Cross-sectional Study

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Profiling the pathological findings of diagnostic curettage for abnormal uterine bleeding a retrospective cross-sectional study among reproductive-aged women

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Background: Abnormal uterine bleeding (AUB) is a common condition among women of reproductive age. This symptom is characterized by irregularities in menstrual frequency, duration, and volume. Early detection and management of AUB are crucial for improving women's health outcomes. This study aimed to assess the pathological findings of diagnostic curettage (D&C) in women of childbearing age with AUB at Afzalipour Hospital, Kerman, Iran.

Methods: This cross-sectional study included 1053 women aged 15–49 who underwent D&C for AUB between 2020 and 2021. Patient demographics and histopathological findings were gathered retrospectively from the pathology reports. Statistical analysis was conducted using the Kruskal–Wallis test to evaluate the relationship between pathological findings and patient age.

Results: Among the participants, 99.3% of the findings were benign, with pregnancy-related issues, normal-phase lesions, and hormone imbalances being the most common diagnoses, respectively. The average ages for the normal phase and pregnancy-related issues were significantly lower than those for malignancies, which were predominantly found in older women (average age of 45 years). Statistical analysis revealed significant age-related differences in the types of pathologies (P-value <0.001).

Conclusion: This study suggests that benign conditions are the primary cause of AUB in younger women, whereas the risk of malignancy increases with age. These findings underscore the importance of targeted diagnostic approaches, timely interventions, and appropriate management, particularly in resource-limited countries, such as Iran.

Keywords: abnormal uterine bleeding, AUB, bleeding, pathology, reproductive age, women

Introduction

The normal physiological menstrual cycle in adult women typically occurs every 24–38 days, with an average blood loss of approximately 40 cc[1]. Abnormal uterine bleeding (AUB) is not a specific diagnosis but rather a clinical manifestation characterized by abnormalities in menstrual volume, duration, frequency, and regularity[2]. AUB is a frequent condition, with approximately 70% of gynecology clinic visits by women in the perimenopausal age[3]. The estimated prevalence of AUB in women of childbearing and perimenopausal age is approximately 20%[4]. This situation significantly impacts physical, mental, social, and economic well-being, thereby reducing overall quality of life. Moreover, AUB imposes notable direct and indirect socioeconomic burden on society[5,6].

The International Federation of Obstetrics and Gynecology (FIGO) provided the most recent terminology update in 2018, which introduced an acronym to define bleeding patterns and included intermenstrual bleeding as a characteristic feature of AUB[4]. Various direct and indirect pathological entities related to the reproductive tract can contribute to AUB. To better

HIGHLIGHTS

- In this study 99.3% of the pathological findings from diagnostic curettage were benign, indicating that abnormal uterine bleeding is primarily associated with noncancerous conditions in women of reproductive age.
- Only 0.5% of cases were pre-malignant and 0.2% were malignant.
- The most common diagnoses being pregnancy-related issues, normal-phase lesions, and hormonal imbalances.
- There was a significant relationship between age and pathological findings; younger women had predominantly benign conditions, while malignancies were more common in older women.
- Hormonal imbalance-related causes were prevalent among older individuals, suggesting the need for systemic evaluation older reproductive ages.

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categorize the potential causes of AUB, FIGO has developed a two-part system that distinguishes between structural (PALM) and non-structural (COEI) entities[7]. The PALM group includes four structural conditions: polyps, adenomyosis, leiomyomas, and malignancies, such as atypical endometrial hyperplasia and epithelial intraepithelial neoplasia, which can be assessed through imaging and histopathological examination. The COEI group includes coagulopathies, ovulatory abnormalities, endometrial dysfunction, and iatrogenic causes from medications, such as gonadal steroids, certain antidepressants, coagulopathy drugs, or intrauterine devices. Their diagnosis typically relies on laboratory tests[4,7]. Additionally, the N category (not otherwise classified) involves rare causes of AUB, such as cesarean section scar defects and arteriovenous malformations, which may require histopathological analysis or imaging for detection[4,7]. Notably, multiple AUB etiologies can co-exist in a single patient[8,9].

