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Original Research Article

ISTOMORPHOLOGICAL SPECTRUM OF ENDOMETRIAL BIOPSIES IN PATIENTS WITH ABNORMAL UTERINE BLEEDING: A RETROSPECTIVE STUDY AT A TERTIARY CARE CENTER

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ABSTRACT

Background: Abnormal uterine bleeding (AUB) is one of the most common gynecological complaints encountered in women of reproductive, perimenopausal, and postmenopausal age groups. It encompasses bleeding that is abnormal in frequency, duration, regularity, or volume and may result from a wide spectrum of endometrial pathologies ranging from physiological changes to premalignant and malignant lesions. Histopathological evaluation of endometrial biopsy specimens remains the gold standard for diagnosing underlying endometrial abnormalities and guiding appropriate clinical management. The present study aimed to evaluate the histomorphological spectrum of endometrial biopsies in patients presenting with AUB at a tertiary care center.

Materials and Methods: This retrospective descriptive study was conducted in the Department of Pathology of a tertiary care teaching hospital. A total of 150 endometrial biopsy and curettage specimens received from patients with AUB during the period from January 2024 to February 2025 were included. Inadequate specimens and pregnancy-related bleeding disorders were excluded. Tissue samples were processed routinely, stained with hematoxylin and eosin, and examined microscopically. Histopathological findings were categorized into physiological, inflammatory, benign non-neoplastic, hyperplastic, and neoplastic lesions. Data were analyzed using descriptive statistics and age-wise distribution of lesions was assessed.

Results: The majority of patients belonged to the 41–50 years age group (40.7%), followed by 31–40 years (28.0%). Proliferative endometrium was the most common histopathological finding, observed in 46 cases (30.7%), followed by secretory endometrium in 28 cases (18.7%). Among pathological lesions, hyperplasia without atypia was identified in 18 cases (12.0%), disordered proliferative endometrium in 16 cases (10.7%), and endometrial polyps in 12 cases (8.0%). Atypical hyperplasia/endometrial intraepithelial neoplasia and endometrial carcinoma were observed in 5 (3.3%) and 7 (4.7%) cases, respectively. Physiological endometrial patterns accounted for 49.3% of biopsies, while hyperplastic and neoplastic lesions constituted 15.3% and 4.7%, respectively.

Conclusion: The histomorphological spectrum of endometrial biopsies in AUB is broad, with physiological endometrial changes constituting the majority of cases. However, the presence of significant premalignant and malignant lesions, particularly in peri- and postmenopausal women, underscores the importance of routine histopathological evaluation. Endometrial biopsy remains a reliable and cost-effective diagnostic tool for the early detection of clinically significant endometrial pathology and appropriate patient management.

Keywords: Abnormal uterine bleeding; Endometrial biopsy; Histomorphology; Endometrial hyperplasia; Endometrial carcinoma.

INTRODUCTION

Abnormal uterine bleeding (AUB) is one of the most common gynecological complaints encountered in clinical practice and constitutes a significant cause of morbidity among women of reproductive, perimenopausal, and postmenopausal age groups. The International Federation of Gynecology and Obstetrics (FIGO) defines AUB as bleeding from the uterine corpus that is abnormal in volume, duration, regularity, and/or frequency and has been present for the majority of the preceding six months.[1] To standardize the nomenclature and etiological classification of AUB, FIGO introduced the PALM–COEIN system, wherein structural causes include Polyp, Adenomyosis, Leiomyoma, and Malignancy/Hyperplasia (PALM), while non-structural causes include Coagulopathy, Ovulatory dysfunction, Endometrial disorders, Iatrogenic causes, and Not yet classified entities (COEIN).[2] AUB accounts for a substantial proportion of gynecological consultations and is a major indication for endometrial sampling because it may be the initial manifestation of significant endometrial pathology.

The pathogenesis of AUB is complex and multifactorial, involving hormonal, vascular, inflammatory, and molecular mechanisms. In women with ovulatory dysfunction, prolonged estrogenic stimulation in the absence of adequate progesterone results in persistent endometrial proliferation, irregular shedding, and breakthrough bleeding.[3] Alterations in local endometrial hemostasis, prostaglandin metabolism, angiogenesis, cytokine production, matrix metalloproteinase activity, and tissue remodeling have also been implicated in the development of abnormal bleeding patterns.[4,5] These mechanisms become particularly relevant during the perimenopausal period, when anovulatory cycles are common and the risk of endometrial hyperplasia increases. In postmenopausal women, AUB warrants prompt evaluation because it may be associated with endometrial hyperplasia, atypical hyperplasia/endometrial intraepithelial neoplasia (EIN), or endometrial carcinoma.[6]

