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Original Article

Endometrial Thickness and Histopathological Findings in Females with Perimenopausal Abnormal Uterine Bleeding

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ABSTRACT

Introduction: Abnormal uterine bleeding (AUB) is one of the most common gynecological complaints among perimenopausal females and often reflects a wide spectrum of underlying endometrial abnormalities ranging from benign hormonal changes to premalignant and malignant lesions. The present study was conducted to assess the association between endometrial thickness measured by Transvaginal Sonography (TVS) and histopathological findings in perimenopausal females presenting with abnormal uterine bleeding. **Methods & Materials:** This cross-sectional analytic observational study was conducted in the Department of Gynecology and Obstetrics of Mugda Medical College & Hospital, Dhaka, Bangladesh, from February 2025 to January 2026. A total of 100 consecutive perimenopausal females aged 40–55 years who attended the gynecology outpatient department with complaints of abnormal uterine bleeding were enrolled using purposive sampling. Data were collected using a structured case record form and entered into Statistical Package for the Social Sciences (SPSS) version 26.0 for analysis. **Result:** Heavy menstrual bleeding was the most common presentation (44.0%). The mean endometrial thickness was 11.9 ± 3.8 mm, with most females having an endometrial thickness of 11–15 mm (38.0%). Histopathologically, proliferative endometrium was the predominant finding (34.0%), while significant endometrial pathology, including hyperplasia and carcinoma, was identified in 26.0% of cases. A statistically significant association was observed between increasing endometrial thickness and the presence of hyperplasia and carcinoma ($p = 0.002$), and mean endometrial thickness increased progressively with the severity of histopathological abnormality ($p < 0.001$). **Conclusion:** This study showed a significant association between endometrial thickness measured by transvaginal ultrasonography and the underlying histopathological abnormalities in perimenopausal females presenting with abnormal uterine bleeding. Clinically important endometrial lesions, including hyperplasia and carcinoma, were detected in 26.0% of the participants. A progressive increase in endometrial thickness was accompanied by a corresponding rise in the occurrence of hyperplasia and carcinoma, with the greatest risk identified in females whose endometrial thickness was greater than 15 mm.

Keywords: *Endometrial Thickness, Perimenopause, Abnormal Uterine Bleeding*

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INTRODUCTION

Perimenopausal abnormal uterine bleeding (AUB) is a common gynaecological problem and often reflects the hormonal instability of the menopausal transition, during which ovulation becomes irregular and endometrial shedding becomes unpredictable. AUB accounts for a substantial proportion of gynaecological consultations and significantly affects women's quality of life. Studies have shown that perimenopausal females constitute a considerable proportion of patients presenting with AUB, emphasizing the clinical importance of evaluating endometrial pathology in this age group [1]. The FIGO PALM-COEIN classification has improved the understanding and management of AUB by categorizing structural and non-structural causes of bleeding. Contemporary reviews and international recommendations continue to support transvaginal ultrasonography (TVS) as the first-line imaging modality for evaluating AUB, while endometrial sampling is recommended for females with persistent bleeding, risk factors for malignancy, or suspicious imaging findings [2,3]. However, interpretation of endometrial thickness (ET) in perimenopausal females is more challenging than in postmenopausal females because the endometrium still undergoes physiological cyclic variation [4]. Histopathological examination remains the gold standard for diagnosing endometrial disorders because ultrasound findings alone cannot reliably differentiate benign proliferative changes from hyperplasia, atypia, or carcinoma. Correlation between sonographic ET and histopathological findings is therefore essential for improving diagnostic accuracy [5]. In a study of females with AUB, perimenopausal patients represented a significant subgroup, and a wide spectrum of endometrial lesions was observed, ranging from normal cyclical endometrium to hyperplasia and malignancy [1]. Several recent studies have investigated the predictive value of ET for significant endometrial pathology. Thoprasert et al. demonstrated that an ET of 8 mm or more was significantly associated with abnormal endometrial histopathology in perimenopausal female with uterine bleeding [6]. Similarly, Sahu et al. reported that increased ET was more frequently associated with abnormal histological findings and concluded that ET can be a useful adjunct in the evaluation of AUB [7]. In a 2024 study, Selvam and Lakshminarayanan found that ET greater than 8 mm was strongly associated with premalignant and malignant lesions in perimenopausal females with heavy menstrual bleeding [8]. More recently, Moshey et al. suggested that endometrial sampling should be strongly considered when ET exceeds 11 mm in perimenopausal females, particularly when bleeding is persistent or recurrent [9]. Despite these findings, no universally accepted ET cut-off exists for perimenopausal AUB. Reported threshold values vary across studies because of differences in study design, patient characteristics, and histopathological criteria. Benign conditions such as proliferative endometrium, secretory endometrium, and polyps may also present with increased ET, creating overlap with premalignant lesions [4,8]. Therefore, ET should be interpreted in conjunction with clinical features and histopathological assessment rather than as an isolated parameter. The histopathological spectrum

