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Original Research Article

Correlation of clinical features, thyroid status and endometrial histopathology in abnormal uterine bleeding

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ABSTRACT

Background: Abnormal uterine bleeding (AUB) is considered as one of the most common but yet a challenging problem presenting to the gynaecologist. AUB is defined as abnormal changes occurring in the frequency of menstruation, duration of flow or amount of blood loss. Its impact on women's physical, social, emotional and maternal quality of life is substantial. A detailed clinical assessment, thyroid profile, measurement of endometrial thickness on sonography and histopathological evaluation of endometrium is crucial for diagnosing the underlying causes of AUB.
Methods: A cross-sectional study was conducted over 18 months at a tertiary healthcare centre. This study enrolled 245 patients aged over 35 years presenting with complaints of AUB. Clinical data of all patients were collected via structured interviews and examinations. They were subjected to thyroid function test and ultrasonography for endometrial thickness. Endometrial samples were obtained through dilatation and curettage (D and C) and analysed histopathologically. The clinical presentation was correlated with histopathological findings of the endometrium.
Results: The majority of patients were in the age group 41-45 years (31.8%), with a mean age of 44.8 years. Menorrhagia was found to be the most common bleeding pattern (57.1%), followed by menometrorrhagia (30.2%) and postmenopausal bleeding (12.7%). Endometrial hyperplasia without atypia was the predominant histopathological finding (63.3%), followed by proliferative phase (17.1%) and secretory phase (14.3%). Endometrial carcinoma was identified in 3.7% of cases.
Conclusions: Histopathological examination is the gold standard investigation for patients presenting with AUB. Clinicopathological correlation aids in accurate diagnosis, early detection of premalignant lesions and appropriate management, thereby improving patient outcomes.

Keywords: Abnormal uterine bleeding, Clinicopathological correlation, Endometrial thickness, Thyroid status

INTRODUCTION

Abnormal uterine bleeding (AUB) is considered as one of the most common but yet a challenging problem presenting to the gynaecologist.[1] AUB accounts for the 33% of the outpatient referrals.[2] Menstruation is characterised by the variability in regularity, volume and the pattern. For the consistent understanding of the AUB, the normal and abnormal pattern has been described. The criteria for normal menstruation comprises cycle length of 21-35 days with two to seven days flow and 30-80ml of total blood loss in a single menstrual cycle.[2] AUB is defined as any change in the frequency of menstruation, duration of flow or amount of blood loss. In women of child bearing and premenopausal age, bleeding between cycles is also considered as abnormal. Postmenopausal bleeding is described as vaginal bleeding after 12 months of cessation of menses.[3] The most common presentations

of AUB are menorrhagia, polymenorrhoea, metrorrhagia and intermenstrual bleeding.[2] The key to successful clinical management is to identify the causative factors responsible. This can be achieved by thorough clinical examination, thyroid profile, ultrasonography and histopathological examination of endometrium.[4] Thyroid dysfunction, including both hypothyroidism and hyperthyroidism, accounts for 30%-40% of systemic disorders causing AUB and can be readily diagnosed by thyroid function tests (TFTs).[5] Transvaginal ultrasonography (USG) is an invaluable tool for measuring endometrial thickness (ET) and patterns and identifying organic causes such as leiomyomas and endometrial malignancies.[5]

The endometrial sampling provides a tissue diagnosis for a wide range of morphologic patterns resulting from both normal and abnormal changes and can be effectively used as the first diagnostic step in AUB in perimenopausal women. Endometrial sampling can be done by Pipelle, four-quadrant endometrial biopsy, dilatation and curettage (D and C) and hysteroscopic-directed sampling. Dilatation and Curettage is considered to be a method of choice. D and C is a useful and cost-effective method. It serves as a standard tool for assessing patients of AUB mostly in developing countries with limited resources.[6] The objectives of this study were to analyse the various histopathological patterns of the endometrium in patients with AUB, to study the spectrum of endometrial lesions across different age groups, to evaluate the relationship between endometrial thickness and endometrial histopathology, to assess the association between bleeding patterns and endometrial histopathology in relation to thyroid profile of the patients.

