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ABNORMAL UTERINE BLEEDING AS A RELEVANT PROBLEM IN MODERN GYNECOLOGY

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Abstract:
Abnormal uterine bleeding (AUB) remains a major clinical challenge in modern gynecology due to its high prevalence, etiological heterogeneity, and significant impact on women's health and quality of life. This review summarizes current approaches to the classification and pathogenesis of AUB, with emphasis on the FIGO PALM–COEIN system and the evolution of standardized terminology. Epidemiological features of AUB are analyzed with consideration of age-related differences between reproductive-aged and perimenopausal women, as well as methodological factors contributing to variability in prevalence estimates. Particular attention is paid to non-structural forms of AUB, including ovulatory and endometrial dysfunction, local disturbances of hemostasis, angiogenesis, hormonal imbalance, and impaired endometrial repair. The review highlights the high rate of disease recurrence and the limitations of symptom-oriented and morphology-based management strategies. Current evidence supports the need to expand the clinical paradigm of AUB beyond structural causes and acute bleeding control toward a more comprehensive, pathogenetically oriented and individualized approach to diagnosis and treatment.

Keywords: abnormal uterine bleeding; PALM–COEIN classification; endometrial dysfunction; pathogenesis; recurrence

INTRODUCTION. For a long time, menstrual cycle disorders and uterine bleeding in non-pregnant women were described using fragmented and largely inaccurate terminology, including terms such as *"dysfunctional uterine bleeding," "menorrhagia," "metrorrhagia,"* and *"menometrorrhagia."* These terms primarily reflected clinical manifestations but failed to adequately characterize the underlying pathogenetic mechanisms of bleeding.

The widespread use of the term *"dysfunctional uterine bleeding"* was particularly problematic, as it functioned essentially as a diagnosis of exclusion and encompassed a heterogeneous group of conditions with different etiologies and prognoses. This resulted in substantial variability in clinical management and complicated the interpretation of research findings, since both ovulatory and structural causes of bleeding could be subsumed under the same diagnosis [7,30,42,43]. Recognition of these limitations prompted the International Federation of Gynecology and Obstetrics (FIGO) to develop a standardized terminology and classification system for abnormal uterine bleeding. In 2011, the PALM–COEIN classification was introduced and subsequently refined, enabling a clear distinction between structural (PALM) and non-structural (COEIN) causes of AUB [13].

AIM. The aim of this study was to analyze the clinical and epidemiological characteristics of abnormal uterine bleeding within the framework of contemporary terminology and classification systems, to assess the influence of age-related and non-structural mechanisms on disease course and recurrence, and to substantiate the need for individualized management strategies.

MATERIALS AND METHODS. This study was based on a comprehensive analysis of contemporary scientific literature, clinical observations, and epidemiological data related to abnormal uterine bleeding.

- Causes of AUB were classified according to the FIGO PALM–COEIN system into structural and non-structural categories.
- Separate analyses were conducted for women of reproductive age and those in the perimenopausal period.
- Data on prevalence, clinical manifestations, complications, and recurrence rates were comparatively evaluated.
- The severity of bleeding, its impact on quality of life, and post-treatment outcomes were assessed.

Methodological factors influencing epidemiological variability, healthcare access, patient behavior, and the

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presence of comorbid conditions were also considered in the analysis.

RESULTS. The introduction of the term *"abnormal uterine bleeding"* represented a crucial conceptual shift, allowing abandonment of descriptive and pathogenetically vague definitions in favor of a systematic approach that integrates clinical, morphological, and functional characteristics of the disorder. According to the contemporary definition, AUB encompasses any deviation from normal menstrual bleeding in terms of volume, duration, regularity, or frequency in non-pregnant women of reproductive age and the perimenopausal period [31].

The literature emphasizes that the unification of terminology has improved the comparability of epidemiological data; however, it has not fully resolved the problem of heterogeneity within study populations. Even within the PALM–COEIN classification, substantial differences persist in the interpretation of certain categories, particularly non-structural forms of AUB, which is critically important for understanding disease pathogenesis and predicting clinical course [7,20].