Histopathological examination of endometrial tissue remains the gold standard for the evaluation of AUB because it provides direct assessment of endometrial morphology and facilitates identification of physiological, inflammatory, hyperplastic, premalignant, and malignant lesions.[6,7]

Endometrial biopsy is a simple, cost-effective, and reliable diagnostic procedure that aids in determining the underlying cause of bleeding and guides appropriate therapeutic management. Although several studies have evaluated the histopathological patterns associated with AUB, variations in demographic characteristics, healthcare accessibility, hormonal status, and regional disease prevalence necessitate institution-specific data. Furthermore, early detection of premalignant and malignant endometrial lesions is of paramount importance in reducing disease-related morbidity and mortality. Therefore, the present study was undertaken to evaluate the histomorphological spectrum of endometrial biopsy specimens in patients presenting with abnormal uterine bleeding at a tertiary care center during the period from January 2024 to February 2025 and to analyze the age-wise distribution and prevalence of various endometrial lesions.

MATERIALS AND METHODS

This retrospective descriptive study was conducted in the Department of Pathology at a tertiary care teaching hospital. The study included all endometrial biopsy and curettage specimens received from patients presenting with abnormal uterine bleeding (AUB) during the period from January 2024 to February 2025. Relevant clinical details, including age and presenting complaints, were obtained from pathology requisition forms and hospital records. Cases with inadequate tissue for histopathological evaluation and pregnancy-related bleeding disorders were excluded from the study.

All specimens were fixed in 10% neutral buffered formalin, processed routinely, and embedded in paraffin wax. Sections of 4–5 µm thickness were prepared and stained with hematoxylin and eosin (H&E). Histopathological examination was performed independently by pathologists, and the endometrial findings were categorized into normal cyclical patterns (proliferative and secretory endometrium), non-neoplastic lesions (atrophic endometrium, endometritis, endometrial polyp, and disordered proliferative endometrium), hyperplastic lesions, and malignant neoplasms according to standard histopathological criteria.

The collected data were entered into Microsoft Excel and analyzed using appropriate statistical software. Descriptive statistics such as frequencies and percentages were used to determine the distribution of various histomorphological patterns. Patients were further stratified into different age groups, and the association between age and histopathological findings was assessed. The results were presented in the form of tables and charts to evaluate the histomorphological spectrum of endometrial lesions in patients with abnormal uterine bleeding.

RESULTS

A total of 150 endometrial biopsy/curettage specimens from patients presenting with abnormal uterine bleeding were evaluated. The maximum number of cases was seen in the 41–50 years age group, comprising 61 cases (40.7%), followed by 31–40 years with 42 cases (28.0%). The least number of cases was observed in women aged >60 years, with 7 cases (4.6%). Thus, AUB was most

commonly encountered in the perimenopausal age group.

Table 1: Age-wise Distribution of Patients with Abnormal Uterine Bleeding (AUB)

Age Group (Years)	Number of Cases (n)	Percentage (%)
≤30	18	12.0
31–40	42	28.0
41–50	61	40.7
51–60	22	14.7
>60	7	4.6
Total	**150**	**100.0**

On histopathological examination, proliferative endometrium was the most common finding, observed in 46 cases (30.7%), followed by secretory endometrium in 28 cases (18.7%). Among pathological lesions, hyperplasia without atypia was seen in 18 cases (12.0%), followed by disordered proliferative endometrium in 16 cases (10.7%) and endometrial polyp in 12 cases (8.0%). Premalignant and malignant lesions included atypical hyperplasia/EIN in 5 cases (3.3%) and endometrial carcinoma in 7 cases (4.7%). Inadequate samples constituted 5 cases (3.3%).

Table 2: Histomorphological Spectrum of Endometrial Biopsies in AUB

Histopathological Diagnosis	Number of Cases (n)	Percentage (%)
Proliferative Endometrium	46	30.7
Secretory Endometrium	28	18.7
Disordered Proliferative Endometrium	16	10.7
Atrophic Endometrium	8	5.3
Chronic Endometritis	5	3.3
Endometrial Polyp	12	8.0
Hyperplasia without Atypia	18	12.0
Atypical Hyperplasia / EIN	5	3.3
Endometrial Carcinoma	7	4.7
Inadequate Sample	5	3.3
Total	**150**	**100.0**

When lesions were categorized broadly, physiological endometrium formed the largest group with 74 cases (49.3%), followed by benign non-neoplastic lesions with 36 cases (24.0%). Hyperplastic/premalignant lesions accounted for 23 cases (15.3%), while neoplastic lesions constituted 7 cases (4.7%). Inflammatory lesions were relatively uncommon, with chronic endometritis seen in 5 cases (3.3%).

