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Original Research Article

Correlation Between Histopathological and Clinico- Radiological Findings in Abnormal Uterine Bleeding Patients in Tertiary Care Centre of Rajasthan

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Conflict of interest: Nil

Abstract

Background: Abnormal uterine bleeding (AUB) is a common gynaecological complaint that may result from hormonal disturbances, structural abnormalities, endometrial hyperplasia, or malignancy. Correlation of ultrasonographic findings with histopathological examination helps in identifying the underlying endometrial pathology and guiding clinical management.

Aim: To evaluate the histopathological spectrum of endometrial lesions in patients with AUB and assess its association with ultrasonographic endometrial thickness.

Materials and Methods: This cross-sectional descriptive study was conducted in the Department of Pathology, Pacific Institute of Medical Sciences, Umarda, Udaipur, Rajasthan, from May 2024 to November 2025. A total of 369 patients aged 18–80 years were included. Endometrial biopsy and hysterectomy specimens were examined using routine histopathological techniques and haematoxylin and eosin staining. Ultrasonographic endometrial thickness was recorded and correlated with histopathological findings. Data were analysed using SPSS version 26.0 and Microsoft Excel 2021. A p-value of less than 0.05 was considered statistically significant.

Results: The mean age of patients was 46.18 ± 8.46 years, with the highest proportion (51.5%) in the 41–50 years age group. Endometrial biopsy constituted 56% of specimens, while hysterectomy specimens accounted for 44%. Endometrial thickness of 5–10 mm was the most common finding (61.8%). Comparison of endometrial thickness with histopathological findings revealed a statistically significant association between the two parameters ($p < 0.001$). Atrophic endometrium was observed exclusively in cases with endometrial thickness 20 mm groups (3; 42.9%), indicating a higher proportion of malignant lesions among cases with greater endometrial thickness.

Conclusion: AUB was most common among women aged 41–50 years, and benign cyclical endometrial patterns predominated. The significant association between endometrial thickness and histopathological findings highlights the value of ultrasonography as a complementary diagnostic tool. Histopathological examination remains essential for definitive diagnosis and identification of premalignant and malignant lesions.

Keywords: Abnormal Uterine Bleeding; Endometrial Thickness; Histopathology; Ultrasonography; Endometrial Carcinoma; Endometrial Hyperplasia.

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Introduction

Abnormal uterine bleeding (AUB) is one of the most common gynaecological complaints affecting women of reproductive, perimenopausal, and postmenopausal age groups. It is characterized by abnormalities in menstrual frequency, regularity, duration, or volume and may significantly affect physical health, psychological well-being, and quality of life [1,2]. Persistent bleeding may lead to iron-deficiency anaemia, while underlying endometrial hyperplasia or malignancy necessitates timely diagnosis and appropriate management [3].

The International Federation of Gynecology and Obstetrics (FIGO) introduced the PALM–COEIN classification system to standardize the diagnosis of AUB. It categorizes causes into structural abnormalities, including polyp, adenomyosis, leiomyoma, and malignancy/hyperplasia, and non-structural causes, comprising coagulopathy, ovulatory dysfunction, endometrial disorders, iatrogenic causes, and those not otherwise classified [2,4]. This classification facilitates systematic evaluation and improves comparability between clinical studies.

Ultrasonography, particularly transvaginal ultrasonography (TVS), is an important initial investigation for assessing endometrial thickness, uterine morphology, and structural abnormalities such as polyps and leiomyomas [5]. However, radiological findings alone may not reliably establish the exact nature of endometrial lesions. Endometrial thickness must also be interpreted in relation to age, menstrual-cycle phase, and menopausal status [6].

Histopathological examination of endometrial tissue provides definitive information regarding endometrial changes, including proliferative and secretory patterns, hyperplasia, inflammation, and malignancy. Previous studies have demonstrated a diverse spectrum of histopathological findings among women presenting with AUB, emphasizing the importance of tissue diagnosis in clinical management [7,8].

Correlation of clinical presentation, radiological findings, and histopathological examination can improve diagnostic assessment and facilitate appropriate treatment. Therefore, the present study aims to evaluate the correlation between histopathological and clinico-radiological findings in patients with AUB at a tertiary care centre in Rajasthan, analyse their age distribution, assess the relationship between ultrasonographic endometrial thickness and histopathological diagnosis, and determine the distribution of histopathological patterns.