Similar challenges have been reported in studies conducted in the countries of the Commonwealth of Independent States, where the transition to contemporary terminology has been gradual and outdated concepts continue to be used in some publications. This limits the integration of regional data into the international scientific context [2,3]. At the same time, the implementation of the FIGO classification in clinical practice has enabled authors from these regions to more clearly structure the causes of AUB and to highlight the significance of non-structural factors that had previously received insufficient attention [1].

The evolution of concepts related to abnormal uterine bleeding reflects a shift from a purely descriptive approach toward a systematic analysis of the disorder. Modern terminology and classification systems have established a foundation for more precise diagnosis and scientific investigation of AUB, while simultaneously underscoring the need for deeper analysis of non-structural mechanisms that determine clinical course and recurrence.

One of the key features of AUB epidemiology is the wide variability in prevalence estimates reported in the literature. According to population-based studies, the prevalence of AUB ranges from 20–25% to 60–70% among women of reproductive age and those in the perimenopausal period [20,36,43].

This pronounced variability is primarily attributable to differences in diagnostic criteria. In some studies, AUB assessment is based on subjective patient-reported symptoms, whereas others apply standardized clinical criteria that consider menstrual duration, volume, and cycle regularity [21,22]. Reliance on self-assessed menstrual blood loss generally leads to overestimation of prevalence, whereas clinically verified data tend to yield lower, but likely more accurate, estimates.

Age of the study population has a substantial impact on epidemiological estimates. Among women of reproductive age, AUB is reported in approximately 20–35% of patients, whereas its prevalence increases markedly during the perimenopausal period. This rise is commonly attributed to a higher proportion of anovulatory cycles and age-related changes in the endometrium [35,43]. Several authors emphasize that combining reproductive-aged and perimenopausal women into a single analytical group may distort prevalence estimates and complicate the assessment of risk factors [7].

Another factor influencing the estimated prevalence of AUB is variability in access to healthcare services and healthcare-seeking behavior. According to published data, a substantial proportion of women with menstrual disorders do not seek medical attention for prolonged periods, perceiving abnormal bleeding as a physiological or age-related phenomenon [6]. This pattern is particularly pronounced among perimenopausal women and is also supported by data from studies conducted in the countries of the Commonwealth of Independent States [1,3].

National studies further indicate that AUB represents one of the leading causes of hospitalization in gynecological units and is frequently associated with iron deficiency anemia, requiring prolonged treatment and repeated medical visits [1]. At the same time, authors note that official statistics underestimate the true prevalence of AUB, as they primarily capture cases requiring inpatient management.

Taken together, the available data indicate that the epidemiology of abnormal uterine bleeding remains heterogeneous and is largely influenced by methodological approaches. This underscores the need for more precise stratification of patients by age, clinical characteristics, and comorbid factors, which is essential for advancing pathogenetic research and developing effective strategies for prevention and treatment of AUB [7]. Despite the unification of terminology, AUB represents a clinically heterogeneous syndrome, the manifestations of which vary substantially depending on a woman's age and reproductive status. Contemporary reviews emphasize that combining reproductive-aged and perimenopausal women into a single analytical group may lead to methodological and clinical bias, as

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the distribution of underlying causes and the clinical relevance of specific bleeding patterns differ across these age intervals [11,18].

In women of reproductive age, the spectrum of AUB causes more commonly involves non-structural mechanisms (FIGO COEIN categories), particularly ovulatory and endometrial dysfunction. The clinical phenotype may range from intermenstrual spotting to pronounced heavy menstrual bleeding [7,28]. An important clinical consideration is that patients' subjective assessment of bleeding "heaviness" often does not correspond to objective criteria. Discrepancies between perceived blood loss and clinical severity partly explain the variability in epidemiological estimates of AUB and heavy menstrual bleeding (HMB) [9,34].