METHODS

The cross-sectional study was conducted at the Department of Obstetrics and Gynaecology of a tertiary healthcare centre for a period of 18 months. All patients aged above 35 years presenting with abnormal uterine bleeding who underwent D and C, with or without a history of hormonal therapy and those who consented to participate and agreed to follow-up were included in our study. The patients with non-response or recurrence after primary hormonal treatment who required endometrial sampling were also part of this study. Patients with AUB due to gestational causes such as abortion, ectopic pregnancies, or molar pregnancies, bleeding attributed to known gynaecological conditions like fibroids, cervical or vaginal pathology or genital malignancy, bleeding associated with intrauterine devices and those who refused to provide consent were excluded from the study.

Sample size

The sample size was determined using Open Epi software. Assuming a prevalence of abnormal uterine bleeding at 33%, a 90% confidence interval, and a 10% margin of error, the minimum required sample size was calculated to be 245 participants.[2]

Data collection procedure

Upon enrolment, participants were interviewed using a structured proforma to obtain relevant clinical information, including menstrual cycle characteristics, duration and pattern of bleeding, associated symptoms, thyroid status, and history of hormonal therapy. A detailed clinical examination was performed to identify the possible underlying causes of AUB. Ultrasonography (transabdominal and/or transvaginal) was performed in all patients to evaluate ET and to rule out structural causes of AUB. Patients with ultrasonographic evidence of uterine polyps, adenomyosis, leiomyoma, uterine fibroids, or malignancy were excluded from the study. Laboratory investigations included complete blood count, urine routine microscopy, and thyroid function tests. Endometrial sampling was carried out by dilatation and curettage, and the obtained specimens were sent to the pathology laboratory for histopathological examination. Histopathological reports were subsequently analysed and correlated with the clinical features, thyroid profile and ET.

Statistical analysis

Descriptive statistical analysis was performed to summarize the study data. Categorical variables were presented as frequencies and percentages to describe the distribution of patient characteristics. Continuous variables were expressed as mean $\pm$ standard deviation. Data were checked for completeness and consistency prior to analysis. All analyses were carried out using SPSS software version 20.

RESULTS

Two hundred forty-five patients were included in this study. The majority of the women 78 (31.8%), 73 (29.8%) and 66 (26.9%) were in the age groups 41-45 years, 36-40 years and 46-50 years respectively. Only 28(11.5%) women were above the age of 50 years. The mean age ± SD was 44.8±7 years and ranged from 36-80 years. The median age at presentation was 44 years (Table 1).

The commonest AUB pattern reported in our study was menorrhagia which was seen in 140 (57.1%) patients, followed by menometrorrhagia in 74 (30.2%) and postmenopausal bleeding in 31 (12.7%) patients (Table 2). The mean ET was 12.3±4.5 mm and ranged from 4.6-38 mm. The median ET was 12 mm. The majority of patients had an ET between 10-15 mm, accounting for 94 patients (38.4%), followed closely by those with a thickness of 5-10 mm, which included 89 patients (36.4%). An ET of 15-20 mm was observed in 49 patients (20%). Only a small proportion of the study population had an ET of ≤5 mm (five patients; 2%) or >20 mm (eight patients; 3.4%) (Table 3).

Table 1: Distribution of patients according to age.

Age group (years)	No. of patients (N)	Percentage (%)
36-40	73	29.8
41-45	78	31.8
46-50	66	26.9
51-55	11	4.5
56-60	8	3.3
>60	9	3.7
Total	245	100
Mean age ± SD (range), years	44.8±7 (36-80)	
Median, years	44(40-48)	

Table 2: Distribution of study population of abnormal uterine bleeding based on bleeding patterns.

