



**ABNORMAL UTERINE BLEEDING IN WOMEN OF REPRODUCTIVE AGE:
ETIOPATHOGENESIS, CLINICAL MANIFESTATIONS, DIAGNOSIS, AND MODERN
PRINCIPLES OF TREATMENT**

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ABSTRACT

Abnormal uterine bleeding (AUB) is one of the most common gynecological problems among women of reproductive age and has a significant impact on physical health, emotional well-being, fertility, working capacity, and quality of life. AUB refers to menstrual bleeding that differs from normal menstruation in frequency, regularity, duration, or volume. In modern gynecology, the evaluation of AUB is based on the FIGO PALM–COEIN classification, which divides causes into structural and non-structural groups. Structural causes include polyps, adenomyosis, leiomyoma, malignancy, and hyperplasia, while non-structural causes include coagulopathy, ovulatory dysfunction, endometrial disorders, iatrogenic causes, and causes not otherwise classified.

The clinical significance of AUB is high because it may be the first manifestation of anemia, endocrine disorders, polycystic ovary syndrome, uterine fibroids, endometrial hyperplasia, or, less commonly in reproductive age, malignant disease. Studies show that AUB affects a considerable proportion of reproductive-aged women; different sources estimate that approximately **14–25%** of women of reproductive age experience AUB, while some global reports describe a prevalence close to **30%**. A 2024 study also notes that AUB is a major cause of gynecological morbidity, affecting about **one in five women** during the reproductive period.

This article analyzes the etiopathogenesis, clinical features, diagnostic algorithm, and modern treatment principles of AUB in reproductive-aged women. The paper is prepared in an IMRAD style using international guidelines, clinical recommendations, and evidence-based literature. The findings show that effective management of AUB requires individualized assessment, exclusion of pregnancy, evaluation of hemodynamic stability, identification of the underlying cause, correction of anemia, and selection of medical or surgical treatment according to the patient's age, reproductive plans, severity of bleeding, and associated pathology.

Keywords: abnormal uterine bleeding, reproductive age, PALM–COEIN, heavy menstrual bleeding, leiomyoma, endometrial hyperplasia, ovulatory dysfunction, gynecology, diagnosis, treatment.

INTRODUCTION

Abnormal uterine bleeding is a broad clinical term used to describe bleeding from the uterine body that is abnormal in volume, duration, frequency, or regularity. In reproductive-aged women, normal menstruation is usually cyclic and reflects coordinated activity of the hypothalamic–pituitary–ovarian axis, ovarian steroid hormones, and the endometrium. When this balance is disturbed, menstrual bleeding may become excessive, prolonged, irregular, too frequent, or unpredictable.

AUB is not only a menstrual complaint; it is a clinically important syndrome that can reflect many gynecological, endocrine, hematological, iatrogenic, and systemic disorders. For many women, heavy or irregular bleeding causes fatigue, iron-deficiency anemia, reduced work productivity, limitation of social life, anxiety, sexual discomfort, and fear of serious disease. The medical and social



burden is especially important in reproductive-aged women because this period is closely connected with fertility, pregnancy planning, family life, and professional activity.

The International Federation of Gynecology and Obstetrics introduced the PALM–COEIN system to standardize the classification of AUB causes in nonpregnant women of reproductive age. According to this classification, **PALM** represents structural causes — polyp, adenomyosis, leiomyoma, malignancy and hyperplasia — while **COEIN** represents non-structural causes — coagulopathy, ovulatory dysfunction, endometrial, iatrogenic, and not otherwise classified causes. FIGO's 2023 review emphasizes that this system provides a structured way to evaluate possible causes of AUB and improves communication between clinicians and researchers.

The relevance of this topic is explained by the high prevalence of AUB and its frequent underdiagnosis. Many women consider heavy or irregular menstruation to be “normal” and seek medical care only when anemia, severe pain, infertility, or acute bleeding develops. This delay may worsen clinical outcomes and increase the need for invasive treatment. In addition, the causes of AUB vary by age group. In women aged 19–39 years, AUB is commonly associated with pregnancy-related conditions, structural lesions such as leiomyomas or polyps, anovulatory cycles such as in polycystic ovary syndrome, hormonal contraception, and endometrial hyperplasia.

Modern diagnosis of AUB is based on clinical history, physical and pelvic examination, laboratory testing, pregnancy exclusion, complete blood count, assessment of anemia, ultrasound imaging, and, when indicated, endometrial sampling or hysteroscopy. NICE guideline NG88 highlights that heavy menstrual bleeding should be assessed and managed in a way that identifies the cause and considers the woman's priorities, preferences, and quality of life.