Taking a comprehensive medical history and a complete physical examination is valuable to differentiate AUB causes and confirm that the bleeding originates from the uterus, rather than another site[4,10]. Subsequently, various laboratory tests and imaging methods along with endometrial biopsy can be employed based on the patient's history, age, and clinical condition. Not all diagnostic methods are necessary for all patients[4,11].

Endometrial biopsy is the gold standard method for evaluating uterine malignancy or hyperplasia[11]. Risk factors such as pre-malignant and malignant changes, age, and imaging findings determine the necessity for endometrial biopsy[11]. Simple dilation and curettage (D&C) can be used to obtain tissues for histopathological examination. This method is among the most commonly used invasive procedures in the United States, and can be performed on both pregnant and nonpregnant women[12].

Unfortunately, nearly half of women with AUB and its associated complications do not seek medical care or receive appropriate treatment, often due to a lack of awareness[13]. This oversight can lead to the diagnosis of malignancies at advanced stages, when prognoses are less favorable[14]. This underscores the necessity for more research into AUB prevalence and risk factors across diverse populations, especially among women in developing regions with limited resources who face higher risks[15].

This study aimed to investigate the frequency of various pathological findings from diagnostic curettage in women of reproductive age presenting with AUB at Afzalipour Hospital, Kerman, Iran. Furthermore, this study can serve as a useful guide for primary care physicians to develop more effective treatment plans and follow-up programs to meet the needs of affected women.

Material and methods

Study design

A retrospective cross-sectional study was conducted between January 2020 and December 2021 at Afzalipour Hospital, Kerman, Iran, to evaluate pathological findings from diagnostic uterine curettage in women of reproductive age with AUB. Ethical approval for the study was obtained from the Ethics Committee of the Kerman University of Medical Sciences (Ethics Code: IR.KMU.AH.REC.1400.230). Furthermore, the study was registered in Research Proposal Information System (RPIS) of the Deputy for Research and Technology of the Ministry of Health and Medical Education of Iran (Registration NO: 400000325, RPIS). All patient's information was anonymized and the principles of confidentiality and privacy were maintained throughout the study from adult patients. In accordance with ethical guidelines, a written consent was also obtained from parents or legal guardians for participants under 18 years of age. This study followed the STROCSS 2021 guideline for cross-sectional studies[16].

Study population and data extraction

This study included women aged 15–49 years[17] or younger who underwent diagnostic uterine curettage for AUB during the study period. Data for this study were collected retrospectively from existing pathology reports. A standardized data collection form was used to extract relevant variables, including the patient's age, as confirmed by the gynecologist, and histopathological findings as documented by the pathologist. Patients with incomplete or inaccessible medical records were excluded from analysis.

Statistical analysis

Categorical variables were summarized as frequencies and percentages, whereas quantitative variables were described using mean and standard deviation (SD). To evaluate the relationship between the types of pathological findings and patient age, the Kruskal–Wallis test was applied. Statistical significance was set at $P < 0.05$. Data analysis was performed using SPSS version 22. In addition, we utilized the Pandas, Matplotlib, and Plotly libraries in Python 3.10.12 to design our figures.

Results

Study population

A total of 1053 patients of reproductive age who presented with the chief complaint of AUB were referred to the Afzalipour Hospital and underwent diagnostic curettage to assess the underlying cause. Among them, 600 (57%) patients were referred for 2020 and 453 (43%) for 2021.

General incidence of pathologic findings

Overall, 99.3% of the findings were benign, 0.5% were pre-malignant, and 0.2% were malignant (Fig. 1). Pregnancy-related issues, normal-phase lesions, and hormone imbalance lesions were the most common pathological findings among the patients. Additionally, the incidence of normal phase (30.09 ± 7.06) and pregnancy-related issues (31.46 ± 7.32) was more prevalent in younger patients, while the diagnosis of malignancy was significantly more frequent in older women of reproductive age (45 ± 2.82) (*P*-value <0.001) (Fig. 2, Table 1).