of perimenopausal AUB includes proliferative endometrium, secretory endometrium, disordered proliferative endometrium, endometrial polyps, hyperplasia without atypia, atypical hyperplasia, and carcinoma [1,5,7]. Identification of these lesions is particularly important in resource-limited settings, where unnecessary invasive procedures should be avoided while ensuring early detection of significant disease. International recommendations emphasize a balanced approach that combines clinical assessment, imaging, and selective endometrial sampling [3,10]. The present study aims to assess endometrial thickness measured by TVS and correlate it with histopathological findings in females presenting with perimenopausal abnormal uterine bleeding.

METHODS & MATERIALS

This cross-sectional analytic observational study was conducted in the Department of Gynecology and Obstetrics of Mugda Medical College & Hospital, Dhaka, Bangladesh, from February 2025 to January 2026. A total of 100 consecutive perimenopausal females aged 40–55 years who attended the gynecology outpatient department with complaints of abnormal uterine bleeding were enrolled using purposive sampling. Perimenopause was defined as the period of menstrual irregularity and hormonal transition preceding menopause. females with pregnancy-related bleeding, known coagulation disorders, cervical malignancy, previously diagnosed endometrial carcinoma, use of hormone replacement therapy, or those unwilling to participate were excluded from the study. After obtaining informed written consent, a detailed history was taken regarding age, marital status, parity, body mass index (BMI), menstrual pattern, and associated medical conditions such as hypertension and diabetes mellitus. A complete general and gynecological examination was performed for all participants. All enrolled females underwent transvaginal ultrasonography using a high-frequency endovaginal probe. Endometrial thickness was measured in the sagittal plane at the thickest part of the endometrium as the maximum double-layer thickness from one endomyometrial interface to the other. The measured values were recorded in millimeters and categorized as <8 mm, 8–10 mm, 11–15 mm, and >15 mm. Following ultrasonographic evaluation, endometrial sampling was performed in all participants by dilatation and curettage or endometrial biopsy according to clinical indication and departmental protocol. The obtained specimens were fixed in 10% formalin and sent to the pathology laboratory for histopathological examination. Histopathological diagnoses were classified as secretory endometrium, proliferative endometrium, disordered proliferative endometrium, endometrial polyp, hyperplasia without atypia, atypical hyperplasia, and endometrial carcinoma. Data were collected using a structured case record form and entered into Statistical Package for the Social Sciences (SPSS) version 26.0 for analysis. Categorical variables were expressed as frequency and percentage, while continuous variables were presented as mean ± standard deviation (SD). Differences in mean endometrial thickness among histopathological groups were analyzed using one-way analysis of variance (ANOVA). A p-value of <0.05 was considered statistically significant. Ethical approval for the study was obtained from the Institutional Ethics Committee of the hospital before commencement of data collection.

RESULTS

The majority of females were aged 45–49 years (47.0%), followed by 40–44 years (28.0%) and 50–55 years (25.0%) (*Table I*).

Table I
Age distribution of the study participants (*n* = 100).

Age group (years)	Frequency (n)	Percentage (%)
40–44	28	28.0
45–49	47	47.0
50–55	25	25.0
Total	100	100.0

Most females were married (92.0%) and multiparous (72.0%). Obesity (BMI ≥30 kg/m²) was observed in 31.0% of the study population (*Table II*).

Table II
Marital, parity, and obesity status of the study participants (*n* = 100).

Variables	Frequency (n)	Percentage (%)
Marital status		
Married	92	92.0
Parity		
Multiparous (≥2)	72	72.0
Obesity status		
Obesity (BMI ≥30 kg/m²)	31	31.0

Heavy menstrual bleeding was the most common presenting complaint (44.0%), followed by irregular menstrual bleeding (29.0%). Hypertension and diabetes mellitus were present in 26.0% and 18.0% of females, respectively (*Table III*).

