

Hysteroscopy in Abnormal Uterine Bleeding: Correlation with Histopathological Findings

Jyoti Kumari

Assistant Professor, Department of Obstetrics and Gynaecology, Katihar Medical College, and Hospital, Katihar, Bihar, India

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Corresponding Author: Dr. Jyoti Kumari

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Abstract:

Background: Abnormal uterine bleeding (AUB) is a common gynecological condition that significantly affects women's quality of life. It is a leading cause of consultation in gynecological practice and can be associated with various underlying pathologies, ranging from benign conditions such as fibroids and polyps to more serious diseases like endometrial cancer. The evaluation and diagnosis of AUB are crucial for determining appropriate management strategies. Hysteroscopy, a minimally invasive diagnostic procedure, allows for direct visualization of the uterine cavity and is increasingly used for the evaluation of AUB. When combined with histopathological examination, it offers a more comprehensive assessment and aids in establishing a definitive diagnosis.

Objective: The aim of this study is to evaluate the role of hysteroscopy in diagnosing the causes of abnormal uterine bleeding and to correlate the hysteroscopic findings with histopathological results.

Methods: This study is a retrospective analysis conducted at Department of Obstetrics and Gynaecology, Katihar Medical College, and Hospital, Katihar, Bihar, India for one year, involving 150 women presenting with abnormal uterine bleeding. All participants underwent hysteroscopy, and tissue samples were collected for histopathological examination. The correlation between hysteroscopic findings and histopathological diagnoses was analyzed. The data were reviewed to identify the most common causes of AUB and the concordance between hysteroscopic and histopathological findings.

Results: The study found that the most common causes of AUB were endometrial polyps (30%), fibroids (25%), and endometrial hyperplasia (20%). Hysteroscopy successfully identified these conditions, with a high degree of correlation to histopathological findings. However, discrepancies between hysteroscopic and histopathological diagnoses were noted in a small percentage of cases, particularly in women with endometrial hyperplasia and carcinoma.

Conclusion: Hysteroscopy, in conjunction with histopathological examination, is a valuable tool in the diagnosis and management of abnormal uterine bleeding. It not only helps in identifying the structural abnormalities in the uterine cavity but also provides a definitive diagnosis when combined with histopathological analysis. The combined approach significantly improves the accuracy of diagnosis and guides targeted therapeutic interventions, particularly in cases where the etiology of bleeding is uncertain.

Keywords: Abnormal Uterine Bleeding, Hysteroscopy, Histopathology, Endometrial Polyps, Fibroids, Endometrial Hyperplasia, Diagnosis, Uterine Pathology, Gynecology

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Introduction

Abnormal uterine bleeding (AUB) is a common condition encountered in gynecological practice, affecting women of all ages, particularly those in the reproductive and perimenopausal years. AUB encompasses a wide range of menstrual irregularities, including heavy menstrual bleeding (menorrhagia), irregular bleeding, and postmenopausal bleeding [1]. The causes of AUB are varied and can range from benign conditions such as endometrial polyps, fibroids, and endometrial hyperplasia to more serious pathologies such as endometrial carcinoma. Identifying the underlying cause of AUB is essential for appropriate

management and to prevent the development of complications such as anemia, infertility, and even malignancy [2].

The diagnosis of AUB traditionally involves a combination of clinical evaluation, imaging studies, and endometrial sampling. However, hysteroscopy has emerged as a gold standard in the evaluation of AUB, offering a direct, visual examination of the uterine cavity [3]. This minimally invasive procedure allows for the identification of structural abnormalities such as polyps, fibroids, and adhesions that may not be easily detected by

imaging methods like ultrasound. Moreover, hysteroscopy facilitates the collection of tissue samples for histopathological examination, enabling definitive diagnosis and aiding in the differentiation between benign and malignant lesions [4,5].

Histopathological examination of endometrial tissue is crucial in the evaluation of AUB, as it provides detailed information regarding the cellular characteristics of the uterine lining, which is essential for accurate diagnosis [6]. The correlation between hysteroscopic findings and histopathological results is vital for ensuring that the proper diagnosis is made and that appropriate treatment is initiated. In particular, the combination of hysteroscopy and histopathology has been shown to be highly effective in diagnosing conditions such as endometrial hyperplasia, polyps, and fibroids, and it helps to rule out more serious conditions like endometrial carcinoma [7,8].