There was a significant variation in the age range between the benign lesions (*P*-value <0.001). Hormone imbalance-related causes (41.11 ± 6.17) and polyps (38.48 ± 6.70) were more prevalent in older individuals. Conversely, most cases of uterine

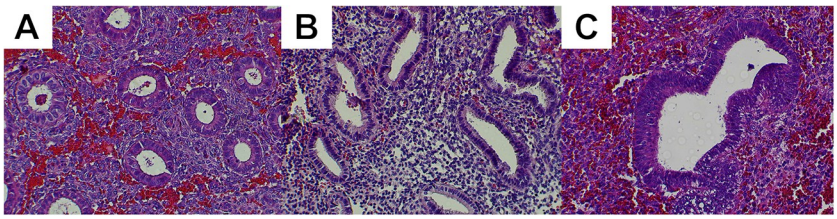

Figure 1. Sample of patient's microscopic representation with hematoxylin and eosin (H&E) staining. (A) Proliferative endometrium. (B) Secretory endometrium. (C) Disordered proliferative endometrium.

bleeding in younger women were associated with a normal uterine phase.

As shown in Table 1, there were no significant differences in the mean age of the patients in the normal phase and pregnancy subgroups. However, there was a statistically significant difference between the hormone imbalance subtypes (*P*-value <0.001). The highest mean age of patients was associated with the disordered proliferative endometrium group (42.84 ± 4.59) and younger patients were diagnosed with excess estrogen effect group (32.5 ± 5.4).

The incidence of cases within the hyperplasia and adenocarcinoma groups was notably low, with no meaningful age-related differences observed among their respective subgroups. However, it is important to note that the age of the patients in these groups was considerably greater than that of the patients with benign lesions (Fig. 3).

Discussion

Endometrial biopsy through D&C remains the gold standard diagnostic method for AUB as it prepares direct visualization, targeted sampling of the uterine lining, and prevents unnecessary surgical approaches[10].

The D&C findings of our study conducted in Kerman, Iran, revealed that the most common etiologies were benign conditions such as pregnancy-related issues (71.6%), normal endometrial changes (12.7%), and hormonal imbalances (10.6%).

