Assessing Clinical and Histopathological Concordance in Abnormal Uterine Bleeding using FIGO PALM-COEIN Classification

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Abstract

Introduction: Abnormal uterine bleeding (AUB) presents diagnostic challenges due to its multifactorial nature. The FIGO PALM-COEIN Classification system offers a comprehensive framework for categorizing AUB, considering both structural (PALM) and non-structural (COEIN) causes. Our study aims to investigate the correlation between clinical presentations and histopathological findings in AUB cases classified according to FIGO's PALM-COEIN system.

Material and Methods: This prospective interventional study, conducted at a prominent tertiary care center in Gujarat from April 2021 to March 2022, focuses on perimenopausal women aged 40 years and older presenting with abnormal uterine bleeding (AUB). Ethical clearance was obtained from the Institutional Ethics Committee, and informed written consent was secured from each participant. Perimenopausal women aged 40 years and above, experiencing symptoms of AUB, were enrolled, while exclusions were made for individuals declining participation or presenting with obstetric causes of bleeding. A total of 150 eligible perimenopausal women were meticulously assessed, with comprehensive demographic data and medical histories collected. Thorough physical exams, gynecological assessments, pelvic ultrasound, and histopathological evaluations were conducted to allocate patients to PALM-COEIN classification. Laboratory tests were correlated with clinical findings, and SPSS analysis ensured rigorous assessment of correlations.

Results: Our study investigated the correlation between clinical and histopathological findings in abnormal uterine bleeding (AUB) using FIGO's PALM-COEIN Classification. Clinical diagnoses were evenly distributed, with 50% categorized under both PALM and COEIN classifications. Leiomyoma (40.67%) was the most prevalent PALM diagnosis, while ovulatory disorders (29.33%) predominated in COEIN. Histopathological examination revealed diverse endometrial patterns, with secretory phase (41.33%) and proliferative phase (36.67%) being prominent. PALM diagnoses were prevalent in both clinical (50%) and histopathological (64%) assessments, with significant correlations observed for adenomyosis ($p < .05$), adenomyosis coexisting with leiomyoma ($p < .01$), and malignancy and hyperplasia ($p < .01$). In the COEIN category, endometrial abnormalities demonstrated significant correlation ($p < .05$).

Conclusion: In conclusion, our study elucidated the correlation between clinical presentations and histopathological findings in abnormal uterine bleeding (AUB) using FIGO's PALM-COEIN Classification. Leiomyoma and ovulatory disorders were predominant diagnoses, with diverse endometrial patterns observed histopathologically. Significant correlations were found between clinical and histopathological diagnoses, emphasizing the utility of the PALM-COEIN system in guiding diagnostic and management strategies for AUB.

Keywords: Abnormal uterine bleeding, PALM-COEIN Classification, Clinical-histopathological correlation, Perimenopausal women.

Introduction

Abnormal uterine bleeding (AUB) is a prevalent gynecological condition characterized by irregularities in menstrual bleeding patterns, which significantly impact a woman's quality of life and reproductive health. [1] The complexity of AUB lies in its multifactorial etiology, ranging from structural abnormalities to hormonal imbalances and systemic disorders. [2] To streamline the diagnosis and management of AUB, the International Federation of Gynecology and Obstetrics (FIGO) introduced

the PALM-COEIN classification system, which categorizes AUB based on its underlying etiology. [3] PALM encompasses structural causes including Polyps, Adenomyosis, Leiomyomas, and Malignancy, while COEIN covers non-structural etiologies such as Coagulopathy, Ovulatory dysfunction, Endometrial causes, Iatrogenic factors, and Not yet classified causes. [4,5] This classification system has revolutionized the approach to AUB, allowing for a more systematic evaluation and personalized treatment strategies.

This classification system has transformed the approach to AUB, providing clinicians with a standardized framework to guide diagnostic workup and therapeutic interventions. [2] By categorizing AUB according to its underlying pathology, FIGO's PALM-COEIN classification facilitates a more systematic evaluation, allowing for tailored management strategies tailored to the individual patient's needs.[6] However, despite its widespread adoption, there remains a need for comprehensive studies that correlate clinical presentations with histopathological findings according to the PALM-COEIN classification. [2,7]

Understanding the correlation between clinical features and histopathological diagnoses is paramount for accurate diagnosis and effective management of AUB. [8] While clinical history and examination may provide clues to the underlying cause of AUB, histopathological evaluation offers definitive confirmation and guides further therapeutic decisions. [9] However, studies investigating the concordance between clinical impressions and histological diagnoses according to FIGO's PALM-COEIN classification are limited in the literature.[10] Therefore, this study aims to address this gap by conducting a comprehensive analysis of the correlation between clinical and histopathological findings in patients presenting with AUB, utilizing FIGO's PALM-COEIN classification as the guiding framework.