Abnormal uterine bleeding	No. of patients (N)	Percentage (%)
Menorrhagia (heavy menstrual bleeding)	140	57.1
Menometrorrhagia (heavy and prolonged intermenstrual bleeding)	74	30.2
Postmenopausal bleeding	31	12.7

Table 3: Distribution of study population based on endometrial thickness.

Endometrial thickness	No. of patients (N)	Percentage (%)
≤5 mm	5	2
5-10 mm	89	36.4
10-15 mm	94	38.4
15-20 mm	49	20
>20 mm	8	3.4

Most patients 206 (84.1%) were euthyroid in our study group, while hypothyroidism was noted in 39 (15.9%) patients. None of our patients had hyperthyroidism. Menorrhagia was the commonest symptom in both euthyroid and hypothyroid women reported in 59.7% and 43.6% patients respectively. Among hypothyroid women, 33.3% patients had menometrorrhagia and 23.1% had postmenopausal bleeding (Table 4). While considering age groups with abnormal bleeding patterns, it was observed that menorrhagia was the commonest symptom in the age groups 36-40 years and 41-45 years accounting for 75.3% and 74.3% of patients respectively. However, menometrorrhagia was more common and noted in 51.5% patients in the age group of 46-50 years. Postmenopausal bleeding was observed in women above 45 years of age and it was the only presentation seen in the age group above 55 years (Table 5). All patients underwent dilatation and curettage procedure and the endometrium obtained was sent for histopathological analysis. The most common finding was endometrial hyperplasia without atypia, observed in 155 (63.3%) patients. The proliferative phase was seen in 42 (17.1%) patients, followed by the secretory phase in 35 (14.3%) patients and disordered proliferative phase in three (1.2%) patients. Endometrial carcinoma was reported in 9 (3.7%) patients, and cystic atrophy was the least common, found in only one patient (0.4%) (Table 6). The proliferative phase (n=42) was most common in the 36-40 years age group (15 cases), decreasing with age. The secretory phase (n=35) peaked in the 41-45 years group (15 cases), with fewer cases in older groups. The disordered proliferative phase (n=3) was rare, with two cases in the 46-50 years group. Endometrial hyperplasia without atypia (n=155) was most prevalent, with 50 cases in the 41-45 years group and 46 in the 36-40 years group, declining with age. Endometrial carcinoma (n=9) increased with age, with five cases in the 56-60 years group and 2 in the >60 years group. Surprisingly we had two cases of endometrial carcinoma in younger patients aged between 35- 45 years. Cystic atrophy (n=1) was only present in the 46-50 years group (Table 7). Most patients with menorrhagia 98 (70%) had histopathology of endometrial hyperplasia without atypia, followed by secretory phase among 22 (15.7%) and proliferative phase in 18 (12.8%) patients.

Among patients with menometrorrhagia also, 37 (50%) had histopathology of endometrial hyperplasia without atypia, followed by proliferative phase among 20 (27%) and secretory phase in 13 (18.6%) patients. The histopathology in patients with postmenopausal bleeding was endometrial hyperplasia without atypia in 20 (64.51%) patients, followed by endometrial carcinoma among seven (22.6%) and proliferative phase in four (12.9%) patients (Table 8). The endometrial thickness on USG was compared with histopathology of endometrium obtained during D and C. The maximum number of cases 94(38.4%) had an ET of 10-15 mm, out of which 62 had endometrial hyperplasia without atypia and 15 had proliferative phase on histopathology. 89 (36.3%) cases were those with an ET ranging from 5-10 mm, of which 61 had endometrial hyperplasia without atypia, 15 had proliferative phase and nine had secretory phase. An ET of 15-20 mm was reported in 49(20%) cases of which 23 had endometrial hyperplasia, 12 had secretory, 12 had proliferative phase and two had endometrial carcinoma. Among the eight (3.4%) cases with an ET of >20mm, six cases had endometrial hyperplasia without atypia. In this study, six out of nine patients diagnosed with endometrial carcinoma had an ET ranging between 5-15 mm (Table 9).

