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Emergency Department Management Of Vaginal Bleeding In The Nonpregnant Patient

August 2013
Volume 15, Number 8

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CME Objectives

Upon completion of this article, you should be able to:

1. Discuss common and serious causes of vaginal bleeding in prepubertal children, nonpregnant adolescents, and women.
2. Describe the ED approach to both the unstable and stable nonpregnant patient with vaginal bleeding.
3. Select the common treatments of acute abnormal vaginal bleeding in nonpregnant patients.
4. Discuss the disposition and follow-up needs of the nonpregnant patient with vaginal bleeding.

Prior to beginning this activity, see the back page for faculty disclosures and CME accreditation information.

Abstract

Abnormal uterine bleeding is the most common reason women seek gynecologic care, and many of these women present to an emergency department for evaluation. It is essential that emergency clinicians have a thorough understanding of the underlying physiology of the menstrual cycle to appropriately manage a nonpregnant woman with abnormal bleeding. Evidence to guide the management of nonpregnant patients with abnormal bleeding is limited, and recommendations are based mostly on expert opinion. This issue reviews common causes of abnormal bleeding, including anovulatory, ovulatory, and structural causes in both stable and unstable patients. The approach to abnormal bleeding in the prepubertal girl is also discussed. Emergency clinicians are encouraged to initiate treatment to temporize an acute bleeding episode until timely follow-up with a gynecologist can be obtained.

Case Presentations

It's the middle of a busy night shift in the ED, and a 23-year-old woman with vaginal bleeding has been waiting several hours to be seen. Her vital signs are normal. She has no past medical history and takes no medications. She states that she has been bleeding continuously for the past 2 weeks. Her menstrual periods have always been irregular, but she has never bled for this long. She describes the bleeding as heavy, sometimes with clots, and she is frequently changing her sanitary pad. A pregnancy test was ordered from triage and is negative. The patient is desperate for you to stop the bleeding, and you wonder if there is anything you can offer her besides a box of tampons and a gynecology referral….

As you walk out the room, the radio goes off and a panicked paramedic reports that they are en route with a 42-year-old woman who is having profuse vaginal bleeding and appears very ill. She is pale, tachycardic, and hypotensive. She has a history of fibroids. She has been bleeding heavily for 3 days, and the bleeding has acutely increased in the past few hours. The on-call gynecologist is delivering a baby at the hospital across town, and you will have to stabilize this patient and manage her on your own for a few hours….

Introduction

Abnormal uterine bleeding is the most common reason women seek gynecologic care,[1] and many of these women present to an emergency department (ED) for evaluation. Abnormal vaginal bleeding can be very distressing for a woman. At a minimum, it is an inconvenience that disrupts her daily life; in severe cases, bleeding can result in life-threatening hemorrhage requiring emergency intervention. Abnormal bleeding may also herald a serious underlying pathology such as cancer. Many women presenting to the ED for evaluation of vaginal bleeding fear that they are in the serious category, and the provider must be sensitive to her concerns. The role of the emergency clinician is to rule out life-threatening complications associated with abnormal uterine bleeding and to obtain emergent, urgent, or routine gynecologic consultation as needed. Emergency clinicians are often hesitant to initiate therapies to temporize a stable patient's bleeding, instead deferring this to a gynecologist on an outpatient basis. The goal of this issue of *Emergency Medicine Practice* is to provide an evidence-based approach to the nonpregnant woman presenting with vaginal bleeding.

Critical Appraisal Of The Literature

A literature search was performed using PubMed, including the search terms *menorrhagia, abnormal uterine bleeding, nonpregnant vaginal bleeding, dysfunctional uterine bleeding,* and *heavy menstrual bleeding*. The resulting 6000 abstracts were reviewed for applicability, and results were limited to the English language and to articles published in the last 20 years. Emphasis was placed on trials conducted in the ED or in the acute clinical setting. Additional references were identified by reviewing bibliographies of relevant articles. The Cochrane Database of Systematic Reviews was searched using the term *heavy menstrual bleeding,* yielding 41 results, 14 of which were applicable to this review. The National Guideline Clearinghouse (www.guideline.gov) was queried using the search term *heavy menstrual bleeding*. A total of 24 guidelines were found, 2 of which were applicable to this review.[2,3] Both of the guidelines were produced by the American College of Obstetricians and Gynecologists (ACOG). ACOG also recently released a Committee Opinion on the management of abnormal uterine bleeding, which is included in this review.[4] There are currently no American College of Emergency Physicians (ACEP) clinical policies that apply to vaginal bleeding in the nonpregnant patient.

It is inherently difficult to form an evidence-based approach to guide the treatment of the nonpregnant patient with vaginal bleeding because high-quality evidence is currently lacking. Unfortunately, there are no large prospective randomized controlled trials, and we must rely on expert opinion, observational studies, and case reports for guidance. Of the few small randomized controlled trials that are available, there is great variability of outcomes across the studies, making comparisons of different interventions difficult.

Etiology And Pathophysiology

A familiarity of the physiology of the menstrual cycle aids the emergency clinician in identifying and understanding causes of abnormal bleeding. As is often said, one must first know "normal" to know "abnormal." The mean time between menstrual periods is 28 days (+/- 7 days); therefore, bleeding outside of this interval is abnormal. The first half of the menstrual cycle is known as the follicular phase. During this phase, the level of estrogen is gradually rising. Around day 14, ovulation occurs and the luteal phase begins. The ovum contains the corpus luteum, which produces progesterone to balance the estrogen. If no fertilization occurs, both progesterone and estrogen levels begin to drop, the endometrial lining sloughs off, and the result is menses.[5,6] **(See Figure 1.)**

