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

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 represent menorrhagia (heavy bleeding at regular intervals), metrorrhagia (excessive bleeding in irregular intervals) or a combination of both or intermittent bleeding or reduced bleeding (oligomenorrhea). About 95% of abnormal bleeding is characterized by dysfunctional uterine bleeding. The cause of AUB can be physiological or pathological or both. After complete medical evolution, 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 around 30 mL, but may be as high as 80 mL. It lasts from 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 the excessive uterine bleeding *of > 80 mL or > 6 full pads or tampons per day*
- **Metrorrhagia** is the 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.

A specific form of abnormal uterine bleeding in the adolescent is known as dysfunctional uterine bleeding, also sometimes referred as anovulatory uterine bleeding.

Dysfunctional uterine bleeding (DUB) is the **excessive and prolonged uterine bleeding despite a normal pelvic examination that is an “unknown cause”**. It is a diagnosis of exclusion.

### PALM: Structural causes

<table>
<thead>
<tr>
<th>P</th>
<th>Polyp (AUB-P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Adenomyosis (AUB-A)</td>
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<tr>
<td>L</td>
<td>Leiomyoma (AUB-L)</td>
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<tr>
<td>I</td>
<td>Submucosal myoma (AUB-L\textsubscript{SM})</td>
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<tr>
<td>II</td>
<td>Other myomas (AUB-L\textsubscript{o})</td>
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<tr>
<td>M</td>
<td>Malignancy and hyperplasia (AUB-M)</td>
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</tbody>
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### COEIN: Non-structural causes

| C | Coagulopathy (AUB-C) |
| O | Ovulatory dysfunction (AUB-O) |
| E | Endometrial (AUB-E) |
| I | Iatrogenic (AUB-I) |
| N | Not yet classified (AUB-N) |

### Epidemiology of DUB

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

Risk factors

- Obesity
- HTN
- Diabetes
- Advancing age
- Tamoxifen use is associated with polyp development

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, and symmetrically enlarged.

AUB-L (Leiomyoma)

Uterine leiomyomas (also: 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.

<table>
<thead>
<tr>
<th>Fibroid characteristic</th>
<th>African American vs. Caucasian women</th>
<th>Reference number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incidence of uterine fibroid</td>
<td>Threefold increase</td>
<td>5</td>
</tr>
<tr>
<td>Relative risk</td>
<td>Threefold increase</td>
<td>5</td>
</tr>
<tr>
<td>Age at diagnosis</td>
<td>3–5 years younger</td>
<td>11</td>
</tr>
<tr>
<td>Severity of disease</td>
<td>Fivefold increase</td>
<td>11</td>
</tr>
</tbody>
</table>
Fibroid growth at an older age (≥ 45 years) | Sevenfold/eightfold increase 53
---|---
Myomectomy risk | Sixfold increase 13
Hysterectomy risk | Twofold/threelfold 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 be structured by medical history (positive screen comprises any of the following):

**One of the following:**
- Postpartum hemorrhage
- Surgery-related bleeding
- Bleeding associated with dental work

**Two or more of the following:**
- Bruising one to two times per month
- Epistaxis one to two times per month
- Frequent gum bleeding
- Family history of bleeding symptoms

### AUB-O (Ovulatory)

Anovulatory cycles result in a range of disorders. Amenorrhea (no 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 female baby’s diaper
- Estrogen withdrawal
- Foreign bodies
- Adenomyosis
- Sexual abuse and vulvovaginitis
- Cancer (sarcoma botryoides)
- Precocious puberty

Adolescents and adults

<table>
<thead>
<tr>
<th>Early post-menarche</th>
<th>Reproductive age</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Anovulation to hypothalamic immaturity</td>
<td>• Anovulation</td>
</tr>
<tr>
<td>• Stress-induced</td>
<td>• Pregnancy</td>
</tr>
<tr>
<td>• Pregnancy</td>
<td>• Endocrine disorder</td>
</tr>
<tr>
<td>• Infection</td>
<td>• Polyps/ fibroids/ adenomyosis</td>
</tr>
<tr>
<td></td>
<td>• Medication</td>
</tr>
<tr>
<td></td>
<td>• Infection</td>
</tr>
<tr>
<td></td>
<td>• Sarcoma</td>
</tr>
<tr>
<td></td>
<td>• Coagulation disorder</td>
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</table>

<table>
<thead>
<tr>
<th>Perimenopausal</th>
<th>Menopausal</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Anovulation</td>
<td>• Atrophy</td>
</tr>
<tr>
<td>• Polyps/ fibroids/ adenomyosis</td>
<td>• Cancer</td>
</tr>
<tr>
<td>• Cancer</td>
<td>• Polyp</td>
</tr>
<tr>
<td></td>
<td>• Hormone Replacement Therapy (HRT)</td>
</tr>
<tr>
<td></td>
<td>• Selective estrogen receptor modulators (SERMs, e.g., tamoxifen</td>
</tr>
</tbody>
</table>

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.
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 the proliferation of the endometrium, 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 the production of progesterone. When progesterone is not released, the effects of estradiol on endometrial growth and proliferation are not opposed. Therefore, the spiral arteries are excessively proliferated. When these spiral arteries rupture, they bleed excessively. It 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 the pregnancy first. The possibility of an ectopic pregnancy or a miscarriage should be always addressed in sexually active adolescents.

A 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 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.

![Image: "Ectopic pregnancy" by BruceBlaus. License: CC BY-SA 4.0]

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

- 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
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 the norm and dysfunctional uterine bleeding will cease.

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 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 in whom pharmacological therapy has failed, or is contraindicated. Hysterectomy may be considered in women in whom childbearing is complete.
References


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