Spectrum of endometrial pathologies in abnormal uterine bleeding: A retrospective descriptive study.

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Abstract
Background
Abnormal uterine bleeding (AUB) is one of the most frequent gynecological complaints affecting women of all reproductive and perimenopausal ages. Histopathological evaluation of the endometrium remains the cornerstone for identifying the underlying causes, which may range from benign hormonal imbalance to premalignant or malignant lesions.

Objectives
To describe the histopathological spectrum of endometrial lesions in women presenting with abnormal uterine bleeding (AUB) over two years

Methods
This retrospective study included 50 cases of AUB evaluated over two years. Endometrial biopsy and curettage specimens were reviewed, and histopathological patterns were categorized as functional, structural, inflammatory, or neoplastic. Clinical data such as age, menopausal status, and bleeding pattern were retrieved from medical records and analyzed descriptively.

Results
The mean age of participants was 42.3 ± 8.1 years, with the highest incidence (46%) in the 41–50-year age group. Menorrhagia (46%) was the most common clinical presentation. Histopathological examination revealed proliferative endometrium (20%), secretory endometrium (16%), endometrial hyperplasia (16%), and disordered proliferative pattern (12%) as the major findings. Structural lesions included endometrial polyps (8%) and carcinoma (4%), while atrophic and inflammatory changes accounted for 6% each. Hyperplasia was most frequent in the perimenopausal group, whereas carcinoma was confined to postmenopausal women.

Conclusion
The predominance of functional and hyperplastic endometrial patterns in AUB underscores the hormonal etiology of bleeding in most women, particularly during the perimenopausal transition. Routine histopathological evaluation of endometrial samples is essential to detect precancerous and malignant conditions early.

Recommendations
All women with persistent or recurrent AUB—especially those aged ≥40 years or postmenopausal should undergo endometrial sampling for definitive diagnosis. Integrating histopathological assessment with hormonal evaluation and imaging improves diagnostic accuracy and guides targeted management.

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Introduction

Abnormal uterine bleeding (AUB) is one of the most frequent gynecological disorders, accounting for nearly 30–40% of outpatient gynecological visits and a considerable proportion of hysterectomies among reproductive and perimenopausal women [1]. It is defined as uterine bleeding that is abnormal in frequency, regularity, duration, or volume, and not related to pregnancy. AUB significantly affects women's physical health, social functioning, and psychological well-being, often leading to anemia, fatigue, and reduced quality of life [2].

To achieve uniformity in diagnosis and management, the International Federation of Gynecology and Obstetrics (FIGO) developed the PALM-COEIN classification, which categorizes AUB into structural causes: Polyp, Adenomyosis, Leiomyoma, Malignancy, and Hyperplasia, and non-structural causes: Coagulopathy, Ovulatory dysfunction, Endometrial, Iatrogenic, and Not otherwise classified [3]. Despite this framework, in many developing regions, the histopathological evaluation of endometrial tissue remains the most reliable, accessible, and cost-effective method for determining the exact etiology of AUB and distinguishing benign, premalignant, and malignant lesions [4].

Endometrial sampling provides critical insight into hormonal response patterns (proliferative, secretory, or disordered proliferative), structural lesions such as polyps or hyperplasia, and neoplastic transformations, thereby guiding appropriate clinical management. The pattern of endometrial pathology varies with age, hormonal status, and menopausal state. Perimenopausal women are particularly susceptible to AUB due to anovulatory cycles and unopposed estrogen exposure, while postmenopausal bleeding warrants prompt evaluation to exclude malignancy [5].

Although several studies across India and abroad have explored the histopathological spectrum of AUB, regional variability persists owing to demographic and environmental differences. However, data from the southern Indian population, especially from tertiary-care centers such as JR Medical College, Tindivanam, remain scarce. Hence, the present study was designed to evaluate the histopathological spectrum of endometrial lesions in women with AUB and correlate the findings with age distribution and menopausal status.