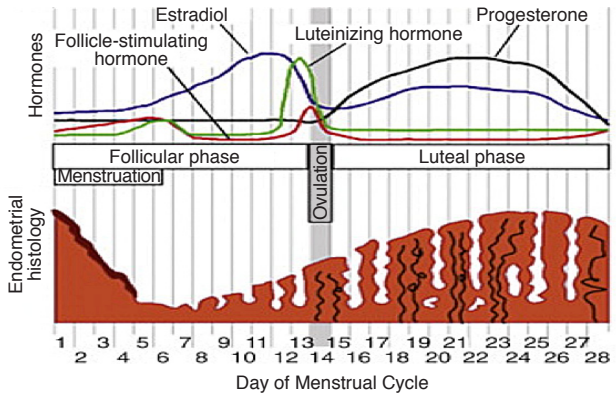
The mean duration of menstrual bleeding is 4 days. Menstrual bleeding duration > 7 days is considered abnormal. The average menstrual blood loss is 35 mL per menstruation.[5] Total menstrual blood loss ≥ 80 mL per menstruation is abnormal.[7]

The PALM-COEIN Classification System

Traditional nomenclature used to describe abnormal uterine bleeding can be confusing. Words such as "menorrhagia," "metrorrhagia," and "menometrorrhagia" are often used inconsistently, which leads to miscommunication between healthcare providers.[8] The more recently introduced term of "dysfunctional uterine bleeding" lacks a clear definition. Many experts feel that all of the aforementioned terms should be abandoned.[9] In 2011, the International Federation of Gynecology and Obstetrics (FIGO) introduced a new classification system known by the acronym PALM-COEIN (**P**olyp, **A**denomyosis, **L**eiomyoma, **M**alignancy/hyperplasia, **C**oagulopathy, **O**vulatory dysfunction, **E**ndometrial, **I**atrogenic, and **N**ot yet classified). In this system, the all-inclusive term "abnormal uterine bleeding" is coupled with descriptors such as "heavy" or "intermenstrual" bleeding as well as letters that correlate to etiology. The etiologies are further divided into "structural" and "nonstructural" causes of bleeding. ACOG supports the adoption of this new system.[2] **(See Figure 2.)**

While applying the PALM-COEIN classification system to reach a specific diagnosis for women is beyond the emergency clinician's scope of practice, it can be helpful to think of the pathophysiology of abnormal uterine bleeding in terms of structural and nonstructural causes. The primary structural causes of abnormal uterine bleeding include polyps, adenomyosis, uterine leiomyomas (fibroids), and endometrial hyperplasia or carcinoma. Common nonstructural causes of abnormal uterine bleeding include systemic conditions such as coagulopathies (inherited and acquired), thyroid disorders, and ovulatory dysfunction.[2]

Figure 1. Normal Menstrual Cycle



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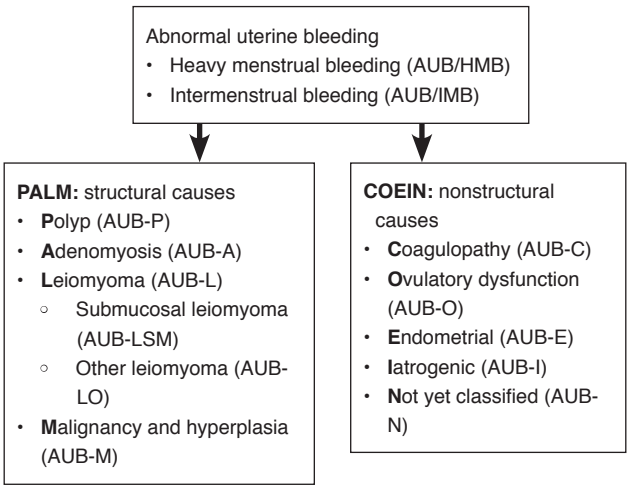
Under the PALM-COEIN system, ovulatory dysfunction includes a spectrum of disorders ranging from amenorrhea to heavy menstrual periods.[2] Approximately 50% of cases of excessive menstruation fall into this category.[10] Irregular bleeding most often occurs if a woman is not ovulating consistently (anovulatory bleeding). If a woman does not ovulate, there is no corpus luteum to produce progesterone, and the result is unopposed estrogen. In the setting of unopposed estrogen, the endometrium will continue to proliferate to the point where it becomes unstable and begins to break down, resulting in irregular and unpredictable bleeding. Heavy bleeding may also occur in the setting of regular ovulation (ovulatory bleeding). Several mechanisms have been implicated for this type of bleeding, including abnormal prostaglandin production, increased local fibrinolytic activity, and increased tissue plasminogen activator activity.[11]

Differential Diagnosis

The differential diagnosis for nonpregnant women with abnormal vaginal bleeding is extensive and ranges from benign causes (such as weight fluctuations and stress) to life-threatening etiologies, including carcinoma. **(See Table 1, page 4.)**

Figure 2. PALM-COEIN Classification System



Abbreviations: AUB, abnormal uterine bleeding; HMB, heavy menstrual bleeding; IMB, intermenstrual bleeding; PALM, polyp, adenomyosis, leiomyoma, malignancy; COEIN, coagulopathy, ovulatory dysfunction, endometrial, iatrogenic, not yet classified.

Reprinted and adapted from: *International Journal of Gynaecology and Obstetrics*, Vol. 113, Issue 3. Malcolm G. Munro, Hilary O.D. Critchley, Michael S. Broder, and Ian S. Fraser for the FIGO Working Group on Menstrual Disorders. FIGO Classification System (PALM-COEIN) for causes of abnormal uterine bleeding in nongravid women of reproductive age. Pages 3-13. Copyright 2011, with permission from Elsevier.