Table III
Clinical profile of females with perimenopausal AUB (*n* = 100).

Clinical variables	n (%)
Bleeding related	
Heavy menstrual bleeding	44 (44.0)
Irregular menstrual bleeding	29 (29.0)
Frequent bleeding	14 (14.0)
Intermenstrual bleeding	8 (8.0)
Prolonged bleeding	5 (5.0)
Others	
Hypertension	26 (26.0)
Diabetes mellitus	18 (18.0)

The mean endometrial thickness was 11.9 ± 3.8 mm. Most females had an ET of 11–15 mm (38.0%), while 17.0% had a markedly thickened endometrium of >15 mm (*Table IV*).

Table IV
Endometrial thickness on transvaginal ultrasonography (*n* = 100).

Endometrial thickness (mm)	n (%)
<8 mm	18 (18.0)
8–10 mm	27 (27.0)
11–15 mm	38 (38.0)
15 mm	17 (17.0)
Mean ET ± SD	11.9 ± 3.8 mm

The commonest histopathological pattern was proliferative endometrium (34.0%). Significant endometrial pathology comprising hyperplasia without atypia (18.0%), atypical hyperplasia (5.0%), and endometrial carcinoma (3.0%) was identified in 26.0% of females (*Table V*).

Table V
Histopathological findings of endometrial sampling (*n* = 100).

Histopathological diagnosis	n (%)
Proliferative endometrium	34 (34.0)
Secretory endometrium	16 (16.0)
Disordered proliferative endometrium	14 (14.0)
Endometrial polyp	10 (10.0)
Hyperplasia without atypia	18 (18.0)
Atypical hyperplasia	5 (5.0)
Endometrial carcinoma	3 (3.0)

A statistically significant association was observed between increasing endometrial thickness and the presence of hyperplasia or carcinoma (p = 0.002). Significant pathology was found in only 5.6% of females with ET <8 mm, compared with 14.8% in the 8–10 mm group, 28.9% in the 11–15 mm group, and 58.8% among females with ET >15 mm, demonstrating a clear positive trend (*Table VI*).

Table VI
Association between endometrial thickness and histopathological findings (*n* = 100).

Endometrial thickness	Benign histology n (%)	Hyperplasia/Carcinoma n (%)	p-value
<8 mm (n=18)	17 (94.4)	1 (5.6)	0.002
8–10 mm (n=27)	23 (85.2)	4 (14.8)	
11–15 mm (n=38)	27 (71.1)	11 (28.9)	
15 mm (n=17)	7 (41.2)	10 (58.8)	
Total	74 (74.0)	26 (26.0)	-

Mean endometrial thickness increased progressively with the severity of histopathological abnormality. Females with secretory endometrium had the lowest mean ET (8.9 ± 1.6 mm), while those with endometrial carcinoma had the highest mean ET (19.4 ± 2.1 mm). The difference in mean ET across histopathological categories was highly significant (p < 0.001), indicating a strong correlation between ultrasonographic endometrial thickness and underlying endometrial pathology (*Table VII*).

Table VII
Mean endometrial thickness in TVS according to histopathological diagnosis (n = 100).

Histopathological diagnosis	Mean ET ± SD (mm)	p-value*
Secretory endometrium	8.9 ± 1.6	<0.001
Proliferative endometrium	10.1 ± 2.0	
Disordered proliferative endometrium	11.8 ± 2.3	
Endometrial polyp	12.7 ± 2.6	
Hyperplasia without atypia	14.6 ± 2.8	
Atypical hyperplasia	16.9 ± 2.4	
Endometrial carcinoma	19.4 ± 2.1	

