

Abnormal (Dysfunctional) Uterine Bleeding (DUB) in Adolescents — Symptoms and Treatment

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Abnormal menstrual bleeding is a common problem faced by adolescent girls after menarche. It is marked by irregular bleeding in amount, duration, and frequency. It may include menorrhagia (heavy bleeding at regular intervals), metrorrhagia (excessive bleeding at irregular intervals), intermittent bleeding, or reduced bleeding (oligomenorrhea). Approximately 95% of abnormal bleeding is characterized by dysfunctional uterine bleeding. The causes of abnormal uterine bleeding (AUB) can be physiological, pathological, or both. After a complete medical examination, hormonal therapeutic intervention is considered more useful than surgery.



Overview

Normal menstrual cycle: The normal menstrual cycle ranges from 21 to 35 days, with an average of 28 days. The average blood loss during each menstrual period is approximately 30 mL, but may be as high as 80 mL. A menstrual period typically lasts four to six days.

Note: The 7, 7, 21 rule

- < 7 pads per day

- < 7 days
- > 21 days between periods

Abnormal uterine bleeding in an adolescent can be defined as any form of bleeding that is abnormal in amount, duration, or frequency:

- **Menorrhagia** is excessive uterine bleeding of > 80 mL or > 6 full pads or tampons per day.
- **Metrorrhagia** is bleeding at irregular times.
- **Menometrorrhagia** is both excessive and irregular uterine bleeding.
- **Polymenorrhea** is when menstrual cycles occur at intervals of less than 21 days.
- **Oligomenorrhea** is when menstrual cycles occur at intervals of greater than 35 days.

There is a specific form of abnormal uterine bleeding in adolescents known as dysfunctional uterine bleeding, also sometimes referred to as anovulatory uterine bleeding. Dysfunctional uterine bleeding (DUB) is **excessive and prolonged uterine bleeding despite a normal pelvic examination that has an “unknown cause.”** It is a diagnosis of exclusion.

Abnormal uterine bleeding (AUB)			
Intermenstrual bleeding (AUB/IMB)			
Heavy menstrual bleeding (AUB/HMB)			
↓ PALM: Structural causes		↓ COEIN: Non-structural causes	
P		C	Coagulopathy (AUB-C)
A		O	Ovulatory dysfunction (AUB-O)
L		E	Endometrial (AUB-E)
	I	I	Iatrogenic (AUB-I)
	II	N	Not yet classified (AUB-N)
M			

Epidemiology of DUB

Dysfunctional uterine bleeding is common in adolescents and perimenopausal women as they have a higher frequency of anovulatory cycles. It is estimated that approximately 50-80% of cycles are anovulatory during the first 2 years after menarche. Approximately 25% of adolescent girls with DUB have menorrhagia, while 29% complain of metrorrhagia. The other forms of abnormal uterine bleeding (AUB) are relatively rare in adolescents.