Girls Aged 12 To 18 Years

In adolescent girls, the most common cause of abnormal vaginal bleeding is immaturity of the hypothalamic-pituitary-ovarian axis, which results in persistent anovulation.[12] The beginning of a woman's menstrual life is characterized by irregularity. It is not until the third year after menarche that the majority of menstrual cycles occur at the adult interval of 28 days,[13] and it takes 6 years for an individual to establish her normal cycle length.[14] Pelvic infection and inflammation due to sexually transmitted infections may also cause abnormal bleeding.[15] Another important cause of excessive vaginal bleeding in adolescents is underlying coagulopathy and bleeding disorders. Up to 20% of girls presenting to the ED with heavy bleeding may have von Willebrand disease.[16] Patients with idiopathic thrombocytopenic purpura may also present with abnormal vaginal bleeding.[17]

Table 1. Differential Diagnosis Of Abnormal Uterine Bleeding In Nonpregnant Females

Structural Causes

- Polyps
- Fibroids
- Malignancy
- Hyperplasia
- Endometriosis

Nonstructural Causes

- Coagulopathies
  - von Willebrand disease
  - Factor XI deficiency
  - Thrombocytopenia
  - Idiopathic thrombocytopenic purpura
- Endocrine
  - Polycystic ovarian syndrome
  - Hypothyroidism
  - Hyperprolactinemia
  - Adrenal hyperplasia
  - Cushing disease
- Weight loss/extreme exercise
- Stress
- Obesity
- Trauma
  - Sexual abuse
- Infections
  - Sexually transmitted infection
  - Tubo-ovarian abscess
  - Vaginitis
- Systemic disease
  - Liver disease
  - Kidney disease
- Foreign bodies
- Medications
  - Antiepileptics
  - Antipsychotics
  - Anticoagulants
  - Hormonal medications
  - Steroids
  - Intrauterine device

Note: It is helpful to divide patients with vaginal bleeding into groups based on age when considering a differential diagnosis.

Women Aged 19 To 39 Years

In the reproductive years, abnormal uterine bleeding frequently occurs from structural lesions such as polyps and fibroids. The incidence of cervical polyps increases with age. The majority are asymptomatic, but some may cause bleeding.[18] By age 50, almost 70% of white women and > 80% of black women will have fibroids.[19] Like polyps, most fibroids are asymptomatic. The subset of fibroids that do cause abnormal bleeding are mostly submucosal in location, and they are difficult to detect on bimanual examination.[20] Polycystic ovarian syndrome is common in reproductive-age women, and it often causes anovulatory cycles, resulting in abnormal bleeding. Polycystic ovarian syndrome should be considered in women with signs of androgen excess such as acne, hirsutism, alopecia, and obesity.[21] Malignancy is less common, but it may occur in this age group. Up to 25% of cases of endometrial cancer occur before menopause.[22] Cervical cancer is also seen during the reproductive years. One study of 81 women with invasive cervical cancer found that 56% presented with vaginal bleeding.[23]

Women Aged 40 Years And Older

As a woman approaches menopause, ovarian function begins to decline and anovulatory cycles are physiologic. The most common cause of abnormal bleeding in postmenopausal women is endometrial atrophy;[24] however, the most concerning cause in this age group is cancer, and a postmenopausal woman with abnormal bleeding should be considered to have cancer until it is proven otherwise.[25] Indeed, 10% of women presenting with postmenopausal bleeding are diagnosed with endometrial carcinoma.[26]

Prehospital Care

Currently, there are little data regarding the prehospital care of a nonpregnant woman with vaginal bleeding. Initial management focuses on assessing stability of the patient, with consideration of placing peripheral intravenous access and starting crystalloid fluid boluses.

Emergency Department Evaluation

History

Evaluation begins with a detailed menstrual history. Onset and length of bleeding should be noted. A history of irregular menstrual periods and unpredictable bleeding suggests anovulatory

cycles. Women who regularly experience heavy and prolonged menstrual periods are likely to have ovulatory bleeding or an underlying systemic condition. Ask about associated symptoms such as abdominal or pelvic pain, fever, trauma, and vaginal discharge. Postcoital bleeding, the presence of vaginal discharge or odor, and history of unprotected sexual activity could point to a possible sexually transmitted infection. The presence of clots indicates heavy bleeding, as normal menstrual blood does not clot.[22] Other clinical features such as the frequency of change of sanitary protection, total number of pads/tampons used, size of clots, and the need to change protection during the night may be helpful,[27] but they have not consistently been shown to predict increased blood loss. Older studies have shown no correlation between pad use and actual menstrual loss.[28]

Many researchers believe that women are poor judges of the volume of their menstrual loss, and there is considerable evidence that the majority of women who complain of heavy bleeding do not lose ≥ 80 mL of blood per menstrual period.[22,29-32] One study of 69 women who all gave a convincing history of heavy menstrual bleeding (eg, "flooding" underwear, using 2 pads at a time) found that 62% of the women lost < 80 mL per menstrual period.[32] However, even if the bleeding does not meet the objective medical criteria of heavy bleeding, it may still have a significant negative impact on the patient's quality of life.[33] Research has shown that many women are dissatisfied after seeking evaluation for heavy bleeding and feel that clinicians are dismissive of their concerns.[34] For these reasons, it is important to elicit a patient's subjective assessment of her blood flow, and if she feels the bleeding is excessive, investigate further.

As part of the history, remember to evaluate the patient's medication list. In addition to obvious drugs such as anticoagulants (eg, warfarin), many other medications are known to cause abnormal bleeding, including antiepileptics (especially valproic acid).[35] Typical antipsychotics, as well as the atypical antipsychotic, risperidone, may also cause abnormal bleeding. These medicines can induce hyperprolactinemia, which can lead to anovulation and other menstrual irregularities.[36] It is also important to note whether the patient uses hormonal contraceptives or whether she has an intrauterine device.