Material and Methods

This study adopts a prospective interventional approach and unfolds at the Department of Obstetrics and Gynaecology within a prominent tertiary care center located in Gujarat. The investigation spans from April 2021 to March 2022, focusing on perimenopausal women aged 40 years and above who present with abnormal uterine bleeding (AUB). Prior to initiation, ethical clearance from the Institutional Ethics Committee was obtained and Informed written consent was taken from each participating patient.

The present study enrolled perimenopausal women aged 40 years and older, spanning up to one year beyond the onset of menopause, experiencing symptoms of abnormal uterine bleeding (AUB). Exclusions are delineated, including individuals declining participation, those younger than 40 years, beyond the specified post-menopausal duration, and those presenting with obstetric causes of bleeding.

A total of 150 eligible perimenopausal women constitute the study cohort, each subjected to meticulous data collection procedures. Comprehensive demographic details are recorded alongside a structured history, spanning menstrual patterns, contraceptive history, and relevant medical/surgical backgrounds. Thorough physical examinations, encompassing general, systemic, and gynecological assessments, augment the dataset.

Demographic details were meticulously recorded, and a structured inquiry into prior and current menstrual history, contraceptive usage, and medical/surgical background was conducted. This was followed by comprehensive general, physical, systemic, and gynecological examinations. Gynecological assessment involved thorough evaluation of the cervix, uterus, and adnexae, focusing on parameters such as cervix position, presence of lesions, uterine size and position, and adnexal tenderness or masses.

Clinical diagnosis and allocation to the PALM–COEIN classification system were performed based on these examinations. Subsequently, pelvic ultrasound was employed to assess uterine and ovarian morphology, including uterine size, endometrial thickness, and the presence of structural abnormalities such as polyps, adenomyosis, or fibroids, as well as ovarian cysts or masses.

Endometrial biopsy and, where indicated, hysterectomy specimens were obtained and subjected to histopathological evaluation. Histopathological findings were categorized to identify potential underlying causes, thereby facilitating correlation with clinical diagnoses to ascertain a final diagnosis.

For the evaluation of the COEIN aspect, ovulatory dysfunction was characterized by irregular timing and varying amounts of bleeding, whereas endometrial disorders were delineated by AUB occurring in a predictable or cyclic pattern. The iatrogenic category was established based on the identification of hormone steroid intake within the preceding three months and/or symptom onset following contraceptive device or method usage.

Following a comprehensive history and clinical examination, laboratory investigations were conducted, including complete blood count, coagulation profile (where applicable, particularly for previously known cases of coagulation defects dating back to menarche and AUB), thyroid function tests, and blood sugar level estimations. These results were then correlated with clinical allocations to refine diagnostic accuracy. Endometrial histology was meticulously correlated with clinical

assignments, particularly in cases of AUB-O and AUB-E, to augment diagnostic precision and therapeutic decision-making.

Data analysis was done using SPSS version 20.1, with descriptive statistics utilized to summarize findings. The significance of observed correlations is rigorously assessed utilizing appropriate statistical tests, thereby enhancing the robustness and validity of the study outcomes.

Results

Our study investigated the correlation between clinical presentations and histopathological findings in cases of abnormal uterine bleeding using FIGO's PALM-COEIN Classification. We observed that a significant proportion of patients (81.33%) were aged between 40 and 50 years, suggesting a notable presence of perimenopausal women. Additionally, 10% of patients were in the age group of 51 to 60 years, and 8.67% were over 60, indicating the condition's prevalence around menopausal age. The mean age of the patients was 44.54 ± 8 years, underscoring the predominance of individuals in their late forties within our study cohort. Furthermore, a majority of women (52.66%) were grandmultipara, and 64.66% belonged to lower socioeconomic classes. Most women experienced symptoms of abnormal uterine bleeding for a duration of 6 months to 1 year before seeking treatment. The primary presenting symptom in our study was heavy menstrual bleeding (30.66%), followed by intermenstrual heavy menstrual bleeding in 32.66% of cases. Our study also identified various risk factors associated with abnormal uterine bleeding. Obesity was present in 11.22% of cases, while thyroid disorders were observed in 4.67% of patients. Additionally, hypertension was noted in 8% of cases, emphasizing the diverse array of factors contributing to this condition.