Material & Methodology

A cross-sectional descriptive study was conducted in the Department of Pathology, Pacific Institute of Medical Sciences, Umarda, Udaipur, Rajasthan, over a period of 19 months, from May 2024 to November 2025, after obtaining approval from the Institutional Ethics Committee.

The study included female patients aged 18–80 years presenting with abnormal uterine bleeding (AUB), whose endometrial biopsy, total hysterectomy (abdominal or vaginal), hysterectomy with unilateral or bilateral oophorectomy, or hysterectomy with unilateral or bilateral salpingo-oophorectomy specimens were received in the pathology department for histopathological examination and who had undergone pelvic ultrasonography for assessment of endometrial thickness. The sample size was calculated using an estimated AUB prevalence of 40%, a 95% confidence level ($Z = 1.96$), and an absolute precision of 5%, yielding a minimum sample size of 369 cases.

Pregnant women, cases in which specimens were not received in 10% formalin, and cases belonging to the COEIN category were excluded. Clinical data, including age, menstrual history, relevant medical and family history, and medication details, were recorded using a predesigned study proforma. Ultrasonographic findings obtained through transabdominal or transvaginal examination were documented and correlated with the histopathological findings.

Tissue specimens were fixed in 10% formalin for 18–24 hours, depending on specimen size, followed by routine tissue processing, paraffin embedding, sectioning, and staining with haematoxylin and eosin (H&E). The stained sections were examined under a light microscope, and histopathological diagnoses were established based on the morphological features of the endometrium and other relevant uterine lesions. Endometrial lesions, including hyperplasia, malignancy, polyps, and other pathological conditions, were evaluated according to established histopathological criteria, with uterine corpus tumours classified according to the WHO Classification of Female Genital Tumours, 5th edition (2020). The histopathological diagnoses were correlated with clinical and ultrasonographic findings, particularly endometrial thickness, to assess the association between radiological and tissue-based diagnoses.

Data were analysed using SPSS version 26.0, while Microsoft Excel 2021 was used for graphical representation. Qualitative variables were expressed as frequencies and percentages, and quantitative

variables as mean ± standard deviation. Associations between histopathological and ultrasonographic findings were assessed using appropriate statistical tests, and agreement between diagnostic modalities was evaluated using Cohen's kappa statistic, wherever applicable. A p-value of less than 0.05 was considered statistically significant.

Result

A total of 369 patients with abnormal uterine bleeding (AUB) were included in the study.

The mean age was 46.18 ± 8.46 years, with the majority of patients belonging to the 41–50 years age group (51.5%). Comparison of endometrial thickness with histopathological findings showed that atrophic endometrium was observed only in cases with <5 mm thickness (10; 16.7%). Disordered proliferative phase was most commonly associated with 5–10 mm thickness (51; 22.4%), followed by <5 mm thickness (12; 20%). Endometrial polyps were distributed across all thickness categories, with relatively higher occurrence in the 11–15 mm group (6; 12.5%).

Endometrial carcinoma was predominantly seen in cases with 16–20 mm thickness (12; 46.2%) and >20 mm thickness (3; 42.9%). A statistically significant association was observed between endometrial thickness and histopathological findings ($p < 0.001$).

Table 1: Baseline characteristics and distribution of study cases (n = 369)

Age Distribution	Frequency (%)
21-30	2 (0.5)
31-40	87 (23.6)
41-50	190 (51.5)
51-60	62 (16.8)
61-70	24 (6.5)
71-80	4 (1.1)
Mean Age	46.18±8.46
Endometrial Biopsy	207 (56.0)
Hysterectomy Specimen	162 (44.0)

Table 2: Distribution of endometrial thickness with histopathological findings.

Variable	Study Groups					p-value
	<5 (n,60)	5-10 (n,228)	11-15 (n,48)	16-20 (n,26)	>20 (n,7)	
Atrophic	10 (16.7)	6 (2.6)	0 (0)	0 (0)	0 (0)	<0.001
Disordered Proliferative Phase	12 (20)	51 (22.4)	2 (4.2)	1 (3.8)	0 (0)	
Endometrial Polyp	2 (3.3)	13 (5.7)	6 (12.5)	1 (3.8)	1 (14.3)	
Carcinoma	2 (3.3)	3 (1.3)	1 (2.1)	12 (46.2)	3 (42.9)	
Hyperplasia with Atypia	0 (0)	0 (0)	1 (2.1)	2 (7.7)	1 (14.3)	
Hyperplasia without Atypia	0 (0)	2 (0.9)	6 (12.5)	4 (15.4)	0 (0)	
Proliferative Phase ± Adenomyosis	20 (33.3)	82 (36)	8 (16.7)	2 (7.7)	2 (28.6)	
Secretory Phase ± endometritis	14 (23.3)	71 (31.1)	24 (50)	4 (15.4)	0 (0)	