Physical Examination

The physical examination begins with determining the patient's hemodynamic stability. Make note of initial vital signs and consider checking orthostatic vital signs if the patient reports dizziness, syncope, or weakness associated with the bleeding. Complete abdominal and pelvic examinations (including bimanual and speculum examinations) are paramount when evaluating a patient with abnormal bleeding.[37,38] During the pelvic examination, attempt to confirm the source of bleeding. Is it definitely coming from the cervical os? Are polyps, masses, ulcers, or evidence of inflammation present? Are there any foreign bodies? One should also look for signs of trauma. Lacerations and other vaginal injury can occur after consensual sexual activity, sexual assault, or trauma (such as straddle injuries).[39]

Both male and female clinicians should have a female nurse chaperone present when performing a pelvic examination. It has been shown that, despite this recommendation, only a minority of providers have a chaperone present when performing intimate examinations.[40]

Diagnostic Studies

Pregnancy Test

Pregnancy must always be ruled out in women presenting with vaginal bleeding. This includes girls in early adolescence through women aged in their early to mid-fifties. A prudent clinician tests for pregnancy even when the patient insists pregnancy is not possible.

Complete Blood Count

A complete blood count should be checked in all women presenting with significant vaginal bleeding to evaluate for anemia and thrombocytopenia. If anemia is severe (hemoglobin < 7 g/dL) or if the patient is symptomatic, blood transfusion may be necessary. It should be noted that, if a patient presents early in an acute bleeding episode, the initial hemoglobin level may be normal, and it is not until after the patient has been fluid resuscitated that the hemoglobin may drop. In unstable patients, type and crossmatch should be sent in preparation for likely transfusion.

Coagulation Studies

The majority of young women with an underlying bleeding disorder causing excessive uterine bleeding will have other bleeding symptoms such as epistaxis, easy bruising, and bleeding gums.[41] In the absence of these symptoms, and if the patient is not taking anticoagulation medications, coagulation studies are not routinely indicated in the ED.

Other Studies

After seeing blood in her underwear or in the toilet bowl, a woman may assume the bleeding is pelvic in origin, but this is not always the case. The blood may actually be originating from the gastrointestinal system or urinary tract. If the origin of the bleeding is unclear, a stool guaiac test and urinalysis test are indicated to identify the organ system involved.

Imaging Studies

Pelvic ultrasound is the imaging study of choice when evaluating abnormal vaginal bleeding. In premenopausal women, ultrasound is used to rule out structural causes of bleeding such as polyps and fibroids.[42] In postmenopausal women, ultrasound is often used to assess endometrial thickness to rule out carcinoma.[43] Nonetheless, these studies can almost always be performed on an outpatient basis, and rarely will the results of these studies change ED management. There is no evidence on the use of emergency bedside ultrasound in vaginal bleeding in nonpregnant women.

Treatment

Treatment recommendations are based mostly on expert opinion; evidence is limited. There is marked variation in practice, and the most appropriate treatment is uncertain. Many factors should be considered when choosing treatment for nonpregnancy-related uterine bleeding, including the patient's age, individual risk factors, the likely cause of the bleeding, and timeliness of follow-up care. However, most important is the severity of the bleeding and clinical stability of the patient. See **Table 2** for drug treatment regimens.

The Unstable Patient

Management of the unstable bleeding patient starts with aggressive fluid resuscitation and transfusion of blood products, if needed. High-dose intravenous estrogen is considered the first-line treatment for severe uterine bleeding; however, there is only 1 small randomized controlled trial that shows estrogen to be superior to placebo (cessation of bleeding within 8 h in 72% of women who received estrogen compared to 38% of women who received placebo).[44] Estrogen promotes rapid endometrial growth, covering areas of the endometrial surfaces that are denuded and bleeding.[45] The suggested dose is conjugated equine estrogen 25 mg intravenously every 4 to 6 hours for up to 24 hours. Contraindications to intravenous estrogen include history of thromboembolic disease (stroke or myocardial infarction), pulmonary embolism or deep vein thrombosis,

Table 2. Pharmacologic Treatment Regimens For Acute Abnormal Uterine Bleeding[4,6,44,54,60,65]

Drug	Suggested Dose*	Contraindications and Cautions†
Hormonal treatments (conjugated equine estrogen)	25 mg IV every 4-6 h until bleeding stops, up to 24 h	• Contraindicated in patients with active or past thromboembolic disease, breast cancer, or liver disease • Use with caution in patients with cardiovascular or thromboembolic risk factors
Combination oral contraceptive pills (monophasic oral contraceptive pills containing < 35 mcg ethinyl estradiol recommended)	1 pill tid PO for 7 days **or** 1 pill bid PO for 5 days, then 1 pill qd until pack is finished	• Contraindicated in women aged > 35 y who smoke • Contraindicated in women who have a history of deep vein thrombosis or pulmonary embolism, breast cancer, liver disease, known thromboembolic disorders, pregnancy, ischemic heart disease, cerebrovascular disease, or uncontrolled hypertension
Progestin-only oral contraceptive pills (medroxyprogesterone acetate)	20 mg tid PO for 7 days **or** 10 mg qd PO for 10 days	• Contraindicated in patients with active or past deep vein thrombosis or pulmonary embolism, liver disease, or breast cancer
NSAIDs: Ibuprofen	200-400 mg 3-4 times/day PO for 5 days	• NSAIDs are contraindicated in patients with advanced renal disease • Use NSAIDs with caution in patients with history of GI ulcers or GI bleed
Mefenamic acid	500 mg tid PO for 4-5 days or until bleeding stops	
Naproxen	500 mg PO initially, then 250 mg 3-4 times/day for 5 days	
Antifibrinolytic agents (tranexamic acid)	1.3 g tid PO for up to 5 days	• Contraindicated if patient has active intravascular clotting or subarachnoid hemorrhage • Use with caution in patients with history of thromboembolic disease

*Other dosages and schedules also may be effective.

†Partial list of contraindications. The United States Food and Drug Administration's labeling contains exhaustive lists of contraindications for each of these treatments. In making treatment decisions for women with abnormal uterine bleeding, physicians must consider the risks of treatment against the risk of continued bleeding on a case-by-case basis.