Our data analysis revealed a balanced distribution of cases according to clinical diagnosis, with 50% of patients categorized under both PALM and COEIN classifications. Within PALM, the most prevalent diagnoses were AUB-L (leiomyoma) at 40.67%, followed by AUB-P (polyp) and AUB-M (malignancy and hyperplasia) at 2.67% each. In the COEIN category, AUB-O (ovulatory disorders) constituted the highest proportion at 29.33%, while AUB-E (endometrial) and AUB-N were observed at 14.67% and 3.33%, respectively. (Table 1)

Table 1: Distribution of cases as per clinical diagnosis

Diagnosis	Total cases (n = 150)	% (100)
PALM	75	50.00
AUB-P (polyp)	04	2.67
AUB-A (adenomyosis)	05	3.33
AUB-L (leiomyoma)	61	40.67
AUB-M (malignancy and hyperplasia)	04	2.67
COEIN	75	50.00
AUB-C (coagulopathy)	00	0.00
AUB-O (ovulatory disorders)	44	29.33
AUB-I (iatrogenic)	00	0.00
AUB-E (endometrial)	22	14.67
AUB-N	05	3.33

Our analysis of endometrial patterns on histopathology revealed diverse distributions among the 150 cases. Secretory phase accounted for the highest percentage at 41.33%, followed closely by proliferative phase at 36.67%. Hyperplasia was observed in 8.67% of cases, while adenocarcinoma was present in 1.33%. (Fig 1) Additionally, among the 13 cases of endometrial hyperplasia, simple adenomatous hyperplasia without atypia constituted 92.31%, whereas simple adenomatous hyperplasia with atypia accounted for 7.69%.
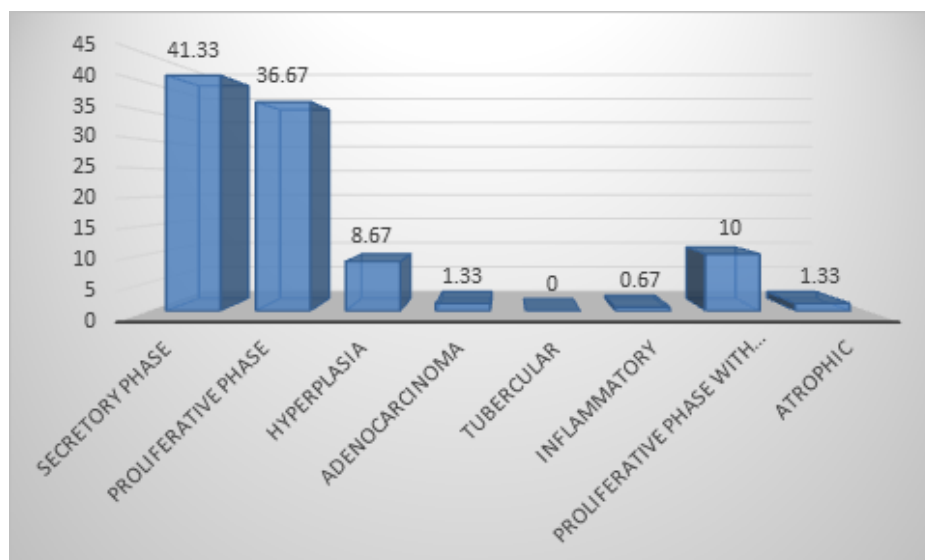
Figure 1: Endometrial pattern on histopathology

Our examination of histopathology-based diagnoses, with PALM diagnoses constituting the majority at 64.00%. AUB-L (leiomyoma) was the most prevalent subtype at 35.33%, followed by AUB-M (malignancy and hyperplasia) at 16.67%. In the COEIN category, AUB-O (ovulatory disorders) represented the highest proportion at 30.00%, followed by AUB-E (endometrial) at 6.00%.