Hence, the present study was undertaken to evaluate the spectrum of endometrial pathologies among women presenting with AUB and to correlate these findings with age distribution and menopausal status, thereby emphasizing the role of histopathology as a key diagnostic tool in patient management.

Methodology
Study Design and Setting

This was a hospital-based retrospective descriptive study conducted in the Department of Pathology at JR Medical College, Tindivanam, Tamil Nadu, India, over two years from January 2022 to January 2024. The study evaluated the histopathological spectrum of endometrial lesions among women presenting with abnormal uterine bleeding (AUB). JR Medical College is a tertiary-care teaching hospital serving a predominantly rural and semi-urban population of the Villupuram district and the surrounding regions of Tamil Nadu. The institution functions as a referral center for gynecological services and histopathological diagnostics.

Study Population

The study included 50 endometrial biopsies and curettage specimens received in the department from patients clinically diagnosed with AUB. Relevant clinical data such as age, parity, menstrual history, menopausal status, and presenting symptoms were collected from medical records and requisition forms accompanying the specimens.

Inclusion Criteria

All women presenting with abnormal uterine bleeding who underwent endometrial biopsy or curettage at JR Medical College, Tindivanam, during the two-year study period from January 2022 to January 2024.

Adequate endometrial tissue samples are available for histopathological evaluation.

Cases with complete clinical and pathological records.

Exclusion Criteria

Inadequate or autolysed endometrial samples.

Cases with uterine bleeding due to pregnancy-related complications or known cervical/vaginal lesions.

Patients with incomplete clinical data.

Specimen Processing and Histopathological Examination

All tissue specimens were fixed in 10% neutral buffered formalin, processed routinely, and embedded in paraffin blocks. Sections of 4–5 µm thickness were cut and stained with hematoxylin and eosin (H&E). Special stains such as Periodic Acid–Schiff (PAS) were used whenever indicated. Each slide was carefully examined under light microscopy to assess architectural and cytological features. Histopathological diagnoses were classified into functional, structural, inflammatory, and neoplastic categories according to the World Health Organization (WHO) classification of endometrial lesions (2020 revision).

Data Analysis

The collected data were entered into Microsoft Excel 2021 and analyzed using descriptive statistics. Results were expressed as frequency and percentage. Comparative analysis was done to establish correlations between age groups, menopausal status, and histopathological findings.

Ethical Considerations

Institutional ethical approval was obtained from the Ethics Committee of JR Medical College, Tindivanam, before initiation of the study. Patient confidentiality was strictly maintained throughout the data collection and analysis process.

Results

A total of 50 women presenting with abnormal uterine bleeding (AUB) were analyzed retrospectively. The participants ranged in age from 22 to 65 years, with a mean age of 42.3 ± 8.1 years. The highest proportion of cases (46%) occurred in the 41–50 years age group, followed by 31–40 years (30%). Only 18% of cases were above 50 years, while the remaining 6% were below 30 years. The age-wise distribution of cases is shown in Table 1. The majority of patients were premenopausal (68%), and 32% were postmenopausal.

Table 1: Age-wise Distribution of Study Participants (n = 50)

Age Group (years)	Number of Cases	Percentage (%)
≤30	3	6.0
31–40	15	30.0
41–50	23	46.0
>50	9	18.0
Total	**50**	**100.0**

Menorrhagia was the most frequent clinical presentation, observed in 46% of patients, followed by metrorrhagia (22%), menometrorrhagia (20%), polymenorrhea (8%), and postmenopausal bleeding (4%). The distribution of clinical presentations is summarized in Table 2. Most cases of menorrhagia were found in women aged between 41 and 50 years, correlating with the perimenopausal hormonal transition phase (Figure 1).