Abbreviations: bid, 2 times per day; GI, gastrointestinal; IV, intravenous; NSAIDs, nonsteroidal anti-inflammatory drugs; PO, by mouth; qd, 1 time per day; tid, 3 times per day.

breast cancer, and liver disease. It is recommended that this treatment be used with caution in women with cardiovascular and thromboembolic risk factors; however, there are little data to support this.[4] In a clinically unstable patient, the risks of continued hemorrhage must be weighed against the risks of potential medication side effects.

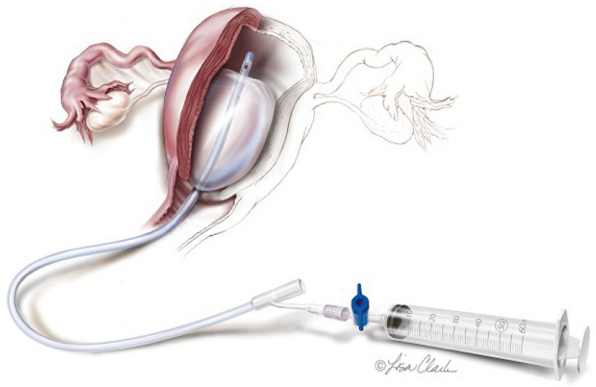
Rarely, bleeding may be so severe that pharmacologic methods fail and additional measures must be taken. In these situations, the vagina may be packed with gauze (using long, continuous gauze instead of smaller pieces, for easier removal). Another approach is to insert a balloon into the uterus transvaginally to tamponade bleeding. There are specific uterine tamponade balloons designed to control postpartum hemorrhage,[46] but these may also be used for profuse uterine bleeding in a nonpregnant patient. **(See Figures 3 and 4.)**

If these devices are not immediately available in the ED, there are case reports of Foley® catheters[47,48] and a Zassi® rectal tube[49] being successfully used in the same manner. Vaginal packing and uterine balloons may be left in place up to 24 hours. There is a theoretical risk of toxic shock syndrome, but no evidence exists regarding the need for prophylactic antibiotics.

The Stable Patient

Treatment of the stable patient with bleeding includes hormonal treatments such as combination oral contraceptive pills, progestins, and danazol. Hormonal treatments are likely to be most effective for women with suspected anovulatory bleeding. It should be noted that if the patient goes on to have endometrial sampling as part of her abnormal bleeding workup, hormonal therapy may alter the morphologic appearance of the endometrium.[50] Whenever possible, before initiating hormonal therapy, it is advised to consult with the gynecologist who will be following up with the patient.

Figure 3. The Bakri SOS Tamponade Balloon



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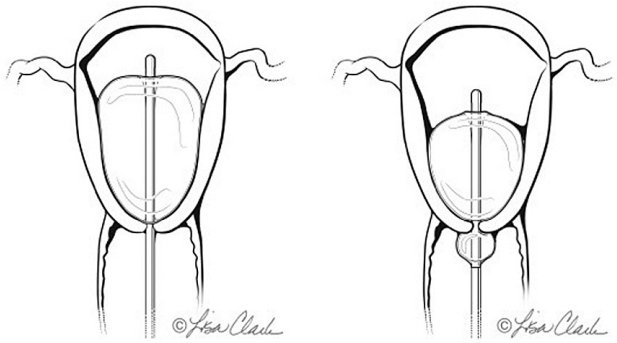
Nonhormonal treatments include nonsteroidal anti-inflammatory drugs and antifibrinolytic agents. Women with ovulatory bleeding are most likely to benefit from nonhormonal therapies. There is also a role for supplemental iron treatment for women with prolonged abnormal uterine bleeding and anemia. Transfusion of packed red blood cells may also be considered.

Oral Contraceptive Pills

Estrogen may also be helpful for stable patients with moderate bleeding, and it can be given by mouth; however, because many women with heavy bleeding episodes have anovulatory cycles, they will eventually need progestin treatment in addition to estrogen. The most convenient and widely used method is to prescribe a combination oral contraceptive pill that contains both estrogen and progestin, although there is a paucity of high-quality data to support this practice. The most recent (2009) Cochrane review determined that there was not enough evidence to assess the effectiveness of oral contraceptive pills for the treatment of abnormal uterine bleeding.[51] One study of 45 women with heavy bleeding found no difference between patients treated with monophasic oral contraceptive pills, naproxen, mefenamic acid, and danazol.[52] A larger randomized controlled trial of 201 patients found that significantly more women given triphasic oral contraceptive pills had improvement in abnormal bleeding compared to placebo.[53]

To stop an acute bleeding episode in hemodynamically stable women, oral contraceptive pills are frequently prescribed as a taper. Mostly anecdotal evidence supports this practice. Munro et al treated 20 women with acute uterine bleeding (some presenting to an ED) with monophasic oral contraceptive pills administered 3 times/day for 7 days. Of this group, 88% had cessation of bleed-

Figure 4. Proper Placement Of Uterine Tamponade Balloon



Proper placement **Improper placement**

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ing in a median of 3 days.[54] Any of the monophasic pills can be used in a taper, but pills containing < 35 mcg of ethinyl estradiol are preferred.[55] There are multiple taper regimens, and there is no consensus about which is most effective. In a 2013 Committee Opinion, ACOG recommended 1 pill 3 times/day for 7 days based on the aforementioned Munro study. Other authors recommend lower-dose taper regimens such as 1 pill 2 times/day for 5 days, then 1 pill/day for the remainder of the pack.[4] An episode of withdrawal bleeding should be expected at completion of the taper.