Figure 1: Uterus Cervix with Adenomyosis



Figure 2: Endometrial Carcinoma

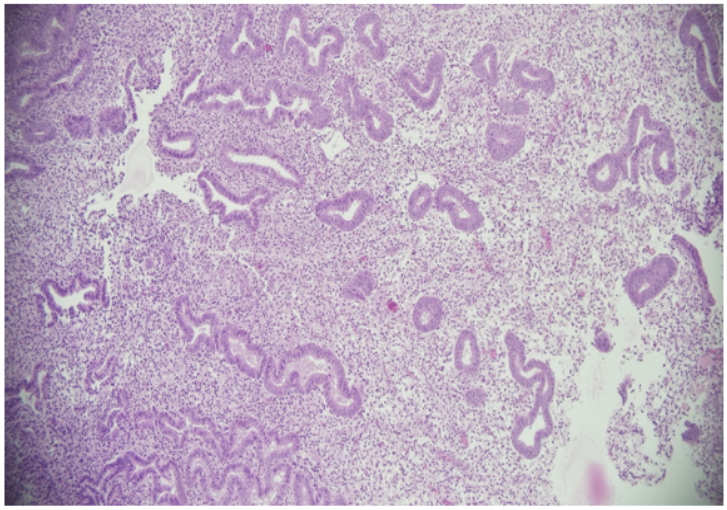


Figure 3: Endometrium – Disordered Proliferative Phase (H&E stain 200x magnification)

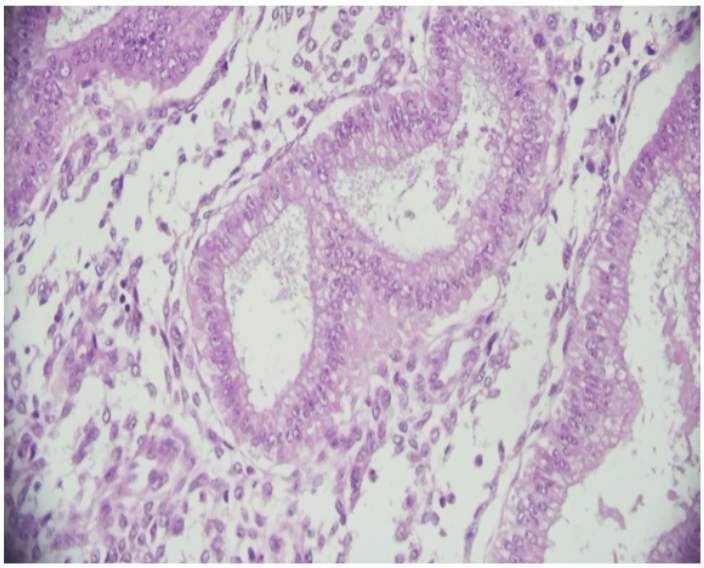


Figure 4: Endometrium - Secretory Phase (H&E stain 400x magnification)

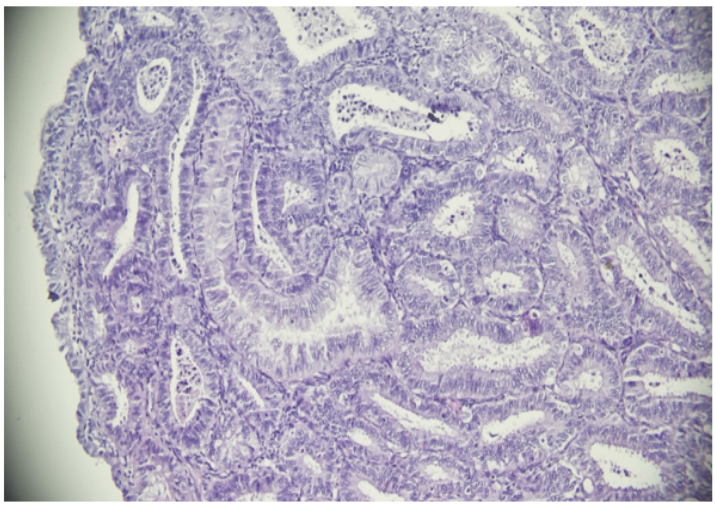


Figure 5: Endometrial Carcinoma (H&E stain 200x magnification)