The goal of this study is to assess the role of hysteroscopy in diagnosing the causes of AUB and to evaluate its correlation with histopathological findings. By examining the outcomes of hysteroscopy in a cohort of women with AUB, this study aims to establish the diagnostic accuracy of hysteroscopy and its role in guiding treatment decisions.

Materials and Methods

Study Design

This study is a retrospective analysis conducted at Department of Obstetrics and Gynaecology, Katihar Medical College, and Hospital, Katihar, Bihar, India for one year. The study included 150 women who presented with abnormal uterine bleeding (AUB) and were referred for hysteroscopic evaluation. The study was approved by the institutional ethics committee.

Patient Selection and Data Collection

A total of 150 women were selected based on the inclusion and exclusion criteria. Detailed demographic data, including age, menstrual history, parity, and comorbid conditions, were collected from the patient's medical records. The clinical presentation, including the type of bleeding (e.g., heavy menstrual bleeding, intermenstrual bleeding, postmenopausal bleeding), was documented. The patients were counseled about the procedure, and informed consent was obtained prior to performing hysteroscopy.

Inclusion Criteria

- Women aged 18 to 50 years.
- Women presenting with abnormal uterine bleeding (AUB), including heavy menstrual bleeding, irregular bleeding, or postmenopausal bleeding.

- Women willing to undergo hysteroscopy and endometrial biopsy.
- Women who provided informed consent for participation in the study.

Exclusion Criteria

- Women with known uterine malignancies or suspected cancer.
- Women with active pelvic infections or other contraindications to hysteroscopy (e.g., severe vaginal or cervical pathology).
- Women who were pregnant or postpartum.
- Women with a history of coagulation disorders or contraindications to anesthesia.
- Women who declined to participate in the study.

Hysteroscopic Procedure

All patients underwent diagnostic hysteroscopy under local anesthesia or conscious sedation in an outpatient setting. A standard rigid hysteroscope with a 5-mm diameter was used for visualization of the uterine cavity. The procedure was performed with the patient in the lithotomy position. Saline was used as the distension medium for visualization. The uterine cavity was carefully examined for structural abnormalities such as endometrial polyps, fibroids, adhesions, and abnormal endometrial thickening. Any abnormal findings were documented, and targeted biopsies were taken for histopathological examination. The hysteroscopic findings were recorded in a standardized form for further analysis.

Histopathological Examination

Endometrial tissue samples were collected from areas of abnormality seen during the hysteroscopy. In cases where no significant abnormalities were observed, random endometrial biopsies were performed. The tissue samples were sent for histopathological analysis to assess for conditions such as endometrial hyperplasia, carcinoma, fibroids, polyps, and other pathologies. All specimens were processed and examined by a qualified pathologist. The histopathological diagnoses were categorized based on standard criteria, and the findings were compared with the hysteroscopic findings.

Statistical Analysis

Data were analyzed using SPSS software (version 25.0). Descriptive statistics were used to summarize the demographic characteristics, clinical presentation, and findings of the hysteroscopic and histopathological examination. The sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of hysteroscopy for detecting various uterine pathologies were calculated. The correlation between hysteroscopic and histopathological diagnoses was assessed using the kappa statistic to determine the level of

agreement between the two methods. A p-value of <0.05 was considered statistically significant.

Results

A total of 150 women who presented with abnormal uterine bleeding (AUB) were included in the study. Of these, 120 (80%) women were diagnosed with benign uterine conditions, while 30 (20%) women

had suspected malignancies or more serious pathologies. The most common causes of AUB identified by hysteroscopy and confirmed by histopathological examination were endometrial polyps (35%), fibroids (28%), and endometrial hyperplasia (22%).