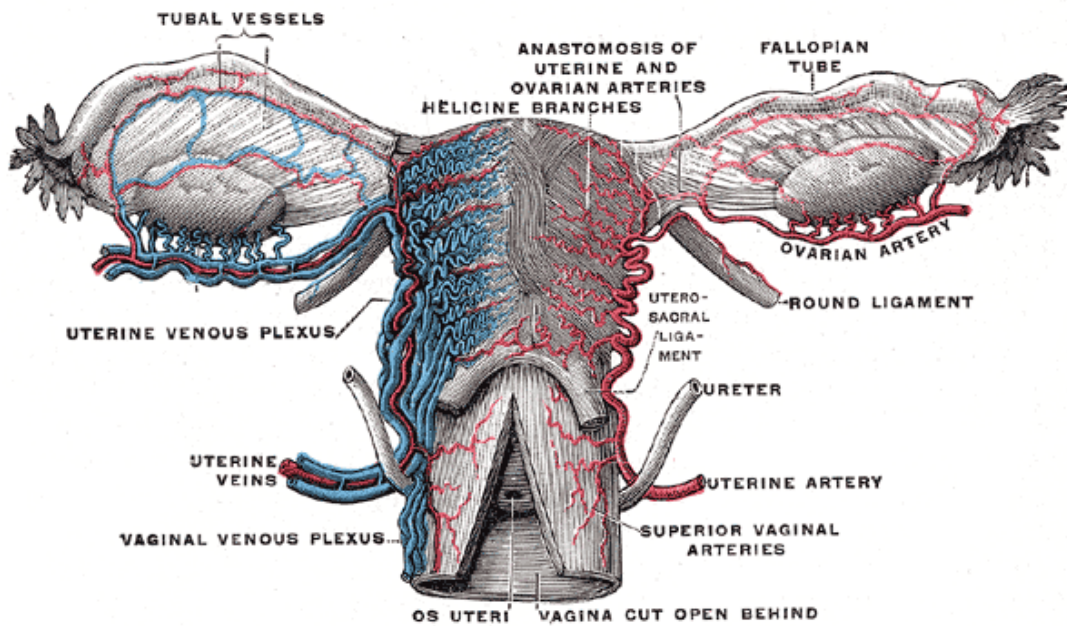


Image: "Vessels of the uterus and its appendages, rear view. (Uterine artery labeled at center right.)" by Henry Vandyke Carter - Henry Gray. License: [Public Domain](#)

AUB-P (Polyp)

Risk factors

- Obesity
- Hypertension
- Diabetes
- Advancing age
- Tamoxifen use

AUB-A (Adenomyosis)

Adenomyosis, formerly termed endometriosis interna, is a benign uterine disease characterized by the presence of ectopic endometrial glands and stroma within the myometrium. Classically, an adenomyotic uterus is termed boggy, globular, or symmetrically enlarged.

AUB-L (Leiomyoma)

Uterine leiomyomas (also known as myomas or fibroids) are benign clonal smooth muscle cell tumors ranging in size from several millimeters to many centimeters. More than 80% of African American and 70% of Caucasian women have detectable leiomyomas which parallel the lifetime incidence of the clinical disease.

Fibroid characteristic	African American vs. Caucasian women	Reference number
Incidence of uterine fibroid	Threefold increase	5
Relative risk	Threefold increase	5
Age at diagnosis	3-5 years younger	11
Severity of disease	Fivefold increase	11

Fibroid growth at an older age (≥ 45 years)	Sevenfold/eightfold increase	53
Myomectomy risk	Sixfold increase	13
Hysterectomy risk	Twofold/ threefold increase	14

AUB-C (Coagulopathy)

Disorder of hemostasis	All patients N = 113n (%)
Any	54 (48)
Platelet function disorders	20 (18)
Von Willebrand disease	15 (13)
Deficiency of a coagulation factor (FV, FVII, VIII, IX, XI or XII)	14 (12)
Isolated increase in bleeding time	8 (7)

Initial screening for an underlying disorder of hemostasis in patients with excessive menstrual bleeding should include medical history. A positive screen includes:

One of the following:

- Postpartum hemorrhage
- Surgery-related bleeding
- Bleeding associated with dental work

Two or more of the following:

- Bruising 1 to 2 times per month
- Epistaxis 1 to 2 times per month
- Frequent gum bleeding
- Family history of bleeding symptoms

AUB-O (Ovulatory)

Anovulatory cycles result in a range of disorders. [Amenorrhea](#) (total lack of menstrual periods) can lead to irregular, heavy bleeding. It is most commonly due to [polycystic ovarian syndrome](#).

AUB-E (Endometrial)

This classification refers to endometrial causes.