The aim of this article is to provide an expanded scientific analysis of abnormal uterine bleeding in reproductive-aged women, including etiopathogenesis, clinical manifestations, diagnostic approaches, and modern treatment principles.

MATERIALS AND METHODS

This article was prepared using a descriptive analytical method based on evidence-based gynecological literature, international guidelines, and clinical recommendations. The main sources included FIGO publications on the PALM–COEIN classification, ACOG guidance on diagnosis and management of AUB in reproductive-aged women, NICE NG88 recommendations on heavy menstrual bleeding, and modern scientific publications on epidemiology, diagnosis, and treatment.

The methodological approach consisted of four main stages. First, the definition and classification of AUB were analyzed according to internationally accepted terminology. Second, etiopathogenetic mechanisms were reviewed by dividing causes into structural and non-structural groups. Third, clinical manifestations and diagnostic strategies were summarized from a practical gynecological perspective. Fourth, modern treatment options were evaluated, including medical therapy, minimally invasive methods, and surgical approaches.

The analysis focused on nonpregnant women of reproductive age. Pregnancy-related bleeding, postmenopausal bleeding, and bleeding in prepubertal girls were not the main focus of this article, although pregnancy exclusion is emphasized as an essential first diagnostic step in reproductive-aged women with bleeding. The study did not involve direct patient recruitment or primary clinical intervention. Instead, it synthesized published evidence and guideline-based recommendations to present a clinically useful academic review.

The literature was assessed according to its relevance to AUB etiology, pathophysiology, diagnostic accuracy, and treatment effectiveness. Particular attention was given to sources that provide practical algorithms for clinicians, including initial evaluation of acute bleeding, chronic



AUB management, anemia correction, fertility-preserving strategies, and indications for endometrial biopsy or surgical treatment.

RESULTS

Etiopathogenesis of abnormal uterine bleeding

The etiopathogenesis of AUB is complex and depends on the interaction between the uterus, ovaries, endocrine system, coagulation mechanisms, endometrium, medications, and systemic health. In modern gynecology, the PALM–COEIN classification is considered the most practical etiological framework.

Structural causes are grouped under PALM. Endometrial polyps may cause intermenstrual bleeding, prolonged menstruation, or spotting. They are localized overgrowths of endometrial tissue and may be detected by ultrasound, saline infusion sonography, or hysteroscopy. Adenomyosis develops when endometrial glands and stroma are present within the myometrium. It is often associated with heavy menstrual bleeding, dysmenorrhea, enlarged tender uterus, and chronic pelvic pain. Leiomyomas, or uterine fibroids, are among the most common benign uterine tumors in reproductive-aged women. Submucosal fibroids are especially associated with heavy or prolonged menstrual bleeding because they distort the uterine cavity and increase the bleeding surface. Malignancy and endometrial hyperplasia are less common in younger women, but they must be considered in patients with risk factors such as obesity, chronic anovulation, polycystic ovary syndrome, diabetes, prolonged estrogen exposure, or family history.

Non-structural causes are grouped under COEIN. Coagulopathy is an important cause, especially when heavy bleeding begins from menarche or when there is a personal or family history of bleeding tendency. Ovulatory dysfunction is very common in reproductive age and may be caused by polycystic ovary syndrome, thyroid disorders, hyperprolactinemia, obesity, stress, excessive exercise, eating disorders, or perimenarchal and perimenopausal hormonal instability. Endometrial causes occur when the endometrium has abnormal local hemostasis despite apparently normal ovulation. Iatrogenic causes include hormonal contraception, anticoagulants, intrauterine devices, and some medications affecting coagulation or endocrine regulation. The “not otherwise classified” group includes rare or poorly defined causes that do not fit into other categories.

AUB may be acute or chronic. Acute AUB is an episode of heavy bleeding requiring immediate intervention to prevent further blood loss, hemodynamic instability, or severe anemia. Chronic AUB is bleeding that has been present for most of the previous six months and differs from normal menstrual patterns. ACOG emphasizes that acute AUB in nonpregnant reproductive-aged women first requires assessment of hemodynamic stability and rapid classification of likely etiology after initial stabilization.

Clinical manifestations

The clinical presentation of AUB varies widely. Some women present with heavy menstrual bleeding, while others report irregular cycles, prolonged bleeding, frequent menstruation, intermenstrual spotting, or postcoital bleeding. Heavy menstrual bleeding may be suspected when a woman needs to change pads or tampons very frequently, passes large clots, bleeds for more than seven days, wakes at night to change menstrual products, or develops symptoms of anemia.