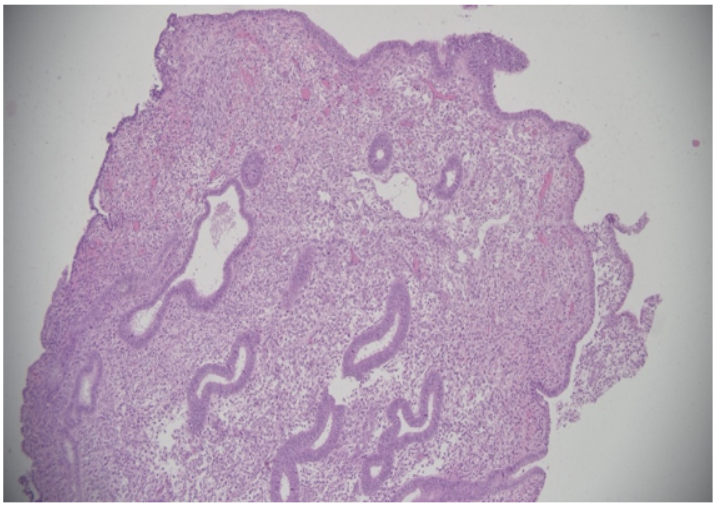


Figure 6: Endometrial Polyp (H&E stain 200x magnification)

Discussion

Abnormal uterine bleeding (AUB) is a common gynaecological condition that can significantly affect women's quality of life. Clinical assessment, ultrasonography, and histopathological examination play complementary roles in identifying its underlying causes [1,5,6].

In the present study, 369 patients were evaluated, with the majority belonging to the 41–50 years age group (51.5%). The mean age was 46.18 ± 8.46 years, indicating a predominance of AUB during the perimenopausal period. Similar findings were reported by Sharma et al. [9], Pundir et al. [10], and Roy et al. [11], who observed a higher frequency of AUB among women in their forties. Hormonal fluctuations and ovulatory dysfunction during this period may contribute to abnormal bleeding. Endometrial biopsy constituted 56% of specimens, while hysterectomy specimens accounted for 44%. This highlights the importance of endometrial sampling in evaluating AUB, while hysterectomy specimens provide comprehensive tissue assessment. Previous studies have also emphasized the diagnostic utility of endometrial biopsy in identifying benign, premalignant, and malignant lesions [10, 11, 12,].

Regarding ultrasonographic findings, endometrial thickness of 5–10 mm was most common (61.8%), followed by 11–15 mm (13.0%). Similar distributions were reported by Sujana et al. [13] and Pundir et al. [10]. Ultrasonography is a useful non-invasive investigation, although endometrial thickness should be interpreted alongside age, menstrual status, and clinical findings [8,14].

Histopathologically, proliferative-phase endometrium, with or without adenomyosis, was the most common finding (30.9%), closely followed by secretory-phase endometrium, with or without endometritis (30.6%). Disordered proliferative endometrium accounted for 17.9% of cases. These findings are broadly comparable with Sharma et al. [9], Behera et al. [15], and Pundir et al. [10], who also reported predominantly benign endometrial patterns. Endometrial carcinoma was identified in

5.7% of cases, while hyperplasia with and without atypia accounted for 1.1% and 3.3%, respectively, emphasizing the importance of histopathological evaluation.

A statistically significant association was observed between endometrial thickness and histopathological findings ($p < 0.001$). Carcinoma was predominantly identified in the 16–20 mm and greater-than-20-mm categories. Similar associations between increased endometrial thickness and significant endometrial pathology have been reported by Thoprasert et al. [16], Kumari et al. [17], and Khanna and Sudha [18]. However, carcinoma was also detected in patients with thinner endometrium, indicating that thickness alone cannot exclude malignancy.

Overall, the findings support an integrated approach combining clinical assessment, ultrasonography, and histopathological examination for appropriate diagnosis and management of AUB.

Conclusion

Abnormal uterine bleeding was most common among women aged 41–50 years, with proliferative and secretory endometrial patterns being the predominant histopathological findings. A statistically significant association was observed between endometrial thickness and histopathological findings ($p < 0.001$). Increased endometrial thickness was associated with a higher occurrence of premalignant and malignant lesions. Ultrasonography, combined with histopathological examination, is essential for accurate diagnosis and appropriate management of AUB.

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