Table 2: Distribution of cases as per histopathology-based diagnosis

Diagnosis	Total cases (n = 150)	% (100)
PALM	96	64.00
AUB-P (polyp)	06	4.00
AUB-A (adenomyosis)	08	5.33
AUB-A;L (adenomyosis and leiomyoma)	04	2.67
AUB-L (leiomyoma)	53	35.33
AUB-M (malignancy and hyperplasia)	25	16.67
COEIN	54	36.00
AUB-O (ovulatory disorders)	45	30.00
AUB-E (endometrial)	09	6.00

PALM diagnoses were prevalent in both clinical and histopathological assessments, with 50% clinically and 64% histopathologically. Among specific diagnoses, adenomyosis showed a statistically significant correlation (p < .05), with 3.33% clinically and 8% histopathologically, while adenomyosis coexisting with leiomyoma also exhibited significant correlation (p < .01), accounting for 0.67% clinically versus 2% histopathologically. Leiomyoma diagnoses were the most common, with 42% clinically and 44.67% histopathologically. Malignancy and hyperplasia showed significant correlation (p < .01), representing 2% clinically and 8% histopathologically. In the COEIN category, ovulatory disorders were predominant (36% clinically vs. 31.33% histopathologically, p > .05), whereas endometrial abnormalities showed significant correlation (p < .05), with 14% clinically and 4.67% histopathologically.

Table 3: Correlation of clinical and histopathology-based diagnosis

Category	Clinical	Histopathology	p value
PALM-Total	75 (50%)	96 (64%)	<.005 (HS)
AUB-P (polyp)	03 (2%)	02 (1.33%)	>0.05 (NS)
AUB-A (adenomyosis)	05 (3.33%)	12 (8%)	<.05 (S)
AUB-A;L(adenomyosis and leiomyoma)	01 (0.67%)	03 (2%)	<.01 (HS)
AUB-L (leiomyoma)	63 (42%)	67 (44.67%)	>0.05 (NS)
AUB-M (malignancy and hyperplasia)	03 (2%)	12 (8%)	<.01 (HS)
COEIN- Total	75 (50%)	54 (36%)	<.005 (HS)
AUB-O (ovulatory disorders)	54 (36%)	47 (31.33%)	>0.05 (NS)
AUB-E (endometrial)	21 (14%)	7 (4.67%)	<.05 (S)

Discussion

In our study, we observed a predominant representation of perimenopausal women, with 81.33% falling within the 40-50 age range, highlighting the significance of this life stage in the context of abnormal uterine bleeding. This finding resonates with Mishra et al.'s [11] study, where a similar demographic trend was observed, with 97.46% of women below 50 years of age. Conversely, Ansari et al. [12] reported a broader age distribution, suggesting potential variations in patient demographics across different study populations.

Furthermore, our study revealed a noteworthy proportion of grandmultiparous women, consistent with Mishra et al.'s [11] findings. However, variations in parity distribution were noted across studies, indicating differences in reproductive patterns among study populations. Socioeconomic status emerged as another important factor, with a significant proportion of patients belonging to lower socioeconomic classes in our study and in Mishra et al.'s [11] study. Conversely, Ansari et al. [12] reported a higher proportion of patients from the middle socioeconomic status, highlighting potential disparities in socioeconomic distribution among study populations. Additionally, our study identified various comorbidities associated with abnormal uterine bleeding, including obesity, thyroid disorders, and hypertension. These findings align with Sabre et al.'s [13] study, which reported similar comorbidity patterns among patients with abnormal uterine bleeding.

Our study examined the correlation between clinical presentations and histopathological findings in abnormal uterine bleeding using FIGO's PALM-COEIN Classification. PALM diagnoses were prevalent in 50% clinically and 64% histopathologically. Adenomyosis (3.33% clinically, 8% histopathologically) and adenomyosis with leiomyoma (0.67% clinically, 2% histopathologically) showed significant correlations. Leiomyoma was the most common diagnosis (42% clinically, 44.67% histopathologically). Malignancy and hyperplasia were significant (2% clinically, 8% histopathologically). Ovulatory disorders prevailed (36% clinically, 31.33% histopathologically), and endometrial abnormalities had significant correlation (14% clinically, 4.67% histopathologically). Additionally, 13 cases of endometrial hyperplasia were observed, with 92.31% simple adenomatous hyperplasia without atypia and 7.69% with atypia.