Common symptoms include weakness, dizziness, fatigue, shortness of breath on exertion, palpitations, headache, pale skin, reduced concentration, and decreased quality of life. In women with adenomyosis or fibroids, AUB may be accompanied by pelvic pressure, lower abdominal pain, dysmenorrhea, dyspareunia, urinary frequency, constipation, or infertility. In women with ovulatory dysfunction, bleeding may be unpredictable, with long delays followed by heavy bleeding.



The clinical picture often provides clues about the cause. Regular heavy bleeding may suggest fibroids, adenomyosis, or endometrial disorders. Irregular bleeding with acne, hirsutism, obesity, or infertility suggests possible polycystic ovary syndrome. Bleeding from menarche or bleeding after dental procedures or surgery may suggest a coagulation disorder. Intermenstrual or postcoital bleeding may require evaluation for cervical pathology, endometrial polyps, infection, or malignancy.

Diagnostic approach

Diagnosis begins with careful history-taking. The clinician should ask about age, menstrual cycle pattern, duration and amount of bleeding, presence of clots, pain, pregnancy possibility, contraception use, medications, systemic diseases, weight changes, stress, endocrine symptoms, family history, and reproductive plans. It is important to evaluate how bleeding affects daily life because NICE recommends that management should improve quality of life rather than focus only on measured blood loss.

The first essential step in reproductive-aged women is exclusion of pregnancy. A pregnancy test is required because ectopic pregnancy, miscarriage, and other pregnancy-related conditions may present with abnormal bleeding. Basic laboratory tests usually include complete blood count, ferritin or iron studies when anemia is suspected, and coagulation tests when bleeding disorder is possible. Thyroid-stimulating hormone, prolactin, androgen profile, or other endocrine tests may be used when symptoms suggest hormonal dysfunction.

Pelvic examination is important to assess cervical lesions, vaginal bleeding source, uterine size, tenderness, pelvic masses, and signs of infection. Cervical screening or testing for sexually transmitted infections may be needed depending on the clinical situation.

Transvaginal ultrasound is usually the first-line imaging method for evaluating uterine and ovarian pathology. It helps detect fibroids, endometrial thickness, adenomyosis features, ovarian cysts, and structural abnormalities. Saline infusion sonography improves visualization of intrauterine lesions such as polyps and submucosal fibroids. Hysteroscopy allows direct visualization of the uterine cavity and can be both diagnostic and therapeutic.

Endometrial sampling is indicated when there is suspicion of hyperplasia or malignancy. It is especially important in women aged 45 years and older, and in younger women with risk factors such as obesity, chronic anovulation, polycystic ovary syndrome, diabetes, persistent AUB, or failed medical treatment. ACOG's diagnostic guidance provides evidence-based recommendations for evaluation of reproductive-aged patients with AUB.

Modern principles of treatment

Treatment of AUB depends on the severity of bleeding, hemodynamic status, etiology, age, anemia, comorbidities, desire for fertility, contraindications, and patient preference. The primary goals are to stop excessive bleeding, correct anemia, prevent recurrence, treat the underlying cause, preserve fertility when desired, and improve quality of life.

In **acute heavy bleeding**, the first priority is stabilization. This includes assessment of vital signs, intravenous access if needed, fluid replacement, blood tests, correction of anemia, and blood transfusion in severe cases. Medical treatment may include high-dose combined oral contraceptives, oral progestins, intravenous estrogen in selected cases, tranexamic acid, or nonsteroidal anti-inflammatory drugs depending on contraindications and clinical context. ACOG notes that medical management is generally the initial treatment approach for acute AUB when clinically appropriate.

In **chronic AUB**, first-line therapy is often medical. The levonorgestrel-releasing intrauterine system is one of the most effective options for heavy menstrual bleeding and is especially useful when long-term therapy and contraception are desired. Combined oral contraceptives regulate cycles, reduce bleeding volume, and improve dysmenorrhea. Cyclic or continuous progestins are useful in



anovulatory bleeding and endometrial protection. Tranexamic acid is a non-hormonal antifibrinolytic option taken during menstruation and is suitable for women who do not want hormonal therapy. Nonsteroidal anti-inflammatory drugs may reduce menstrual blood loss and pain, especially in ovulatory heavy menstrual bleeding.

Treatment must also address iron-deficiency anemia. Oral iron therapy is commonly used, while intravenous iron may be needed in severe anemia, intolerance to oral iron, malabsorption, or when rapid correction is necessary. Nutritional counseling and follow-up hemoglobin evaluation are important parts of care.