Table 3: Distribution of Endometrial Lesions According to Histopathological Categories

Category	Histopathological Lesions Included	Number of Cases (n)	Percentage (%)
Physiological	Proliferative + Secretory Endometrium	74	49.3
Inflammatory	Chronic Endometritis	5	3.3
Benign Non-Neoplastic	Atrophic Endometrium, Polyp, Disordered Proliferative Endometrium	36	24.0
Hyperplastic (Premalignant)	Hyperplasia without atypia + Atypical Hyperplasia/EIN	23	15.3
Neoplastic	Endometrial Carcinoma	7	4.7
Inadequate Sample	Unsatisfactory biopsy	5	3.3
Total		**150**	**100.0**

Age-wise analysis showed that proliferative and secretory endometrium were most frequent in the reproductive and perimenopausal age groups. Hyperplasia without atypia was most commonly seen in the 41–50 years age group, with 10 cases, while atypical hyperplasia/EIN was mainly observed after 40 years. Endometrial carcinoma showed an increasing trend with age, with most cases occurring in women aged >50 years, including 3 cases in 51–60 years and 3 cases above 60 years.

Table 4: Age-wise Distribution of Histopathological Findings

Histopathological Diagnosis	≤30	31–40	41–50	51–60	>60	Total
Proliferative Endometrium	12	16	15	3	0	46
Secretory Endometrium	5	10	11	2	0	28
Disordered Proliferative Endometrium	0	4	9	3	0	16
Atrophic Endometrium	0	0	2	4	2	8
Chronic Endometritis	1	2	2	0	0	5
Endometrial Polyp	0	3	6	2	1	12
Hyperplasia without Atypia	0	4	10	3	1	18
Atypical Hyperplasia/EIN	0	0	2	2	1	5
Endometrial Carcinoma	0	0	1	3	3	7
Inadequate Sample	0	3	3	0	0	5

Total	**18**	**42**	**61**	**22**	**7**	**150**

Premalignant and malignant lesions together accounted for 30 cases. These lesions were uncommon below 40 years but increased markedly after 40 years. The highest number was seen in the 41–50 years age group with 13 cases, followed by 51–60 years with 8 cases and >60 years with 5 cases. This highlights the importance of endometrial evaluation in peri- and postmenopausal women presenting with AUB.

Table 5: Distribution of Premalignant and Malignant Lesions According to Age Group

Age Group (Years)	Hyperplasia without Atypia	Atypical Hyperplasia/EIN	Endometrial Carcinoma	Total
≤30	0	0	0	0
31–40	4	0	0	4
41–50	10	2	1	13
51–60	3	2	3	8
>60	1	1	3	5
Total	**18**	**5**	**7**	**30**

DISCUSSION

Abnormal uterine bleeding (AUB) is a common gynecological problem that affects women across all age groups and frequently necessitates endometrial evaluation to identify the underlying pathology. Histopathological examination of endometrial tissue remains the cornerstone for diagnosing various physiological, inflammatory, hyperplastic, and neoplastic lesions. In the present study, the majority of patients belonged to the 41–50 years age group (40.7%), followed by the 31–40 years age group (28.0%). This predominance of perimenopausal women is consistent with the findings of More et al., who reported 40.09% of AUB cases in the 41–50 years age group, and Sharma et al., who similarly observed the highest incidence of AUB among women in the perimenopausal decade.[8,9] A clinico-histopathological study by Patil et al. also documented that 61.17% of women with AUB belonged to the 40–49 years age group.[10] The increased prevalence of AUB during the perimenopausal period is largely attributed to declining ovarian function, hormonal imbalance, and increased frequency of anovulatory cycles resulting in irregular endometrial shedding.

In the present study, proliferative endometrium was the most common histopathological finding, accounting for 30.7% of cases. Similar observations have been reported in numerous studies evaluating endometrial biopsies in AUB. Sharma et al. reported proliferative endometrium in 38.8% of cases, whereas More et al. documented a prevalence of 41.58%.[8,9] Patil et al. observed proliferative endometrium in 35.53% of endometrial biopsies.[10] Likewise, Kumari et al. found proliferative endometrium to be the predominant histological pattern in approximately one-third of patients presenting with AUB.[11] The predominance of proliferative endometrium in these studies, including the present one, reflects the high frequency of anovulatory cycles and prolonged estrogen stimulation, particularly during the perimenopausal transition.