The histopathological findings were compared with the thyroid status of the patients. The most common histopathology across both groups is endometrial hyperplasia without atypia (n=155), with 127 (61.6%) cases in the euthyroid group and 28 (71.8%) in the hypothyroid group. In euthyroid group, 40 (19.4%) cases had proliferative phase, 33 (16%) had secretory phase and five (2.4%) had endometrial carcinoma. In the hypothyroid

group, proliferative phase and secretory phase was observed in two (5.1%) cases each and endometrial carcinoma in four (10.2%) cases. The disordered proliferative phase (n=3) was exclusively observed in hypothyroid patients (Table 10).

Table 4: Thyroid status in different forms of Abnormal Uterine Bleeding.

Thyroid status	Menorrhagia N (%)	Menometrorrhagia N (%)	Postmenopausal bleeding N (%)
Euthyroid (n=206)	123 (59.7%)	61 (29.6%)	22 (10.7%)
Hypothyroidism (n=39)	17 (43.6%)	13 (33.3%)	9 (23.1%)
Hyperthyroidism (n=0)	0	0	0

Table 5: Association of age group with bleeding patterns.

Age group(years)	Menorrhagia (N)	Menometrorrhagia (N)	Postmenopausal bleeding (N)
36-40 (n=73)	55	18	0
41-45 (n=78)	58	20	0
46-50 (n=66)	25	34	7
51-55 (n=11)	2	2	7
56-60 (n=8)	0	0	8
>60 (n=9)	0	0	9
Total	140	74	31

Table 6: Distribution of study population based on histopathological analysis.

Histopathological lesions	No. of patients (N)	Percentage (%)
Proliferative phase	42	17.1
Secretory phase	35	14.3
Disordered proliferative phase	3	1.2
Endometrial hyperplasia without atypia	155	63.3
Endometrial carcinoma	9	3.7
Cystic atrophy	1	0.4
Total	245	

Table 7: Distribution of different endometrial patterns in cases of AUB according to age group.

Histopathology	Age (years)					
	36-40	**41-45**	**46-50**	**51-55**	**56-60**	**>60**
Proliferative phase (n=42)	15	11	13	2	1	0
Secretory phase (n=35)	11	15	8	1	0	0
Disordered proliferative phase (n=3)	0	1	2	0	0	0
Endometrial hyperplasia without atypia (n=155)	46	50	42	8	2	7
Endometrial carcinoma (n=9)	1	1	0	0	5	2
Cystic atrophy (n=1)	0	0	1	0	0	0
Total	73	78	66	11	8	9

Table 8: Association of histopathology with abnormal uterine bleeding patterns.

Histopathology	Menorrhagia	Menometrorrhagia	Postmenopausal bleeding
Proliferative phase (n=42)	18	20	4
Secretory phase (n=35)	22	13	0
Disordered proliferative phase (n=3)	0	3	0
Endometrial hyperplasia without atypia (n=155)	98	37	20
Endometrial carcinoma (n=9)	2	0	7
Cystic atrophy (n=1)	0	1	0
Frequency	140 (57.1%)	74 (30.2%)	31 (12.7%)

Table 9: Association of histopathology in cases of AUB with endometrial thickness.

Histopathology	Endometrial thickness (mm)				
	≤5	5-10	10-15	15-20	>20
Proliferative phase (n=42)	0	15	15	12	0
Secretory phase (n=35)	1	9	11	12	2
Disordered proliferative phase (n=3)	0	1	2	0	0
Endometrial hyperplasia without atypia (n=155)	3	61	62	23	6
Endometrial carcinoma (n=9)	1	3	3	2	0
Cystic atrophy (n=1)	0	0	1	0	0
Frequency	5 (2%)	89 (36.3%)	94 (38.4%)	49 (20%)	8 (3.4%)

Table 10: Association of histopathology with thyroid status.