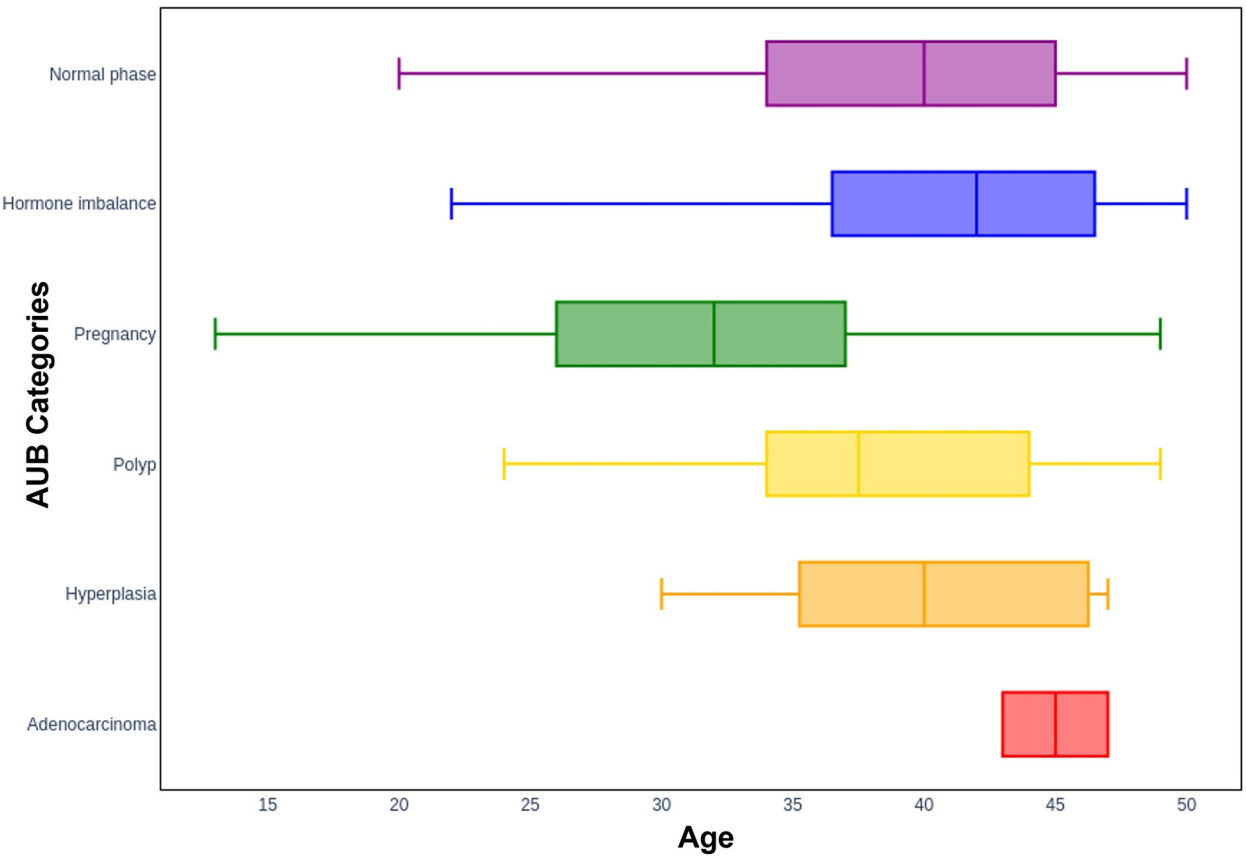

Figure 2. Age distribution of different categories of pathology findings.

Table 1

Mean age and frequency of pathology diagnoses in patients with AUB complaints

Pathology findings	Number of cases (%)	Age (mean ± SD)	*P*-value
Benign lesions			
Normal phase			
Proliferative endometrium	49 (36.8)	38.33 ± 7.23	0.515
Secretory endometrium	80 (60.2)	39.61 ± 6.93	
Endometrial shedding	4 (3.0)	37.67 ± 9.6	
Total[a]	133 (12.7)	30.09 ± 7.06	<0.001
Hormones imbalance			
Disordered proliferative endometrium	66 (59.5)	42.84 ± 4.59	<0.001
Progesterone effect	7 (6.3)	42.67 ± 4.36	
Excess estrogen effect	17 (15.3)	32.5 ± 5.4	
Estrogen withdrawal shedding	17 (15.3)	42.47 ± 6.33	
Other types of hormone imbalance	4 (3.6)	41 ± 4.69	
Total	111 (10.6)	41.11 ± 6.17	<0.001
Pregnancy			
POC[b]	711 (94.9%)	31.56 ± 7.24	0.209
Molar pregnancy	38 (5.1%)	29.72 ± 8.44	
Total	749 (71.6)	31.46 ± 7.32	<0.001
Polyp			
Adenomyomatous	53 (100.0)	38.48 ± 6.70	N/A[c]
Total	53 (5.0)	38.48 ± 6.70	<0.001
Pre-malignant lesions			
Hyperplasia			
Simple cystic hyperplasia	3 (60.0)	41 ± 9.53	N/A
Atypical hyperplasia	1 (20.0)	40	
Hyperplasia without atypia	1 (20.0)	37	
Total	5 (0.5)	40 ± 6.96	<0.001
Malignant lesions			
Adenocarcinoma			
Endometroid adenocarcinoma	2 (100)	43, 47	N/A
Total	2 (0.2)	N/A	<0.001

[a]Compared to all patients.
[b]Product of consumption including gestational endometrium, decidual tissue, decidual cast, decidualized endometrium, necrotic decidual tissue, and blood clot.
[c]Not available.