Contraindications to oral contraceptive pills include a history of vascular disease (thromboembolism, atherosclerosis, or stroke), known inherited thrombophilia (eg, factor V Leiden), liver disease, pregnancy, severe uncontrolled hypertension (systolic blood pressure ≥ 160 mm Hg or diastolic blood pressure ≥ 100 mm Hg), and in women aged > 35 years who smoke. **(See Table 2, page 6.)** A history of breast or endometrial cancer is also considered a contraindication because these are hormone-sensitive tumors; however, there are no direct data that oral contraceptive pills are harmful to women with these diseases.[5] Precautions include women aged < 35 years who smoke or women who have mild to moderate hypertension, migraine headaches, and undiagnosed abnormal uterine bleeding.[56] Many women with precautions to estrogen can be safely treated with oral contraceptive pills for a short amount of time (≤ 4 wk).[57] The goal of the emergency clinician is to temporize an acute bleeding episode; it is not appropriate to initiate long-term hormonal therapy in the ED setting.

Use of oral contraceptive pills is associated with a 2- to 6-fold increased risk of venous thrombosis, with the risk being highest in the first few months of use. A large case-control study by van Hylckama Vlieg et al showed that the risk of clot differed based on the type of progestin used, and they found oral contraceptive pills containing levonorgestrel to be the safest option.[58] There are no data on the risk of thrombosis when oral contraceptive pills were used as a short taper to temporize an acute bleeding episode. Use of high-dose estrogen can be associated with nausea and vomiting. An antiemetic may be prescribed in addition to the oral contraceptive pills taper.

Oral Progestin

In women with contraindications to estrogen, high-dose progestin-only treatment is frequently used to temporize bleeding. In 1 clinical trial, 24 adolescents who were hospitalized with heavy uterine bleeding were given 60 to 120 mg medroxyprogesterone acetate orally on day 1, then 20 mg/day for 10 days. Within 4 days, all of the patients had cessation of bleeding.[59] Munro et al found that medroxyprogesterone acetate 20 mg orally 3 times/day stopped bleeding in a median of 3 days for 76% of women with an acute bleeding episode.[54] Again, there are multiple dosing regimens, and there is no consensus on which is best. ACOG recommends medroxyprogesterone acetate 20 mg 3 times/day for 7 days. Another common regimen is medroxyprogesterone acetate 10 mg 1 time/day for 10 days.[60] Progestin alone is generally thought to be low risk for causing thrombosis, though data are limited. A meta-analysis of 8 observational studies found that progestin-only regimens of contraception did not pose an increased risk of venous thromboembolism compared to nonusers.[61]

Nonsteroidal Anti-Inflammatory Drugs

Evidence is mounting supporting NSAIDs as a treatment for abnormal uterine bleeding. NSAIDs act by reducing endometrial prostaglandin levels and promoting vasoconstriction in the uterus, leading to decreased blood loss.[62,63] NSAIDs have been shown to decrease blood loss by 20% to 50% in the majority of women.[64] A Cochrane review of 18 small randomized controlled trials showed that NSAIDs were more effective than placebo at reducing heavy menstrual bleeding.[65] Several different NSAIDs have been studied, and there does not appear to be a difference between individual NSAIDs at reducing bleeding. In 1 study, 35 women with heavy bleeding were treated with naproxen sodium and mefenamic acid, and excessive bleeding was reduced by 46% and 47%, respectively.[66] NSAIDs are typically administered during the first 3 days of menses, and they have the added benefit of reducing menstrual cramps. NSAIDs are readily available over the counter, have few side effects, and can be used as a supplement for most causes of vaginal bleeding in nonpregnant women. However, in patients with known or suspected bleeding disorders, NSAIDs should be avoided because of their antiaggregator effect on platelet function.[67]

Antifibrinolytic Agents

Women with heavy menstrual bleeding have been found to have higher levels of plasminogen activators in their endometrium compared to other women, leading to increased fibrinolysis (dissolution of clots). Therefore, antifibrinolytic agents (plasminogen activator inhibitors) can be used to treat heavy menstrual bleeding.[68] Drugs such as tranexamic acid have been used for decades in Europe, but they are underused in the United States despite growing evidence of their efficacy. In 2009, tranexamic acid was approved by the United States Food and Drug Administration for the treatment of heavy menstrual bleeding. A Cochrane meta-analysis of 4 small randomized controlled trials found that antifibrinolytic drugs were superior to placebo, NSAIDs, and oral progestins in decreasing blood loss.[69] In another review of 11 randomized controlled trials, tranexamic acid

was shown to reduce menstrual blood loss by 26% to 60%.[70] Despite concerns that antifibrinolytics may be associated with an increased risk of thromboembolic disease, the drugs appear to be very safe. No cases of thromboembolic disease were reported in any of the 11 studies (> 2500 women total).[70] Additionally, a long-term Scandinavian study found that the incidence of thrombosis in > 200,000 women-years of patients taking tranexamic acid was comparable to the spontaneous frequency of thrombosis of the general female population.[68] No data are available regarding the risk of thrombosis when antifibrinolytic agents are used concurrently with hormonal therapies to treat heavy bleeding; therefore, the combination of these drugs needs to be carefully considered. The recommended dose of tranexamic acid is 1.3 g orally 3 times/day for up to 5 days.[71]

Iron

Women with prolonged or heavy vaginal bleeding can easily become iron deficient. The average menstrual blood loss per menstrual period is 35 to 40 mL, which correlates to an iron loss of 16 mg.[63] For a stable patient with mild to moderate anemia consistent with iron deficiency (microcytic anemia), consider initiating oral iron supplementation. A common regimen is 1 324-mg ferrous sulfate tablet taken orally 3 times/day. Each tablet contains 65 mg of elemental iron.[72]

Transfusion Of Packed Red Blood Cells

Transfusion of packed red blood cells is indicated for women with active bleeding who are hemodynamically unstable; however, the exact hemoglobin level at which blood transfusion should be given for a stable, anemic patient with vaginal bleeding is not certain. Guidelines exist to provide recommendations,[73] but clinical judgment is paramount in the decision to transfuse. In 2012, the AABB (formerly known as the American Association of Blood Banks) issued clinical practice guidelines based on a review of 19 randomized controlled trials that used a clear transfusion "threshold" for the transfusion groups. The AABB recommends following a restrictive transfusion plan, in which stable adult and pediatric patients are transfused at a hemoglobin level of ≤ 7 g/dL. In cases of patients with preexisting cardiovascular disease, transfusion should be considered at a hemoglobin concentration of ≤ 8 g/dL.[73] A Cochrane review also found that existing evidence supports a restrictive transfusion strategy.[74] There are little data incorporating symptoms of anemia into the decision to transfuse.