Histopathology	Euthyroid N (%)	Hypothyroidism N (%)
Proliferative phase (n=42)	40 (19.4%)	2 (5.1%)
Secretory phase (n=35)	33 (16%)	2 (5.1%)
Disordered proliferative phase (n=3)	0	3 (7.7%)
Endometrial hyperplasia without atypia (n=155)	127 (61.6%)	28 (71.8%)
Endometrial carcinoma (n=9)	5 (2.4%)	4 (10.2%)
Cystic atrophy (n=1)	1 (0.5%)	0
Total	206	39

DISCUSSION

The present study investigated the clinicopathological correlation of endometrial findings in 245 women presenting with AUB, with a focus on age, bleeding patterns, thyroid status, ET on USG and histopathological patterns in endometrium obtained during D and C procedure. The findings are compared with previous studies to contextualize the results and highlight their clinical implications.

Demographic profile and age distribution

The present study found that the majority of women with AUB were aged between 41-45 years (31.8%), followed by 36-40 years (29.8%) and 46-50 years (26.9%), with a mean age of 44.8±7 years. This aligns closely with several studies in the literature. For instance, Nair et al (2015) reported a mean age of 45±5 years among their cohort, while Mune et al (2016) identified the 41-50 years age group as the most common, with a mean age of 44.2 years.[7,8] This consistent finding across studies underscores that AUB is particularly prevalent in the perimenopausal age group, likely due to hormonal fluctuations and anovulatory cycles that characterize this transitional phase. The present study's broader age range (36-80 years) and inclusion of postmenopausal women (7% aged >50 years) further highlights the persistence of AUB beyond the perimenopausal period, particularly in cases associated with malignancy or hyperplasia.

Bleeding patterns

Menorrhagia was the most common bleeding pattern in the present study, observed in 57.1% of cases, followed by menometrorrhagia (30.2%) and postmenopausal bleeding (12.7%). Sinha et al (2018) found menorrhagia to be the most common presentation (58.45%), and Golecha et al (2018) reported menorrhagia in 32.33% of cases, followed by metrorrhagia (19.67%) and menometrorrhagia (16.33%).[9,10] The predominance of menorrhagia in these studies reflects its association with anovulatory cycles and endometrial hyperplasia, which are common in the perimenopausal period due to declining ovarian function. The present study's finding of postmenopausal bleeding in 12.7% of cases is particularly significant, as it was strongly associated with endometrial hyperplasia (64.51%) and carcinoma (22.6%), aligning with Kumar et al (2025) who reported a high rate of endometrial hyperplasia and carcinoma in postmenopausal women with AUB.[11] This emphasizes the importance of thorough evaluation in postmenopausal women presenting with AUB to rule out malignancy.

Endometrial thickness and histopathological findings

The mean ET in the present study was 12.3±4.5 mm, with the majority of cases (38.4%) having a thickness of 10-15 mm. Endometrial hyperplasia without atypia was the most common histopathological finding, particularly in cases with menorrhagia (70%) and menometrorrhagia (50%), and was also prevalent in postmenopausal bleeding (64.51%). These findings are consistent with Nikethan et al (2020) who reported endometrial hyperplasia without atypia in 43% of cases, and Pidigundla et al (2023) who found hyperplasia in 94 cases, predominantly in perimenopausal and postmenopausal women.[12,13] The present study's finding of endometrial carcinoma in 22.6% of postmenopausal bleeding cases is particularly concerning and aligns with Kumar et al (2025) and Pundir et al (2024) who reported carcinoma in postmenopausal women.[11-14] This highlights the utility of transvaginal

ultrasound as a screening tool, with endometrial biopsy reserved for patients with increased ET or persistent symptoms. The present study's use of dilatation and curettage (D and C) for all patients ensured comprehensive sampling, though Golecha et al (2018) noted that D and C may miss organic lesions like leiomyomas or adenomyosis, suggesting the need for complementary imaging studies.[10]