These results align remarkably with prior investigations performed in other areas of Iran and internationally[18–21].

For instance, a study in India demonstrated that pregnancy (56.6%), normal endometrial changes (22.3%), and hormonal imbalances (12.7%) were the most frequent pathological findings among reproductive-aged women with AUB[18]. Similarly, a study in Iran reported that benign conditions including normal endometrial changes (42.4%) and hormonal imbalances (21.2%) were the most prevalent pathological findings in this population[19]. As a result, a higher percentage of AUB etiologies can be treated at childbearing age, but unfortunately, many women believe that there is no cure for this disorder or postpone its follow-up[10,13].

Notably, compared to other studies, more than half of our findings were related to pregnancy-related issues, which could be because Afzalipour Hospital of Kerman City, as a first-level referral hospital in the southeast of Iran, has more referrals for pregnant women with complications.

Moreover, there was an obvious difference in the mean age of the patients with hormone imbalance-related uterine bleeding. The unopposed estrogen effect was interestingly more associated with younger ages, despite past studies that reported that it causes marked proliferation and thickening, and eventually heavy menstrual bleeding in extremes of reproductive age[22]. This controversy may be related to various factors, including the increasing awareness of women about AUB, rising use of hormonal therapies, and the incidence of hormonal diseases in younger ages, such as polycystic ovary syndrome[23].

In contrast, our current study also illustrated that the incidence of pre-malignant and malignant lesions was relatively low, accounting for 0.5% and 0.2% of the cases, respectively. This result is consistent with the generally low prevalence of endometrial cancer among women of reproductive age, as described in previous epidemiological studies[24]. Likewise, a global cancer statistics report indicated that the incidence of endometrial cancer is higher in older women and more frequent in postmenopausal women[24]. However, the importance of detecting malignant lesions in the early stages is undeniable and plays a substantial role in the patient's lifespan and rate of treatment response[10].

This study has multiple limitations, including the cross-sectional nature of the study, loss of accurate and complete available medical records of patients, low number of eligible samples, and participation of only a single tertiary care center. Future studies should consider a prospective design with a larger sample size from multiple healthcare facilities. Incorporating detailed clinical and demographic data, as well as long-term follow-up, would further improve our understanding of AUB epidemiology and risk factors in populations. Furthermore, exploring the socioeconomic and quality of life impacts of AUB could help healthcare policies to manage this common gynecological condition.

Conclusion

Overall, this study provides valuable insights into the prevalence of different pathological findings among women of reproductive age presenting with AUB in Kerman, Iran. The results emphasize the importance of early diagnosis and correct management of benign etiologies as well as the need for consistent and careful identification of pre-malignant and malignant lesions, especially in older women.

Ethical approval

Ethical approval for the study was obtained from the Ethics Committee of the Kerman University of Medical Sciences (Ethics Code: IR.KMU.AH.REC.1400.230). Furthermore, the study was registered in the Research Proposal Information System (RPIS) of the Deputy for Research and Technology of the Ministry of Health and Medical Education of Iran (Registration NO: 400000325, RPIS).

Consent

Not applicable.

Sources of funding

Not applicable.