Table 2. Clinical Presentation of Abnormal Uterine Bleeding

Clinical Presentation	No. of Cases	Percentage (%)
Menorrhagia	23	46.0
Metrorrhagia	11	22.0
Menometrorrhagia	10	20.0
Polymenorrhea	4	8.0
Postmenopausal bleeding	2	4.0
Total	**50**	**100.0**

Histopathological examination of endometrial samples revealed a diverse spectrum of lesions (Table 3). Proliferative endometrium (20%) was the most frequent finding, followed by secretory endometrium (16%), endometrial hyperplasia (16%), and disordered proliferative endometrium (12%). Structural pathologies such as endometrial polyps (8%) and carcinoma (4%) were less frequent. Atrophic and inflammatory endometrial patterns each accounted for 6% of cases. Overall, functional endometrial changes (proliferative, secretory, and disordered proliferative) constituted nearly half of all AUB

cases, indicating a predominance of hormonal imbalance in the etiopathogenesis.

Table 3. Spectrum of Endometrial Histopathological Findings

Histopathological Diagnosis	No. of Cases	Percentage (%)
Proliferative endometrium	10	20.0
Secretory endometrium	8	16.0
Disordered proliferative endometrium	6	12.0
Endometrial hyperplasia (simple/complex)	8	16.0
Endometrial polyp	4	8.0
Atrophic endometrium	3	6.0
Chronic endometritis	3	6.0
Pill endometrium / hormonal effect	4	8.0
Endometrial carcinoma	2	4.0
Total	**50**	**100.0**

Correlation of endometrial lesions with age groups (Table 4) showed that the majority of endometrial hyperplasia cases were observed in women aged 41–50 years (5 out of 8 cases), corresponding to the perimenopausal age group. All cases of endometrial carcinoma were confined to women above 50 years, highlighting the increased malignant risk in postmenopausal abnormal uterine bleeding. Proliferative and secretory endometrial patterns were more frequently noted among women of reproductive age.

Table 4. Age-wise Correlation of Major Endometrial Lesions

Age Group (years)	Hyperplasia (n=8)	Carcinoma (n=2)	Proliferative Pattern (n=10)	Secretory Pattern (n=8)
≤30	–	–	2	1
31–40	1	–	3	3
41–50	5	–	4	3
>50	2	2	1	1

Discussion

Abnormal uterine bleeding (AUB) represents a heterogeneous clinical condition that frequently necessitates histopathological evaluation to establish an accurate diagnosis. In the present retrospective descriptive study, the highest incidence of AUB was observed in women aged 41–50 years, corresponding to the perimenopausal transition. This age group is particularly vulnerable due to anovulatory cycles, fluctuating estrogen levels, and prolonged unopposed estrogen exposure, which predispose to endometrial hyperplasia and disordered proliferative changes [6].

Menorrhagia was the most common presenting symptom, followed by metrorrhagia and menometrorrhagia. This pattern is consistent with earlier reports indicating that excessive or irregular menstrual bleeding is the predominant clinical manifestation among perimenopausal women with endometrial pathology [2,8]. Persistent heavy bleeding in this age group warrants prompt endometrial evaluation to exclude premalignant and malignant conditions.

Histopathological examination revealed that functional endometrial patterns—proliferative, secretory, and disordered proliferative endometrium—constituted the majority of cases. These findings reinforce the role of hormonal imbalance and ovulatory dysfunction as key

contributors to AUB, particularly in reproductive and perimenopausal women [9]. Similar distributions have been reported across multiple regional and international studies, underscoring the consistency of these patterns across diverse populations [8].

Endometrial hyperplasia accounted for a notable proportion of cases and was predominantly observed in women aged 41–50 years. This observation aligns with published evidence highlighting a higher prevalence of hyperplastic lesions in perimenopausal women, attributed to prolonged estrogenic stimulation without adequate progesterone opposition [5,6]. Identifying hyperplasia at this stage is clinically significant, as timely intervention can prevent progression to endometrial carcinoma.

Endometrial carcinoma was detected exclusively in women above 50 years of age in the present study. This finding emphasizes the increased malignant potential associated with postmenopausal AUB and supports existing recommendations that all postmenopausal bleeding should be considered malignant until proven otherwise [9]. Although the incidence of carcinoma was low, the detection of malignancy highlights the indispensable role of histopathology in early diagnosis and risk stratification.