Secretory endometrium constituted 18.7% of cases in the present study and represented the second most common physiological pattern. Comparable frequencies have been reported by Sharma et al. (16.3%) and More et al. (17.32%).[8,9] Patil et al. also observed secretory endometrium in approximately 18% of biopsies evaluated for AUB.[10] These findings suggest that a substantial proportion of women presenting with abnormal bleeding may still demonstrate normal ovulatory endometrial changes, highlighting the multifactorial nature of AUB and the importance of correlating histopathological findings with clinical presentation.

Disordered proliferative endometrium was identified in 10.7% of cases in the present study. This finding is comparable to the 12.2% prevalence reported by Jetley et al,[12] Disordered proliferative endometrium is considered a transitional lesion between normal proliferative endometrium and endometrial hyperplasia and is commonly associated with prolonged estrogen exposure. The majority of such lesions in the present study were encountered in women aged 41–50 years, supporting the hypothesis that hormonal fluctuations during the perimenopausal period contribute significantly to its development.

Benign non-neoplastic lesions constituted an important component of the histomorphological spectrum. Endometrial polyps were identified in 8.0% of cases, while atrophic endometrium accounted for 5.3%. Similar frequencies have been reported by several authors. In a study by Doraiswami et al., endometrial polyps were observed in approximately 7% of cases, whereas atrophic endometrium was predominantly seen among postmenopausal women.[13] The age-wise distribution observed in the present study showed that most atrophic endometrial lesions occurred after 50 years of age, consistent with the hypoestrogenic state characteristic of menopause. Atrophic endometrium remains an important cause of postmenopausal bleeding due to fragility of superficial endometrial vessels and stromal breakdown.

Chronic endometritis was diagnosed in 3.3% of cases in the present study. Similar low prevalence

rates have been documented in previous studies evaluating endometrial biopsies in women with AUB.[8,9] Although relatively uncommon, chronic endometritis remains clinically significant because it represents a treatable cause of abnormal bleeding. Histological identification of plasma cells within the endometrial stroma is essential for accurate diagnosis and appropriate therapeutic intervention.

Endometrial hyperplasia is a precursor lesion for endometrial carcinoma and therefore represents one of the most clinically significant findings in endometrial biopsies. In the present study, hyperplasia without atypia was observed in 12.0% of cases, while atypical hyperplasia/endometrial intraepithelial neoplasia (EIN) was identified in 3.3%, resulting in an overall prevalence of hyperplastic lesions of 15.3%. Sharma et al. reported endometrial hyperplasia in 12.0% of cases, while More et al. documented a prevalence of 15.34%, both of which closely resemble the findings of the present study.[8,9] In contrast, Jetley et al. reported a higher prevalence of approximately 25%.[12] Such variations may be attributable to differences in patient demographics, referral patterns, and inclusion criteria. Notably, most hyperplastic lesions in the present study occurred in women aged 41–50 years, reinforcing the established association between prolonged unopposed estrogen exposure and endometrial hyperplasia.

Endometrial carcinoma was diagnosed in 4.7% of cases in the present study. This prevalence is comparable to the 4.5% reported by Jetley et al,[12] However, Sharma et al. and More et al. reported lower frequencies of 1.1% and 1.98%, respectively.[8,9] In the present study, the majority of carcinomas occurred in women older than 50 years, with the highest incidence observed in those above 60 years of age. Similar observations have been reported in previous studies, where malignant lesions were predominantly encountered in postmenopausal women.[12,13] These findings emphasize the importance of prompt endometrial assessment in older women presenting with AUB, as early detection significantly influences prognosis and management.

When the histopathological findings were categorized broadly, physiological endometrium (proliferative and secretory patterns) constituted 49.3% of all biopsies, whereas benign non-neoplastic lesions accounted for 24.0%, hyperplastic lesions for 15.3%, and neoplastic lesions for 4.7%. Similar distributions have been reported in several studies where physiological endometrium represented approximately 45–55% of endometrial biopsies evaluated for AUB.[11,14] Although benign and physiological patterns predominated, the identification of premalignant and malignant lesions in nearly one-fifth of patients underscores the indispensable role of histopathological evaluation in women presenting with abnormal uterine bleeding.

CONCLUSION

The present study demonstrated that abnormal uterine bleeding is most commonly encountered in the perimenopausal age group, with the highest incidence observed between 41 and 50 years of age. Proliferative endometrium was the predominant histomorphological pattern, followed by secretory endometrium, indicating that physiological endometrial changes constitute a major proportion of endometrial biopsies in AUB. However, a significant proportion of patients harbored hyperplastic (15.3%) and malignant (4.7%) lesions, highlighting the importance of histopathological evaluation in identifying premalignant and malignant endometrial pathology. The prevalence of atypical hyperplasia and endometrial carcinoma increased with advancing age, particularly among peri- and postmenopausal women.

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