Danazol

Danazol is a synthetic steroid occasionally used by gynecologists to treat heavy uterine bleeding. Danazol decreases uterine bleeding by inhibiting estrogen and progesterone receptors, causing endometrial atrophy.[75] A 2007 Cochrane review examined 9 randomized controlled trials using danazol, but all were thought to be underpowered (n= 20 participants in the largest study arm).[76] Nevertheless, danazol appears to be more effective than placebo, NSAIDs, progestins, oral contraceptive pills, and progesterone-releasing intrauterine devices in decreasing uterine bleeding. Side effects include weight gain and acne, which women may find unacceptable.[76] There is no evidence for the role of danazol in acute bleeding episodes, and this treatment would probably add little to ED management.

Surgical Treatments

Gynecologists have many surgical tools in their armamentarium for the treatment of abnormal uterine bleeding when medical therapies fail. In patients with acute bleeding resulting in hypovolemia, dilation and curettage (D&C) is the surgical treatment of choice.[5] This treatment has shown some benefit in the short term, but there is a high need for recurrent procedures.[77] Therefore, D&C is not considered a treatment option in all cases.

A variety of endometrial ablation procedures may be employed to stop bleeding, and they can be performed in an office setting. Endometrial ablation techniques can be resectoscopic (loop electrode, roller ball, grooved or spiked electrode) or nonresectoscopic.[5] Nonresectoscopic techniques use multiple different energy sources and include balloon thermal ablation, cryoablation, hydrothermal ablation, bipolar radiofrequency, and microwave ablation.[78]

Although these are procedures performed by a gynecologist, women may present to the ED postprocedure with complications. Potential complications range from light vaginal bleeding and urinary tract infections to endometritis, thermal burns to the uterus and external genitalia, and uterine perforation.[79]

In cases of severe bleeding, hysterectomy may be necessary. Hysterectomy remains a popular, though definitive, treatment for heavy menstrual bleeding. In a retrospective chart review of 205 patients, 60% of women with heavy bleeding had a hysterectomy within 5 years of being referred to a gynecologist.[80] Interestingly, over one-third of women who have a hysterectomy for heavy bleeding have anatomically normal uteri.[80,81] Most women are satisfied with the improvement of their symptoms after hysterectomy,[81] but the risk of major surgery must outweigh the benefits. A woman's desire for future fertility must also be considered.

Treatment Summary

Based on the limited available evidence, there is no single treatment that will be appropriate for every woman presenting with abnormal bleeding. However, it is the author's opinion that many women will

benefit from a short course of hormonal treatment to temporize a bleeding episode. It is the author's practice to treat young women presenting with abnormal heavy bleeding who have no contraindications to estrogen with oral contraceptive pills, 1 pill 2 times/day for 5 days, and then 1 pill daily until the pack is finished. For women who are older or have contraindications to estrogen, the author prescribes medroxyprogesterone acetate, 10 mg daily for 10 days. The author also frequently prescribes ibuprofen 400 mg orally 3 to 4 times/day for 5 days as a supplement to hormonal therapy or as a single treatment.

Special Circumstances

Prepubescent Children

Compared to the prevalence of gynecologic disease in reproductive-age women, gynecologic disease in children is uncommon. Though a rare occurrence, vaginal bleeding in a premenarchal girl can herald serious underlying physical and social pathology.

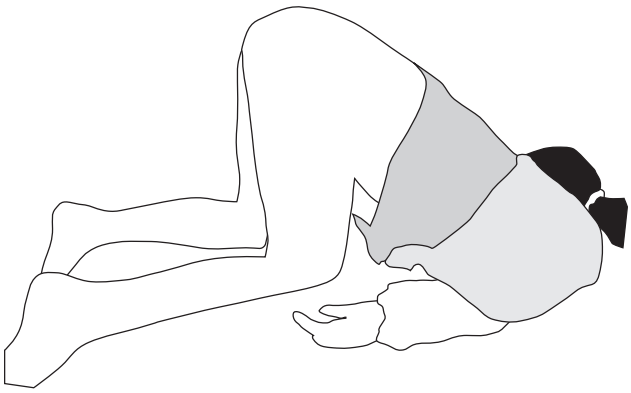
Vaginal bleeding may be seen as early as the first week of life secondary to maternal estrogen withdrawal. This is benign and requires no intervention unless the bleeding is excessive or persists past the first month of life.[82] In all other cases, vaginal bleeding in a prepubertal girl is abnormal and requires further investigation. In the ED, this means a complete physical examination, at a minimum. Consent from the child's parent must be obtained before performing a genital examination. It is helpful to examine infants and small children in the caregiver's lap. The knee-chest position **(see Figure 5)** or frog-leg position **(see Figure 6)** may be used to examine larger children.[83,84] In children, visualization of the cervix using a speculum is almost always unnecessary in the ED.

Causes Of Prepubertal Bleeding

Vaginitis

Vulvovaginitis is the most common gynecologic disease in young girls, and it can cause vaginal irritation and bleeding.[85] Most often, it is a result of poor hygiene[86] and nonspecific irritants. These cases should resolve with simple behavioral changes (ie, front-to-back wiping, avoiding nylon tights, wearing cotton underpants) or with sitz baths.[87] Less commonly, bacterial infections may be the cause. A retrospective study found pathogenic bacteria to be the cause of vulvovaginitis in 36% of girls aged 2 to 12 years. The most common isolated pathogen was group A beta-hemolytic streptococcus *(Streptococcus pyogenes),* which was found in 59% of the cases.[88] A variety of other microbes have also been implicated, including *Haemophilus influenzae* and *Shigella*.[87] **(See Table 3.)** Antibiotic treatment may be necessary in these cases.