AUB-I (Iatrogenic)

Medication

- Contraceptives
- [Anticoagulants](#)
- Antipsychotics
- [Chemotherapy](#)
- Spironolactone
- Drugs related to dopamine metabolism, i.e., [antidepressants](#) and antipsychotics

Causes by age group

Children/ Neonatal

- Mom usually calls pediatrician because there is blood in the female baby's diaper.
- Estrogen withdrawal
- Foreign bodies
- Adenomyosis
- Sexual abuse and vulvovaginitis
- Cancer (sarcoma botryoides)
- Precocious puberty

Adolescents and adults

Early post-menarche	Reproductive age
<ul style="list-style-type: none"> • Anovulation to hypothalamic immaturity <ul style="list-style-type: none"> • Stress-induced • Pregnancy • Infection 	<ul style="list-style-type: none"> • Anovulation • Pregnancy • Endocrine disorder • Polyps/ fibroids/ adenomyosis <ul style="list-style-type: none"> • Medication • Infection • Sarcoma • Coagulation disorder
Perimenopausal	Menopausal
<ul style="list-style-type: none"> • Anovulation • Polyps/ fibroids/ adenomyosis <ul style="list-style-type: none"> • Cancer 	<ul style="list-style-type: none"> • Atrophy • Cancer • Polyp • Hormone Replacement Therapy (HRT) • Selective estrogen receptor modulators (SERMs, e.g., tamoxifen)

Pathophysiology of DUB

To understand how anovulatory cycles cause DUB, it is important to understand the normal physiologic changes that occur during a menstrual cycle.

The average age of menarche is 12.8 years in the United States. The menstrual cycle is divided into three phases.

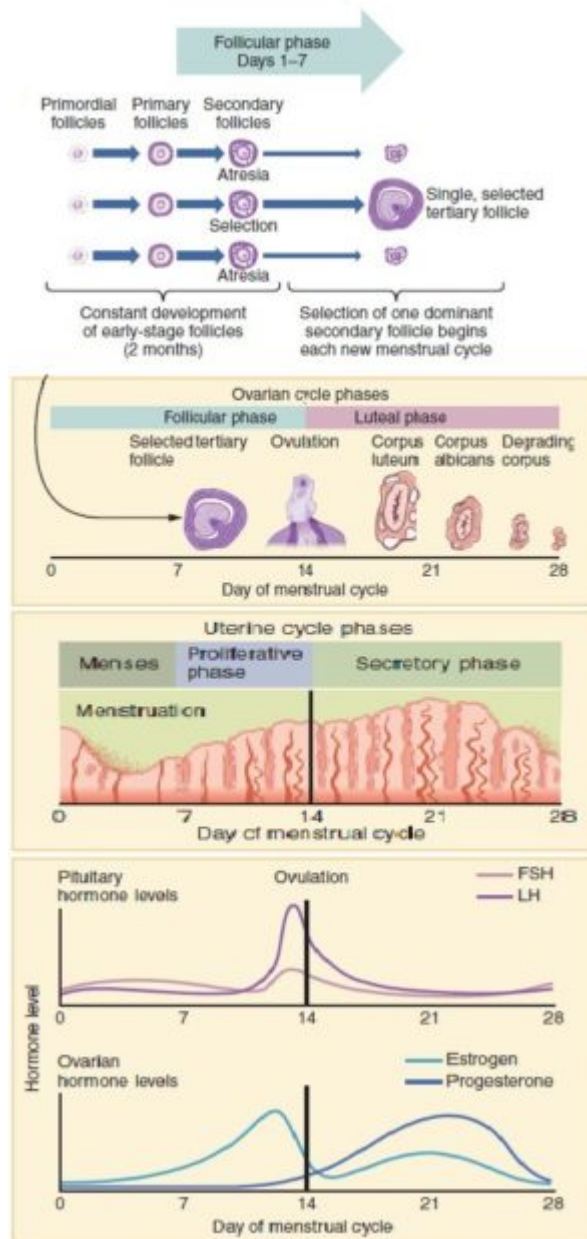


Image: "Figure showing the progression of the menstrual cycle and the different hormones contributing to it" by OpenStax College. License: [CC BY 3.0](https://creativecommons.org/licenses/by/3.0/)

The first phase, known as the proliferative phase, is characterized by the **release of gonadotropin-releasing hormone (GnRH)** from the hypothalamus which stimulates the pituitary gland to secrete follicle stimulating hormone (FSH) and luteinizing hormone (LH). FSH stimulates the proliferation of ovarian follicles.

Eventually, a dominant follicle is selected, and this **follicle starts producing estradiol**. Estradiol is responsible for endometrium proliferation, the formation of spiral arteries, and the production of progesterone receptors on the endometrium. Once the levels of estradiol reach a certain threshold, a surge of LH is released from the pituitary.