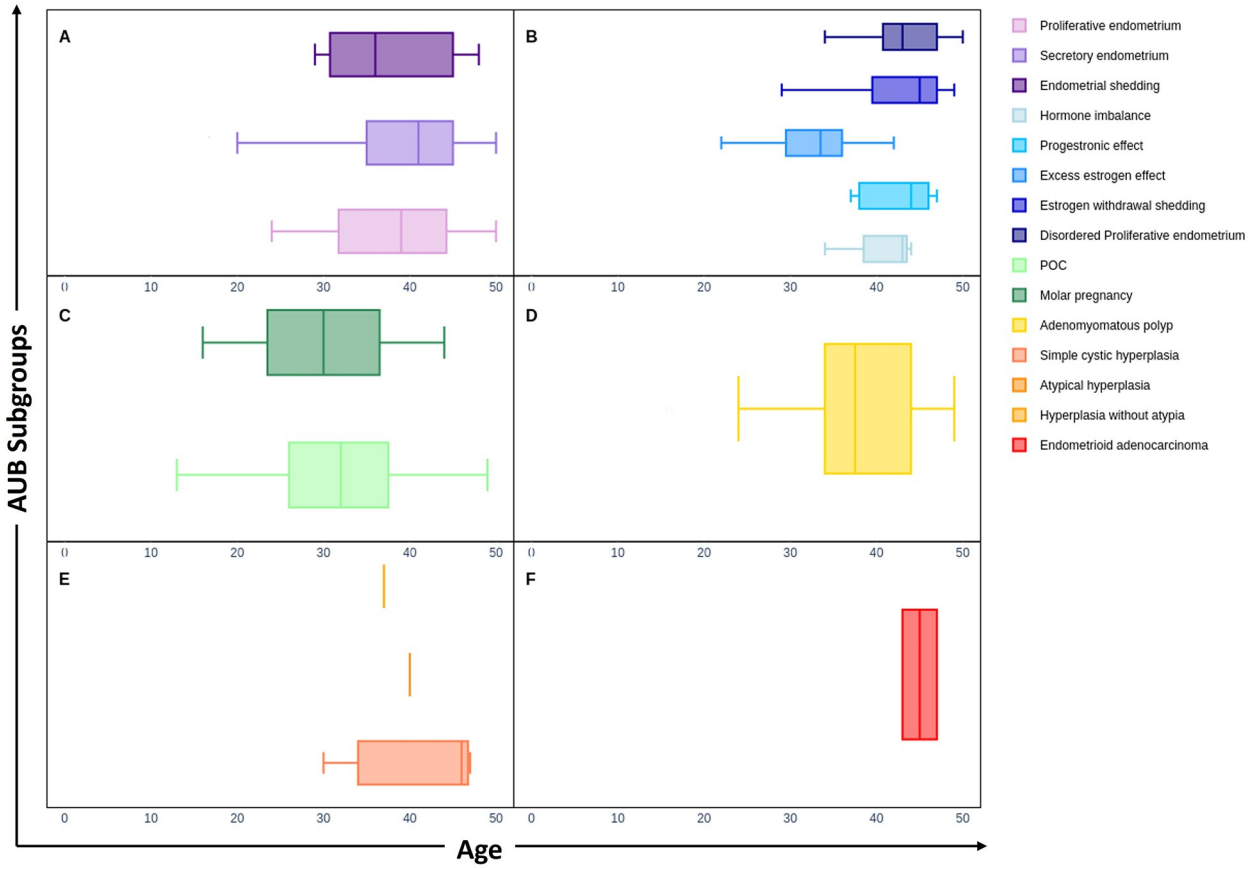

Figure 3. Age distribution of various subgroups of pathology findings. (A) Normal phase; (B) hormone imbalance; (C) pregnancy; (D) polyp; (E) hyperplasia; (F) adenocarcinoma subgroups. POC, product of conception.

Author's contributions

Designed the project: M.I.; collected the data: M.F.; analyzed the data and designed figures: M.F. and F.B.; wrote the manuscript: M.F., S.F., F.B.; supervised the project and revised the manuscript: M.F., M.I. All authors have read and approved the final manuscript.

Conflicts of interest disclosure

Not applicable.

Research registration unique identifying number (UIN)

Not applicable.

Guarantor

Not applicable.

Provenance and peer review

Not applicable.

Data availability statement

The data related to this study will be provided upon considerable request from the corresponding author. This research was conducted at Afzalipour Hospital, Kerman, Iran. But, as the main body of the paper should not include any identifying information, we omitted this information from the main text.

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