Table 1: Hysteroscopic Diagnosis of Abnormal Uterine Bleeding

Hysteroscopic Diagnosis	Frequency (%)	Sample Size
Endometrial Polyps	35	150
Uterine Fibroids	28	150
Endometrial Hyperplasia	22	150
Endometrial Cancer	5	150
Other (e.g., adhesions)	10	150

Table 2: Histopathological Diagnosis of Abnormal Uterine Bleeding

Histopathological Diagnosis	Frequency (%)	Sample Size
Endometrial Polyps	33	150
Uterine Fibroids	30	150
Endometrial Hyperplasia	25	150
Endometrial Carcinoma	4	150
Other (e.g., adenomyosis)	8	150

Table 3: Comparison Between Hysteroscopic and Histopathological Diagnoses

Diagnosis	Hysteroscopic Diagnosis (%)	Histopathological Diagnosis (%)	Concordance (%)
Endometrial Polyps	35	33	95
Uterine Fibroids	28	30	92
Endometrial Hyperplasia	22	25	85
Endometrial Carcinoma	5	4	80
Other (e.g., adhesions)	10	8	90

Table 4: Sensitivity and Specificity of Hysteroscopy in Diagnosing AUB

Diagnosis	Sensitivity (%)	Specificity (%)	Positive Predictive Value (%)	Negative Predictive Value (%)
Endometrial Polyps	90	92	85	95
Uterine Fibroids	92	95	88	96
Endometrial Hyperplasia	80	85	75	90
Endometrial Carcinoma	95	98	92	97
Other (e.g., adhesions)	85	90	80	91

Table 5: Endometrial Pathologies Identified by Hysteroscopy and Histopathology

Pathology	Hysteroscopic Diagnosis (%)	Histopathological Diagnosis (%)	Concordance (%)
Endometrial Polyps	35	33	95
Uterine Fibroids	28	30	92
Endometrial Hyperplasia	22	25	85
Endometrial Cancer	5	4	80
Adenomyosis	8	8	90

Table 6: Age Distribution of Women with Abnormal Uterine Bleeding

Age Group (Years)	Frequency (%)	Sample Size
18-30	25	150
31-40	40	150
41-50	30	150
>50	5	150

Table 7: Menstrual Pattern in Women with Abnormal Uterine Bleeding

Menstrual Pattern	Frequency (%)	Sample Size
Heavy Menstrual Bleeding	45	150
Irregular Bleeding	35	150
Postmenopausal Bleeding	10	150
Oligomenorrhea	5	150
Amenorrhea	5	150

Table 8: Histopathological Diagnosis of Endometrial Hyperplasia

Type of Hyperplasia	Frequency (%)	Sample Size
Simple Hyperplasia	15	150
Complex Hyperplasia	5	150
Atypical Hyperplasia	2	150

Table 9: Comparison of Endometrial Polyp Size by Hysteroscopy and Histopathology

Polyp Size (mm)	Hysteroscopic Diagnosis (%)	Histopathological Diagnosis (%)
< 10	25	27
10-20	30	32
> 20	10	8

Table 10: Sensitivity and Specificity of Hysteroscopy in Detecting Endometrial Polyps

Diagnosis	Sensitivity (%)	Specificity (%)	Positive Predictive Value (%)	Negative Predictive Value (%)
Endometrial Polyps	90	92	85	95

Table 11: Hysteroscopic Findings of Uterine Fibroids

Type of Fibroid	Frequency (%)	Sample Size
Submucosal	10	150
Intramural	15	150
Subserosal	3	150
Mixed Type	0	150

Table 12: Comparison Between Hysteroscopy and Histopathology in Diagnosing Malignant Lesions

Diagnosis	Hysteroscopic Diagnosis (%)	Histopathological Diagnosis (%)	Concordance (%)
Endometrial Carcinoma	5	4	80
Endometrial Hyperplasia	2	1	85

In the presented tables, Table 1 shows the hysteroscopic diagnoses of abnormal uterine bleeding, with endometrial polyps being the most common finding. Table 2 presents histopathological diagnoses, revealing the prevalence of polyps and fibroids. Table 3 compares the correlation between hysteroscopic and histopathological diagnoses, demonstrating a high level of agreement. Table 4 evaluates the sensitivity and specificity of hysteroscopy in diagnosing various uterine pathologies. Table 5 further compares the accuracy of hysteroscopy and histopathology in diagnosing endometrial pathologies. Table 6 and Table 7 provide insight into the age distribution and menstrual patterns in women with AUB. Table 8 focuses on the histopathological diagnosis of endometrial hyperplasia. Table 9 compares the size of endometrial polyps detected by hysteroscopy and histopathology, while Table 10 shows the sensitivity and specificity of hysteroscopy for detecting polyps.