Structural lesions such as endometrial polyps and inflammatory endometritis were less frequent but clinically relevant. Atrophic endometrium was primarily observed among postmenopausal women, a finding that has been consistently reported in studies correlating histopathology with imaging and clinical presentation [10,11]. Integrating histopathological assessment with transvaginal ultrasonography has been shown to improve diagnostic accuracy and reduce unnecessary invasive procedures [11,12].

Overall, the findings of this study reaffirm that histopathological evaluation remains the gold standard for diagnosing AUB and differentiating functional from organic causes. Routine endometrial sampling, particularly in women aged 40 years and above or those with postmenopausal bleeding, is essential for early detection of premalignant and malignant lesions and for guiding appropriate clinical management.

Generalizability

The findings of this study are primarily generalizable to women presenting with abnormal uterine bleeding in tertiary-care teaching hospitals serving similar rural and semi-urban populations. While the histopathological patterns observed are comparable to those reported in other institutional and regional studies, variations in population demographics, referral patterns, and healthcare access may influence disease distribution. Therefore, caution should be exercised when extrapolating these results to community-based or primary-care settings.

Conclusion

The present study highlights that abnormal uterine bleeding most commonly affects women in the perimenopausal age group, with menorrhagia being the predominant symptom. Histopathological evaluation revealed that functional endometrial patterns and hyperplastic changes were the leading causes, while malignancy was confined to postmenopausal women. These findings reaffirm the pivotal role of endometrial sampling in the diagnostic workup of AUB to identify underlying pathology and exclude precancerous or malignant lesions. Routine histopathological examination, particularly in women aged 40 years and above, should be emphasized to facilitate early diagnosis, timely intervention, and prevention of endometrial carcinoma through appropriate medical or surgical management.

Limitations

The present study was limited by its retrospective design and relatively small sample size, which may restrict the generalizability of findings. Clinical and hormonal correlations could not be extensively analyzed due to incomplete patient records. Additionally, the study was conducted at a single tertiary-care center, and follow-up data were unavailable to assess treatment outcomes or progression of endometrial lesions over time.

Recommendations

All women aged 40 years and above, or those presenting with persistent or recurrent abnormal uterine bleeding, should undergo mandatory endometrial sampling irrespective of imaging findings. Histopathological examination must be integrated into routine gynecological evaluation to ensure early detection of hyperplasia and carcinoma. Combining histopathology with transvaginal ultrasonography and hormonal assessment enhances diagnostic accuracy. Establishing standardized AUB management protocols and conducting larger multicentric studies with molecular and immunohistochemical correlation are recommended to refine diagnostic precision and improve patient outcomes.

Acknowledgements

Abbreviations

AUB – Abnormal Uterine Bleeding
FIGO – International Federation of Gynecology and Obstetrics
PALM-COEIN – Polyp, Adenomyosis, Leiomyoma, Malignancy/Hyperplasia–Coagulopathy, Ovulatory dysfunction, Endometrial, Iatrogenic, Not otherwise classified
H&E – Hematoxylin and Eosin
WHO – World Health Organization
PAS – Periodic Acid–Schiff
PCOS – Polycystic Ovary Syndrome
TVS – Transvaginal Sonography
D&C – Dilatation and Curettage
JRMC – JR Medical College

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Conflict of interest

The Author declares no conflict of interest.

Author contributions

SA-Concept and design of the study, results interpretation, review of literature, and preparation of the first draft of the manuscript. Statistical analysis and interpretation, revision of manuscript.**APP**- design of the study, results interpretation, review of literature, and preparation of the first draft of the manuscript. Statistical analysis and interpretation, revision of manuscript.**VS results** interpretation, review of literature, and preparing the first draft of the manuscript. Statistical analysis and interpretation, revision of manuscript.

Data availability

Data available on request

Author Biography

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