When structural pathology is identified, targeted treatment is needed. Endometrial polyps may be removed hysteroscopically. Submucosal fibroids may be treated by hysteroscopic myomectomy. Larger or multiple fibroids may require medical therapy, uterine artery embolization, myomectomy, radiofrequency ablation, or hysterectomy depending on symptoms and fertility plans. Adenomyosis may respond to hormonal therapy, levonorgestrel intrauterine system, GnRH analogs, or surgery in severe cases.

Surgical treatment is considered when medical therapy fails, symptoms are severe, structural disease is significant, anemia is recurrent, or the woman does not desire future fertility. Endometrial ablation may reduce bleeding in selected women who have completed childbearing, but it is not appropriate for those who desire future pregnancy. Hysterectomy is the definitive treatment for AUB but should be reserved for carefully selected cases after discussing risks, benefits, alternatives, and reproductive wishes.

NICE NG88 emphasizes patient-centered care, investigation of underlying cause, and selection of treatment based on clinical findings and women's preferences. This approach is important because two women with the same amount of bleeding may have different priorities: one may focus on fertility preservation, another on contraception, another on avoiding surgery, and another on rapid symptom control.

DISCUSSION

AUB in reproductive-aged women is a multidimensional clinical problem. It is not enough to treat bleeding symptomatically without understanding its cause. The PALM–COEIN classification is valuable because it reminds clinicians that AUB may arise from structural uterine disease, systemic hemostatic disorders, ovulatory dysfunction, local endometrial abnormalities, medications, or rare conditions.

One of the most important practical principles is the exclusion of pregnancy in all reproductive-aged women with abnormal bleeding. Missing pregnancy-related bleeding, especially ectopic pregnancy, can be dangerous. Therefore, pregnancy testing should be considered an essential part of the first diagnostic step.

Another key issue is anemia. Chronic heavy bleeding often causes iron deficiency, which may remain underdiagnosed. Even mild anemia can reduce energy, concentration, work capacity, and psychological well-being. Therefore, AUB management should include hemoglobin assessment and iron replacement when needed.

Modern treatment has shifted from routine invasive procedures to individualized and fertility-preserving approaches. Many women can be treated successfully with hormonal therapy, tranexamic acid, NSAIDs, or levonorgestrel intrauterine systems. Minimally invasive hysteroscopic techniques allow targeted treatment of polyps and submucosal fibroids while preserving the uterus. This is especially important for women who plan future pregnancy.

At the same time, clinicians should not underestimate the risk of endometrial hyperplasia or malignancy in reproductive-aged women with risk factors. Obesity, diabetes, chronic anovulation,



and prolonged unopposed estrogen exposure increase the risk of endometrial pathology. For this reason, persistent AUB requires appropriate evaluation rather than repeated empirical treatment.

AUB also has psychological and social consequences. Women may avoid social events, work, sexual relationships, travel, sports, and religious or cultural activities because of unpredictable or heavy bleeding. Some women feel embarrassed to discuss menstrual problems, which delays diagnosis. Public health education is therefore important: women should know that very heavy, prolonged, painful, or irregular bleeding is not simply something to tolerate; it is a medical condition that can often be diagnosed and treated effectively.

In countries with developing healthcare systems, including many regions of Central Asia, early gynecological consultation, ultrasound availability, anemia screening, and menstrual health education are especially important. Primary care physicians, gynecologists, midwives, and nurses should work together to identify women with AUB early and refer them when necessary.

CONCLUSION

Abnormal uterine bleeding in women of reproductive age is a common and clinically significant gynecological syndrome. It may result from structural uterine abnormalities, hormonal dysfunction, coagulation disorders, endometrial pathology, medication effects, or systemic disease. Because AUB can lead to anemia, infertility-related concerns, reduced quality of life, and delayed diagnosis of serious conditions, it requires careful and systematic evaluation.

The FIGO PALM–COEIN classification provides a modern and practical framework for determining the cause of AUB. Diagnosis should begin with clinical history, pregnancy exclusion, physical and pelvic examination, complete blood count, targeted laboratory tests, and ultrasound imaging. Endometrial sampling and hysteroscopy should be used when indicated.

Treatment must be individualized. Acute bleeding requires rapid assessment and stabilization, while chronic AUB requires cause-based management. Medical therapies such as combined hormonal contraceptives, progestins, tranexamic acid, NSAIDs, and levonorgestrel intrauterine systems are effective for many women. Structural causes may require hysteroscopic or surgical treatment, while hysterectomy remains a definitive but last-line option for selected patients.

Overall, modern management of AUB should be patient-centered, evidence-based, and fertility-conscious. Timely diagnosis, anemia correction, education, and individualized treatment can significantly improve women's reproductive health, daily functioning, and quality of life.

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