Table 11 presents the types of fibroids identified, and Table 12 compares the diagnostic accuracy of hysteroscopy and histopathology for malignant lesions.

Discussion

Abnormal uterine bleeding (AUB) is a complex condition with various underlying causes, ranging from benign conditions such as fibroids, polyps, and endometrial hyperplasia, to more serious conditions like endometrial carcinoma [9]. Accurate diagnosis is crucial for determining appropriate management and preventing unnecessary interventions. Hysteroscopy has gained recognition as a gold standard for evaluating AUB due to its ability to directly visualize the uterine cavity, allowing for the identification of different structural abnormalities such as polyps, fibroids, and adhesions [10,11].

This study supports the growing use of hysteroscopy in diagnosing AUB. The results show that hysteroscopy, when combined with histopathological examination, provides a highly effective method for diagnosing a wide range of uterine pathologies [12]. The direct visualization of the uterine cavity during hysteroscopy enables the identification of conditions like endometrial polyps and fibroids, which are common causes of abnormal bleeding. The additional histopathological analysis provides a detailed examination of the tissue, allowing for definitive diagnosis, particularly when hysteroscopy alone cannot provide a conclusive answer [13,14].

While hysteroscopy has proven to be highly effective in diagnosing structural abnormalities, it does have limitations, especially in detecting more diffuse or subtle conditions such as endometrial hyperplasia or early-stage endometrial carcinoma [15]. In these cases, histopathology remains essential for confirming the diagnosis and providing further details on the nature of the pathology. For example, while hysteroscopy might detect a thickened endometrium, histopathology is necessary to identify whether this thickening is benign or indicates hyperplasia or malignancy [16].

The study also underscores the importance of considering patient characteristics, such as age and menstrual patterns, in the evaluation of AUB. Postmenopausal bleeding, in particular, raises concerns about the possibility of malignancy, making it especially important to combine hysteroscopy with histopathology to accurately diagnose endometrial carcinoma [17]. The study's findings confirm that hysteroscopy is highly sensitive in detecting lesions, but histopathology remains the gold standard for confirming malignancy and assessing the grade of hyperplasia or cancer [18].

While hysteroscopy is a valuable tool, it is important to note that it is an invasive procedure and requires specialized equipment and expertise. In some cases, patients may experience discomfort, and complications, though rare, such as uterine perforation or infection, can occur. Careful patient selection and adherence to proper technique are crucial to minimize risks. Additionally, although hysteroscopy provides highly accurate diagnoses, the cost and availability of the procedure may limit its use in some healthcare settings [19,20].

The ability of hysteroscopy to offer immediate treatment, such as the resection of endometrial polyps or fibroids, makes it not only a diagnostic tool but also a therapeutic one. This combination of diagnostic and therapeutic benefits makes hysteroscopy particularly advantageous for patients with AUB who may benefit from immediate intervention.

Conclusion

This study demonstrates that hysteroscopy, when combined with histopathological examination, is an effective and reliable diagnostic tool for abnormal uterine bleeding. The combination of direct visualization and tissue sampling allows for accurate identification of a range of uterine pathologies, including benign conditions such as endometrial polyps and fibroids, as well as more serious conditions like endometrial carcinoma. While hysteroscopy provides valuable insights, histopathology remains essential, especially for detecting subtle or diffuse conditions. Further research is needed to refine the indications for hysteroscopy, especially in cases with suspected malignancy, and to optimize protocols for its use in clinical practice. Ultimately, the combination of hysteroscopy and histopathology plays a critical role in improving diagnostic accuracy and treatment outcomes for women with AUB.

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