During the perimenopausal period, the prevalence of AUB increases, which is attributed to age-related decline in ovarian reserve, a higher proportion of anovulatory cycles, and instability of hormonal regulation. Fluctuating estrogen secretion in the absence of adequate progesterone opposition promotes uneven endometrial proliferation and clinically manifests as irregular, prolonged, and/or heavy bleeding [11,40]. Reviews focusing on perimenopausal AUB highlight the high frequency of symptoms that adversely affect quality of life in this age group, with heavy menstrual bleeding around the age of 40–45 years being associated with a significant decline in quality of life [40]. These observations are consistent with clinical data indicating that menstrual bleeding disorders are most typical during menarche and perimenopause, reflecting hormonal instability at these life stages [28].

Clinically, it is important that AUB in perimenopausal women more often requires active medical intervention and may be characterized by a higher tendency toward recurrence. In practical terms, this results in an increased number of repeat consultations and diagnostic procedures [11,34]. Studies from the Commonwealth of Independent States emphasize that in older age groups, AUB ranks among the leading causes of hospitalization in gynecological units, while delayed presentation is frequently related to the perception of bleeding as an "age-related" phenomenon, leading to hospital admission at the stage of complications [1–3].

Age-related factors fundamentally determine the clinical course of AUB, the spectrum of probable causes, severity of manifestations, and prognosis. This necessitates stratification of patients by age (reproductive age versus perimenopause) in both research settings and clinical algorithms, particularly when analyzing risk factors for severe disease and recurrence [7,11,18].

The clinical significance of AUB is defined not only by its prevalence but also by its substantial impact on women's overall health. The most common complication of chronic and/or heavy bleeding is iron deficiency and iron deficiency anemia, which are associated with reduced physical performance, fatigue, and impaired quality of life. International guidelines for the management of women with heavy menstrual bleeding emphasize the importance of assessing the impact of bleeding on quality of life and the need for identification and correction of iron deficiency as an integral component of patient management [34]. Contemporary reviews also indicate that AUB is frequently associated with clinically significant direct and indirect burdens, ranging from repeated medical visits and diagnostic procedures to the need for inpatient treatment [7,43].

AUB has a pronounced negative effect on quality of life, including limitations in daily activities, reduced social participation, emotional disturbances, and impaired sexual well-being. Systematic reviews and population-based studies demonstrate that the burden of HMB/AUB extends beyond a purely "gynecological symptom" and affects key domains of quality of life, including physical functioning, emotional health, and occupational activity [34,40]. In perimenopausal women, the coexistence of multiple factors—hormonal instability, vasomotor and somatic symptoms, sleep disturbances, and anxiety—further amplifies subjective disease burden and may result in a more pronounced decline in quality of life in the presence of AUB [11,40].

Another important aspect is that AUB imposes a substantial burden on healthcare systems, including repeated medical visits, the need for instrumental diagnostic procedures, and pharmacological treatment. Clinical guidelines emphasize that diagnostic and therapeutic strategies should consider not only the presumed cause of bleeding but also the extent to which symptoms affect a woman's quality of life, as well as her preferences and expected treatment outcomes [4,18,34]. However, in real-world practice, a gap often exists between recommended algorithms and actual management: patients frequently receive predominantly symptomatic treatment without a systematic assessment of factors determining the duration and recurrence of bleeding episodes. This approach may increase the risk of recurrence and repeated interventions [7,11].

Studies from the Commonwealth of Independent States further highlight that delayed healthcare-seeking behavior and the high prevalence of anemia in women with AUB increase the need for inpatient care and

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invasive interventions, particularly among older age groups [1–3]. This reinforces the importance of developing management strategies aimed not only at controlling acute bleeding episodes but also at preventing recurrence and reducing the overall clinical and societal burden of the condition.

AUB should therefore be regarded as a condition with significant systemic consequences and a substantial impact on quality of life and healthcare resource utilization. Evaluation of its clinical significance requires consideration of age-related factors, symptom severity, and determinants of recurrent bleeding, which is essential for substantiating comprehensive preventive and therapeutic strategies [7,18,34].