Thyroid profile and its impact

In the present study, 84.1% patients were euthyroid and hypothyroidism was identified in 39 (15.9%) patients of which 43.6% patients reported menorrhagia as the presenting complaint. 9 cases of postmenopausal bleeding also had hypothyroidism. These observations align with a study conducted by Koirala et al, where most of the cases were euthyroid (65%) followed by hypothyroid (27%) and hyperthyroid (8%).[15] Among hypothyroid patient's menorrhagia was the commonest bleeding pattern seen in 93.75% and metrorrhagia in 6.25% patients in their study.

A high proportion of patients (71.8%) with hypothyroidism were found to have endometrial hyperplasia without atypia. This is an important finding, as thyroid dysfunction, particularly hypothyroidism, is known to disrupt menstrual cycles by altering gonadotropin-releasing hormone secretion and oestrogen metabolism, leading to anovulatory cycles and endometrial hyperplasia causing menorrhagia. Notably all cases with disordered proliferative phase in endometrium and four out of nine cases diagnosed with endometrial carcinoma had hypothyroidism. This was in contrast with the study conducted by Sahu et al which observed that among the hypothyroid patients, 70.2% had a proliferative phase endometrium, 18% had a secretory phase endometrium and hyperplastic endometrium without atypia was seen in 7.5% of patients.[5] This underscores the importance of assessing metabolic and endocrine profiles in women with AUB to guide management.

Clinical and histopathological correlation

The present study demonstrated a strong correlation between bleeding patterns, age, and histopathological findings, consistent with Malik et al (2025), who reported a strong clinicopathological correlation in AUB.[16] For instance, menorrhagia and menometrorrhagia were most common in the 36-45 years age group and were associated with endometrial hyperplasia, while postmenopausal bleeding in women >50 years was linked to carcinoma and hyperplasia. This age-specific pattern is supported by Mune et al (2016), who found a significant association between age and histopathological diagnosis ($p<0.01$), and Sinha et al (2018), who utilized the PALM-COEIN classification to demonstrate age-related variations in AUB etiology.[8,9] The present study's findings reinforce the utility of structured history-taking and classification systems like PALM-COEIN, as suggested by Banmeru et al (2025), to align clinical presentations with histopathological outcomes for better management.[17]

Management and clinical implications

The present study's reliance on D and C for histopathological diagnosis aligns with the recommendations of Mune et al (2016) and Pidigundla et al (2023), who advocate for endometrial biopsy as a critical diagnostic tool.[8-13] The present study's strengths include its large sample size (n=245), comprehensive histopathological analysis and inclusion of comorbidity like thyroid dysfunction which provide a holistic view of AUB.

Limitation

The limitation of the study includes the lack of evaluation of long-term outcomes and the efficacy of various medical and surgical treatment modalities, which restricted the ability to assess the impact of histopathological findings on patient management. Additionally, D and C was the sole method used for endometrial sampling in this study. Other office-based procedures, such as endometrial lavage, endometrial brush or pipelle sampling and hysteroscopy-guided biopsy could have been employed as alternative techniques.

CONCLUSION

AUB is a common yet intriguing gynaecological problem with diverse etiologies, particularly in the perimenopausal age group. A thorough and prompt evaluation is mandatory to rule out underlying causes, especially premalignant and malignant conditions thereby enabling timely and appropriate management and improving patient outcomes. An accurate interpretation of bleeding patterns, ET and histopathological evaluation of the endometrium remains the cornerstone for identifying the exact etiology of AUB. A good clinicopathological correlation was observed between the patterns of bleeding and endometrial histology in this study. Menorrhagia was the most common clinical presentation and endometrial hyperplasia without atypia was the predominant histopathological feature in endometrial samples.

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