic and histopathological findings was statistically significant.

Table 4: Diagnostic Validity of Hysteroscopy in Detecting Endometrial Pathology

Diagnostic Parameters	Value (%)
Sensitivity	95.45
Specificity	86.36
Positive Predictive Value (PPV)	84
Negative Predictive Value (NPV)	95
Diagnostic Accuracy	89.36
p-value	<0.05

Discussion

The present study evaluated the correlation between hysteroscopic findings and histopathological diagnosis in women presenting with abnormal uterine bleeding (AUB). Most of the women in the present study were in the reproductive and perimenopausal age group of 44.7% in the age group 35-40 years and 38.3% in the age group 41-50 years of women. The results are similar with those obtained by Cohen & Dmowski (1973) [11] who found that 59% of women with AUB were in their perimenopausal age. In the same way, Edwin et al., (2014) [12] found that women who presented with AUB had a mean age of 40.33 years. This perimenopausal period may be due to hormonal changes and anovulatory cycles, which are more common during this time."

Menstrual periodicity was very common in the present study. Of the women, irregular periods were reported by 57.4%, and HMB was the most common symptom reported by 63.8% of women. The present findings are very similar to the study done by Khan et al., (2016) [4] who reported that menorrhagia was the most common presenting symptoms. Significant disturbances in the menstrual frequency, regularity, and heaviness of women with AUB were also reported by Kazemijaliseh H. The prevalence of HMB in the current study was however far greater than that reported by Fraser IS with only 27.2% of women reporting symptoms from HMB. This difference could be attributed to study population, ethnicity, and to healthcare seeking or inclusion criteria. Heavy menstrual bleeding has an impact on anemia, quality of life and health care costs and is

one of the largest clinical features associated with AUB.

The hysteroscopic findings in the present study revealed that normal endometrium was seen in 40.4% and the most frequent finding was that of endometrial hyperplasia in 27.7% of women. Endometrial polyps made up 19.1% of the cases while the other conditions, such as submucous fibroids and endometritis were relatively rare. The results are similar to those of Edwin et al., 2014 [12] and Firdous et al., 2017 [9] who found endometrial hyperplasia and polyps as the most common hysteroscopic findings in women of AUB. Similarly, Kumar et al., (2017) [6] reported hyperplasia in 42% and polyps in 22% of cases which are slightly higher than the value obtained in the present study. However, there are differences in the prevalence of intrauterine lesions in different regions and population as endometrial polyps were the most common lesion in Shrestha et al., (2017) [7] study (59%). Hysteroscopy can directly visualize the uterine cavity, facilitating the accurate diagnosis of focal abnormalities like uterine fibroids (submucous) and uterine polyps, which may not be detected by blind curettage.

The present study demonstrated that the endometrium was normal in 46.8% of the cases and endometrial hyperplasia was diagnosed in 23.4% of women. Polyps were observed in 19.1% of participants, which was very similar to that noted hysteroscopically. Kathuria & Bhatnagar (2014) [13] and Shrestha et al., (2017) [7] reported almost 57% and 60% of patients with normal histopathological findings. The prevalence of endometrial hyperplasia in the present study was found similar to the study by Bashir et al., (2015) [14] which found that about 18-20% of women with AUB had endometrial hyperplasia. However, lower rates were documented by Doraiswami et al., (2011) [15] and Abid et al., (2014) [16]. In the present study, the majority of cases (not atypia) were similar to previous reports, where prolonged estrogen exposure and anovulatory cycles are found to be associated with hyperplasia.

One of the key findings of the present study was that there was a high degree of agreement between the hysteroscopic and the histopathological findings. Correlation rates were especially high for normal endometrium (89.5%) and for endometrial hyperplasia (92.3%) and complete agreement was seen in endometrial polyps, endometritis and adhesions. The results highlight the accuracy of hysteroscopy in the diagnosis of intrauterine pathology. Tiwari & Pareek (2019) [8] have also reported similar strong correlation between hysteroscopy and histopathological diagnosis in AUB cases and Firdous et al., (2017) [9] have also found similar strong correlation between hysteroscopy and histopathological diagnosis in AUB cases. The concordance rate for atrophic endometrium was lower in the current study, however, as were the rates for submucous fibroids, some cases may still need to be histopathologically confirmed for the diagnosis.

The present study further demonstrates the diagnostic utility of hysteroscopy as the validity of the diagnosis was confirmed. The sensitivity of hysteroscopy was 95.45%, specifically 86.36%, PPV: 84%, NPV: 95%, and overall accuracy 89.36%. The results are similar to the results of Kumar et al., (2017) [6] who gave the sensitivity of 91.89% and the specificity of 92.31%. In the same way, Firdous et al., (2017) [9] reported the sensitivity of 93.2% and specificity of 83.9% which was very similar to the present study. Sinha et al., (2018) [17] on the other hand, reported relatively low sensitivity (78.3%) and specificity (63.6%). The negative predictive value was high in the current study, suggesting that hysteroscopy is most useful in excluding endometrial pathology when this is normal. Hence, hysteroscopy is a highly sensitive, minimally invasive and accurate diagnostic procedure which complements the histopathological examination in the assessment of women suffering from AUB.

Conclusion

This study concludes that abnormal uterine bleeding was more commonly observed among women in the perimenopausal age group and was frequently associated with irregular menstrual patterns and heavy menstrual bleeding. There was high concordance between hysteroscopy and histopathological diagnosis in the assessment of endometrial abnormalities particularly in cases of endometrial hyperplasia, polyps, and normal endometrium. The results suggest hysteroscopy is a safe and useful tool for determining intrauterine disease in women with AUB. The high sensitivity, specificity and overall diagnostic accuracy of this test make it an important modality for early diagnosis and management which can be confirmed by histopathology, which is the gold standard.

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