Comparing our study with other research reveals varied demographic and clinical characteristics among patients with abnormal uterine bleeding. Mishra et al. [11] observed a significant difference between clinical and histological diagnoses, with a higher prevalence of PALM components on histological examination. Similarly, Sabre et al. [13] found a median age of 47 years among their patient cohort, with prevalent comorbidities such as hypertension, diabetes, and thyroid disease. Our study, in line with Mishra et al. [11], underscores the predominance of perimenopausal women and a substantial presence of leiomyoma diagnoses.

Conversely, Betha et al. [14] reported leiomyoma as the most common cause of abnormal uterine bleeding, followed by ovulatory disorders. Similarly, Ansari et al.12 identified leiomyoma, adenomyosis, and malignancy as prominent etiologies, with varying frequencies across their patient population. Pingjuan et al. [15] also highlighted the predominance of structural abnormalities, particularly leiomyoma, in their study. Khan et al. [16] reported hyperplasia as the most common endometrial pathology, emphasizing the diverse spectrum of underlying causes contributing to abnormal uterine bleeding. Shukla et al. [17] reinforced the importance of endometrial sampling in diagnosing underlying pathology, particularly in women above 35 years of age. Overall, the comparative analysis suggests that while certain patterns such as leiomyoma prevalence are consistent across studies, variations in demographic factors, etiologies, and diagnostic approaches underscore the multifactorial nature of abnormal uterine bleeding.

The study by Mishra et al. [11] underscores the importance of histopathological examination in confirming diagnoses and elucidating the underlying etiology of abnormal uterine bleeding (AUB). Their findings reveal a significant disparity between clinical and histopathological diagnoses, particularly in cases of adenomyosis and malignancy/hyperplasia. Adenomyosis, a common cause of AUB, demonstrated a notable difference in diagnosis between clinical assessment and histopathological examination, highlighting the challenges in accurately diagnosing this condition based solely on clinical presentation. This emphasizes the complementary role of clinical and histopathological evaluations in accurately diagnosing and managing AUB, underscoring the need for continued research and refinement of diagnostic criteria to improve the accuracy and reliability of AUB diagnosis and management.

Our findings emphasize the critical importance of accurately diagnosing and managing abnormal uterine bleeding (AUB) to improve patient outcomes and quality of life. Our study highlights the challenges in diagnosing AUB based solely on clinical presentation and the crucial role of histopathological examination in confirming diagnoses and elucidating underlying etiologies. Moreover, it underscores the need for continued

research and refinement of diagnostic criteria to enhance the accuracy and reliability of AUB diagnosis and management, particularly in cases where clinical and histopathological findings may not align. This highlights the importance of a multidisciplinary approach involving clinicians, pathologists, and researchers to optimize AUB diagnosis and management strategies.

One limitation of our study is the relatively small sample size, which may limit the generalizability of our findings to broader populations. Additionally, the retrospective nature of the study design could introduce biases and limitations inherent in retrospective data collection methods. Furthermore, the reliance on clinical and histopathological records for data extraction may introduce variability in the accuracy and completeness of the information collected. Future studies with larger, more diverse cohorts and prospective designs are warranted to validate our findings and address these limitations, ultimately contributing to a more comprehensive understanding of the correlation between clinical presentations and histopathological findings in cases of abnormal uterine bleeding.

Conclusion

In our study, we found that both PALM and COEIN components contributed nearly equally to abnormal uterine bleeding (AUB) when assessed clinically. However, histological examination revealed a significantly higher prevalence of PALM components, highlighting the importance of structural or anatomical abnormalities in the etiology of AUB. Specifically, there was a notable increase in cases of AUB-M (malignancy and hyperplasia) and coexistent cases of AUB-A;L, underscoring the necessity of comprehensive histopathological evaluation in diagnosing AUB. Furthermore, our findings align with previous research emphasizing the challenges in distinguishing clinical presentations of various AUB components, such as AUB-P, AUB-L, and AUB-O, which can manifest similarly but have diverse underlying etiologies. This underscores the importance of integrating clinical impressions within the context of the PALM-COEIN classification system to guide accurate diagnosis and optimize treatment protocols.

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