This step marks the start of the second phase, the ovulatory phase, where the **dominant ovarian follicle is stimulated to undergo ovulation**. Once ovulation happens, the empty ovarian follicle becomes the corpus luteum. The corpus luteum produces progesterone, which stops the growth of spiral arteries and prepares the endometrium for possible fertilization and implantation of the embryo.

If fertilization does not occur, the corpus luteum undergoes involution and stops the production of progesterone. In the absence of progesterone, the endometrium collapses and is shed as menstrual flow.

The main difference between ovulatory and anovulatory cycles is the **absence of progesterone production**. When progesterone is not released, the effects of estradiol on endometrial growth and proliferation are not opposed. Therefore, the spiral arteries proliferate. When these spiral arteries rupture, they bleed excessively. This is the hallmark of the pathogenesis of DUB.

Summary: Pathology of DUB

- Failure to ovulate
- Absence of corpus luteum
- No progesterone secretion and unopposed estrogen
- Excessive proliferation of the endometrium
- No cyclical hormone withdrawal
- Irregular, heavy bleeding

Clinical Presentation of DUB

History

A detailed history and physical examination are indispensable in the diagnosis of DUB and in excluding organic causes of abnormal uterine bleeding. Always exclude pregnancy first. The possibility of an [ectopic pregnancy](#) or a [miscarriage](#) should always be addressed in sexually active adolescents.

Detailed information regarding the patient's menstrual history and age of menarche is important. It should be used to **classify the abnormal uterine bleeding into one of the following: metrorrhagia, menorrhagia, bleeding due to anatomic problems, trauma, or medicines**. The use of steroid hormone contraception, hormone replacement therapy, and other hormone treatments may cause abnormal uterine bleeding.

The presence of local and systemic disease, including bleeding disorders, should also be explored. The previous history of easy bruising, prolonged bleeding time, hemarthrosis, and a family history of bleeding disorders point towards pathologic abnormal uterine bleeding rather than DUB.

- Age of menarche
- Pattern of bleeding
- Cramping or pain
- History of trauma
- Sexual activity/contraception use
- Medications that affect hemostasis of HPO axis.
- Associated symptoms: dizziness, fatigue
- Family history of bleeding disorders/ gynecologic problems

Physical Examination

The hemodynamic stability of the patient should be explored first. The signs of excessive blood loss are pallor, tachypnea, tachycardia, delayed capillary refill time, and

hypotension. Hypotension is a late sign of excessive blood loss.

A local examination should be performed to rule out local pathology, including trauma to the external or internal gynecological organs that can cause vaginal bleeding.

Vaginal and spatula examination should be reserved for sexually active adolescents. Virgin adolescents who present with DUB and dysmenorrhea should undergo a digital rectal examination to exclude endometriosis in the cul-de-sac.