One of the most challenging and still insufficiently resolved issues in the management of patients with abnormal uterine bleeding is the high rate of disease recurrence. Despite the use of modern medical and surgical treatment modalities, recurrent episodes of AUB remain a common clinical problem, significantly reducing treatment effectiveness and negatively affecting patients' quality of life [7,30–32].

According to systematic reviews and large clinical observational studies, the recurrence rate of AUB within 6–12 months after treatment ranges from 30% to 50%, depending on patient age, baseline bleeding severity, and the chosen management strategy [32,42,43]. Particularly high rates of repeat presentations are observed among perimenopausal women, which is commonly attributed to hormonal instability and the high prevalence of concomitant somatic conditions in this age group [11,40].

Clinical analyses of AUB recurrence indicate that therapeutic interventions are often primarily aimed at controlling the acute bleeding episode, while factors underlying disease recurrence remain insufficiently addressed. Hormonal hemostatic therapy, widely used in clinical practice, may provide temporary stabilization but does not eliminate underlying disturbances that can sustain the pathological process [31–34].

Several studies emphasize that recurrent AUB episodes frequently occur even after diagnostic and therapeutic curettage in the absence of structural endometrial pathology, calling into question the adequacy of a purely morphological approach to evaluating bleeding etiology [7,18]. This is particularly characteristic of non-structural forms of AUB, in which morphological changes may be minimal or transient, whereas functional disturbances persist.

Authors from national studies also report a high rate of recurrent hospitalizations due to AUB, particularly among older women. Clinical observations indicate that recurrent bleeding episodes often necessitate repeated invasive interventions, thereby increasing the risk of complications and adversely affecting patients' overall condition [1–3].

The issue of AUB recurrence has become a central concern in contemporary gynecology, indicating that existing diagnostic and treatment algorithms do not fully account for the multifactorial nature of the disorder. The high frequency of recurrent episodes highlights the need to identify factors capable of modifying the disease course and determining individual prognosis in affected patients [7,31].

Current clinical guidelines for the management of abnormal uterine bleeding are based on the PALM–COEIN classification and propose a stepwise diagnostic and therapeutic algorithm that includes exclusion of structural pathology, assessment of hormonal status, and the use of medical or surgical treatment modalities [4,30,34]. This approach has contributed to standardization of clinical management and reduced variability in clinical decision-making; however, its effectiveness in preventing recurrence remains limited.

A key limitation of existing algorithms is their predominant focus on local bleeding mechanisms and morphological assessment of the endometrium. In the absence of structural uterine abnormalities (PALM categories), subsequent management often relies on hormonal correction without in-depth evaluation of systemic factors that may influence endometrial function and reparative processes [7,18]. As a result, patients with non-structural forms of AUB frequently receive repeated courses of symptomatic therapy without achieving sustained clinical benefit.

In recent years, the literature has increasingly emphasized that a purely symptom-oriented approach is insufficient to fully explain individual differences in the clinical course of AUB or to predict the risk of recurrence. Even among patients with similar clinical and morphological characteristics, fundamentally different responses to therapy are observed, indicating the presence of additional, insufficiently considered factors [11,31,32].

Several authors note that current clinical guidelines inadequately reflect the role of a woman's overall somatic health and comorbid conditions, which may indirectly affect endometrial function. In particular, there is growing recognition of the need for a more comprehensive assessment of patients with AUB that extends beyond the reproductive system and includes evaluation of endocrine and metabolic characteristics, especially in older age groups [7,40].

Studies conducted in the countries of the Commonwealth of Independent States similarly report that standard AUB management protocols are often

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applied without consideration of individual risk factors, potentially contributing to the development of chronic and recurrent disease courses [1–3]. The authors emphasize that, in real-world clinical practice, more flexible and personalized approaches to AUB management are required.

CONCLUSION. Thus, analysis of contemporary data indicates a clear gap between formalized clinical algorithms and the inherently multifactorial nature of abnormal uterine bleeding. The high recurrence rate, variability in therapeutic response, and limited effectiveness of symptom-based treatment underscore the need to expand the current clinical paradigm of AUB and to justify further research aimed at identifying factors that modify disease course and determine individual prognosis.

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