**One-way ANOVA*

DISCUSSION

In this study, the largest age group was 45–49 years (47.0%), followed by 40–44 years (28.0%) and 50–55 years (25.0%). Similar findings were reported by Doraiswami et al., who found that 44.3% of females with AUB were in the 41–50-year age group, indicating that late reproductive and perimenopausal years represent the period of highest AUB prevalence [11]. Regarding marital, parity, and obesity status, 92.0% of the participants were married, 72.0% were multiparous, and 31.0% were obese (BMI ≥30 kg/m²). Jetley et al. reported that 78.0% of females with perimenopausal AUB were multiparous and 29.0% were obese [12]. Wise et al., in a large epidemiological analysis, demonstrated that obesity significantly increased the risk of endometrial hyperplasia and carcinoma, with obese females having approximately a two- to fourfold higher risk than females with normal BMI [13]. The percentage of obesity in this study is therefore clinically important and may partly explain the relatively high frequency of premalignant endometrial lesions observed. In the clinical profile, heavy menstrual bleeding was the most common presentation in this study (44.0%), followed by irregular menstrual bleeding (29.0%). Hypertension and diabetes mellitus were present in 26.0% and 18.0% of females, respectively. Doraiswami et al. found menorrhagia in 48.0% and irregular bleeding in 27.0% of females with AUB [11]. Another study reported heavy menstrual bleeding in 46.7% of perimenopausal females and noted hypertension in 24.2% and diabetes in 16.1% [14]. The close similarity of these values with the present study's findings suggests that heavy menstrual bleeding remains the predominant symptom of significant endometrial pathology, while metabolic comorbidities are frequently associated in this age group. The mean endometrial thickness (ET) in this study was 11.9 ± 3.8 mm. Most females had ET between 11 and 15 mm (38.0%), and 17.0% had ET >15 mm. Getpook and Wattanakumtornkul reported a mean ET of 11.3 ± 3.5 mm in females with perimenopausal AUB, and the probability of abnormal histology increased markedly when ET exceeded 11 mm [15]. Opolskiene et al. also demonstrated that females with ET >15 mm had a substantially higher likelihood of hyperplasia or carcinoma than those with thinner endometrium [16]. Histopathologically, proliferative endometrium was the commonest pattern in the present study (34.0%), followed by hyperplasia without atypia (18.0%), disordered proliferative endometrium (14.0%), endometrial polyp (10.0%), atypical hyperplasia (5.0%), and carcinoma (3.0%). Doraiswami et al. reported proliferative endometrium in 36.2%, hyperplasia without atypia in 17.8%, atypical hyperplasia in 4.6%, and carcinoma in 3.4% of cases [11]. The distribution of the present study closely parallels these established histopathological patterns, particularly the predominance of benign proliferative lesions and the smaller but clinically significant proportion of atypical hyperplasia and carcinoma. In this study, hyperplasia or carcinoma was present in 5.6% of females with ET <8 mm, 14.8% with ET 8–10 mm, 28.9% with ET 11–15 mm, and 58.8% with ET >15 mm (p = 0.002). Chee et al. in a systematic review and meta-analysis reported that the pooled prevalence of significant endometrial pathology increased progressively with increasing endometrial thickness, with a substantially higher probability of atypical hyperplasia or carcinoma when ET was ≥11 mm compared with thinner endometrium [17]. The mean ET increased progressively with histopathological severity, from 8.9 ± 1.6 mm in secretory endometrium to 19.4 ± 2.1 mm in endometrial carcinoma (p <0.001). Similar progressive increases were reported by Getpook and Wattanakumtornkul, who found mean ET values of 8.7 mm for benign endometrium, 14.8 mm for hyperplasia, and 18.6 mm for carcinoma [15]. This stepwise rise in ET across histological categories in this study demonstrates a strong correlation between ultrasonographic endometrial thickness and underlying pathological severity

LIMITATIONS

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community. Endometrial thickness was measured at a single time point, and inter-observer variability in ultrasonographic assessment could not be completely excluded. In addition, other potential confounding factors, including hormonal status, duration of symptoms, use of medications, and detailed metabolic parameters, were not evaluated.

CONCLUSION

This study concludes that transvaginal ultrasonographic endometrial thickness is significantly associated with underlying histopathological abnormalities in perimenopausal females with abnormal uterine bleeding. Heavy menstrual bleeding was the most common presentation, and proliferative endometrium was the predominant histological pattern. However, significant endometrial pathology, including hyperplasia and carcinoma, was identified in 26.0% of females. Increasing endometrial thickness was associated with a progressively higher frequency of hyperplasia and carcinoma, with the highest risk observed when endometrial thickness exceeded 15 mm.

RECOMMENDATION

Perimenopausal females presenting with abnormal uterine bleeding should undergo routine transvaginal ultrasonographic assessment of endometrial thickness as an initial screening tool. Females with increased endometrial thickness, particularly those with ET >15 mm or associated risk factors such as obesity, hypertension, or diabetes, should be considered for prompt endometrial sampling and histopathological evaluation. Further large-scale multicentre studies are recommended to establish optimal endometrial thickness cut-off values for predicting significant endometrial pathology.

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CONFLICT OF INTEREST

None declared

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