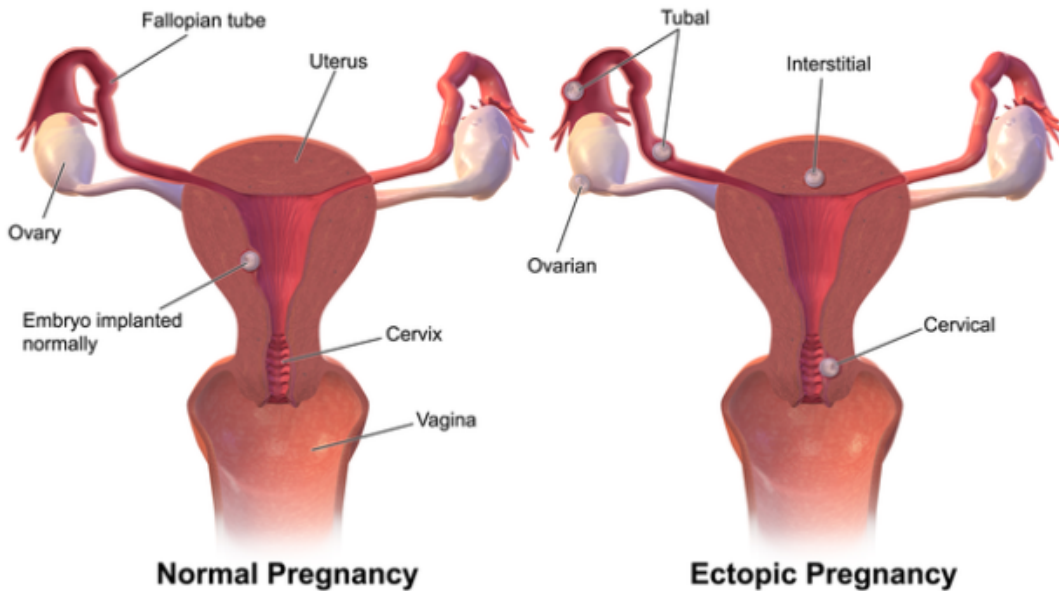


Image: "Ectopic pregnancy" by BruceBlaus. License: [CC BY-SA 4.0](https://creativecommons.org/licenses/by-sa/4.0/)

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- Vital signs of hemodynamic instability
- Check for pallor or other signs of anemia
- Tanner stage (sexual maturity rating)
- Androgen excess (hirsutism, acne)
- Goiter
- Breast exam for galactorrhea and tenderness
- Bleeding disorder
- Pelvic exam

Diagnostic Workup of DUB

Sexually active adolescents should undergo a serum or urine pregnancy test to exclude pregnancy. Threatened abortion, incomplete abortion, and ectopic pregnancy should be ruled out.

A **complete blood count** is indicated to look for hemoglobin and platelets. The degree of anemia determines the severity of the condition, while the thrombocytopenia can cause excessive uterine bleeding.

Thyroid hormone levels should be determined. Both hypothyroidism and hyperthyroidism cause menstrual abnormalities.

Coagulation profile testing includes prothrombin time, partial thromboplastin time, and bleeding time. It should be checked, especially in women with excessive acute uterine bleeding, a hemoglobin level below 10 g/dL, or a history suggestive of a bleeding disorder.

Pap smear should be performed as per the United States Preventive Services Task Force (USPSTF) recommendations. Cervical cancer presents with abnormal uterine bleeding and is one of the most common cancers affecting women of reproductive age.

Endometrial sampling should be performed to rule out endometrial hyperplasia or endometrial cancer in high-risk women.

If the diagnostic workup fails to identify a cause of the abnormal uterine bleeding, then the diagnosis of dysfunctional uterine bleeding is established.

Treatment of DUB

The treatment of DUB depends on the severity of blood loss.

Patients with mild dysfunctional uterine bleeding and a normal hemoglobin level should receive **reassurance and education**. It should be explained that within a couple of years, ovulatory cycles will become normal, and dysfunctional uterine bleeding will cease.



Image: "Half-used blister pack of a combined oral contraceptive. The white pills are placebos, mainly for the purpose of reminding the woman to continue taking the pills." by Tristanb. License: [CC BY-SA 3.0](https://creativecommons.org/licenses/by-sa/3.0/)

Adolescents with normal hemoglobin levels but excessive dysfunctional uterine bleeding that interferes with daily activities should receive treatment. **Oral contraceptive pills are the treatment of choice** for DUB in adolescents.

Patients with excessive ongoing dysfunctional uterine bleeding and a hemoglobin level < 10 g/dL should be **carefully examined to confirm hemodynamic stability**.

Hemodynamically stable patients should receive high-dose estrogen therapy for two to three days. High-dose estrogen therapy will usually stop the bleeding or significantly decrease the bleeding. It should be followed by regular oral contraceptive pills for at least one to two years. Iron supplementation is also recommended in this group.

Hemodynamically unstable patients with acute bleeding should be admitted to the hospital for inpatient care. Blood transfusions might be needed. Intravenous estrogen is used in most cases.

Surgery should be reserved as a last option for patients for whom pharmacological therapy has failed, or is contraindicated. Hysterectomy may be considered in women in

whom childbearing is complete.

References

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