Figure 5. Child In Knee-Chest Position



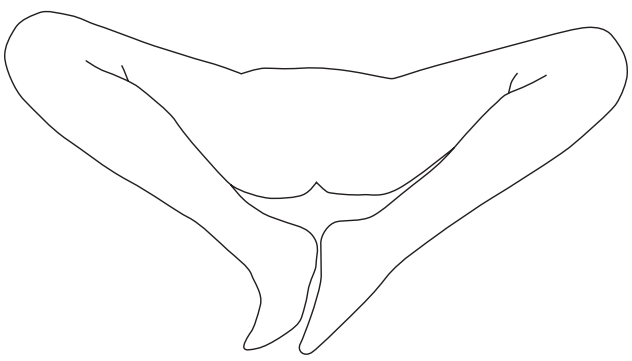
Foreign Bodies

Vaginal foreign bodies may cause bleeding or purulent discharge. Indeed, up to 10% of girls presenting with bloody discharge will have a foreign body.[89] The majority of girls with vaginal foreign bodies are between 3 and 9 years of age,[87] and pieces of wadded toilet paper are the most common objects found on examination.[90] In the majority of cases, a careful history and physical examination will suggest the diagnosis. One retrospective chart review of 35 patients found that 91% of girls with a foreign body either gave a history of insertion of the object, and/or had bleeding or bloodstained discharge, and/or the object was visible or palpable on examination.[91]

Sexual Abuse

Sexual abuse must be considered in the differential when evaluating a child for vaginal bleeding. The American Academy of Pediatrics (AAP) defines sexual abuse as "when a child is engaged in sexual activities that he or she cannot comprehend, for which he or she is developmentally unprepared and cannot give consent, and/or that violate the law or social taboos of society."[92] For a complete and detailed description of the approach to the potentially sexually abused child, providers may refer to the AAP Guidelines for the Evaluation of Sexual Abuse in Children (updated in 2005).[92] The full guideline

Figure 6. Child In Frog-Leg Position



is available at: http://pediatrics.aappublications.org/content/103/1/186.full (or scan the QR code in **Figure 7** with a smartphone.) The Centers for Disease Control and Prevention's Sexually Transmitted Diseases Treatment Guidelines is also an excellent resource and is available at: http://www.cdc.gov/std/treatment/2010/.[93]

In some jurisdictions, trained pediatric sexual assault treatment experts may be available, and they are best equipped to perform the examinations of potential child sexual abuse victims; however, the emergency clinician may occasionally be called upon to examine a child and evaluate for possible abuse if a sexual assault expert is unavailable. On examination, posterior hymen transections, deep hymen notches or perforations, and anal lacerations are highly suspicious for sexual abuse.[94-97] In many cases of abuse, however, there will be no abnormal genital findings. In a study of 236 legally confirmed cases of sexual abuse, the majority of children had normal or nonspecific examination findings.[98] Even if genital injury has occurred, these injuries heal rapidly and may not leave scarring.[94] In 1 study of 204 girls aged 9 to 17 years, abnormal genital findings were more common when the girl reported bleeding at the time of the assault or when an examination was performed within 72 hours of the last abuse episode.[97] Many jurisdictions use 72 hours as the cutoff time for a forensic examination. As mandatory reporters, the most important role of the emergency clinician is to contact Child Protective Services if there is any suspicion of abuse and to ensure that the patient is going to a safe environment if they are being discharged. The provider should have a low threshold for admitting the patient if this is uncertain.

Tumors

Genital tumors are another important cause of vaginal bleeding in prepubertal girls. Older studies show a surprisingly high rate of vaginal lesions causing bleeding. One review by Heller et al of 51 girls aged < 10 years with vaginal bleeding found that 14 girls (27%) had a genital lesion as the cause of the bleeding. In 6 of the girls, the lesion was malignant.[99] In a similar study, Hill et al reviewed 52 cases of girls aged < 10 years presenting with vaginal bleeding. They found that 54% of girls had a genital lesion and almost half of the lesions were malignant.[100] Two unusual types of tumors that can cause bleeding and tend to affect children are sarcoma botryoides and endodermal sinus tumors. Both malignancies are very aggressive. If no obvious cause of bleeding is found in the ED, prepubertal girls with bleeding should be referred to a pediatric gynecologist expeditiously for a complete workup including vaginoscopy.[85]

Trauma

Women and girls may sustain traumatic injuries to the genitals in a number of different ways, and injuries can vary from minor abrasions and contusions to large hematomas and deep, potentially life-threatening lacerations. Common mechanisms of injury include motor vehicle collisions, straddle injuries, and injuries occurring during sexual activity (both consensual and nonconsensual). In adult females, the most common mechanism of genital injury is coitus, accounting for 80% of vaginal lacerations. A transverse tear of the posterior fornix is the most common injury.[101]

In young girls, studies have shown that straddle injuries are the most common mechanism of accidental injury. In a retrospective chart review of 105 girls with genital trauma, 82% were due to straddle injury.[102] Again, sexual abuse must always be considered when evaluating a young girl with genital trauma. Most cases of accidental trauma do not involve the hymen.[103,104] The importance of obtaining an accurate history and assuring that the injury matches the history cannot be stressed enough.[105]

As long as a patient is able to urinate, most blunt genital injuries can be managed conservatively.[85] In the case of penetrating trauma resulting in lacerations, it is important to determine whether the penetrating object had the length to extend beyond the pelvic floor.[106] If so, or if the injury resulted in

Table 3. Potential Pathogens And Nonpathogenic Bacteria Isolated From Cultures In Prepubertal Girls

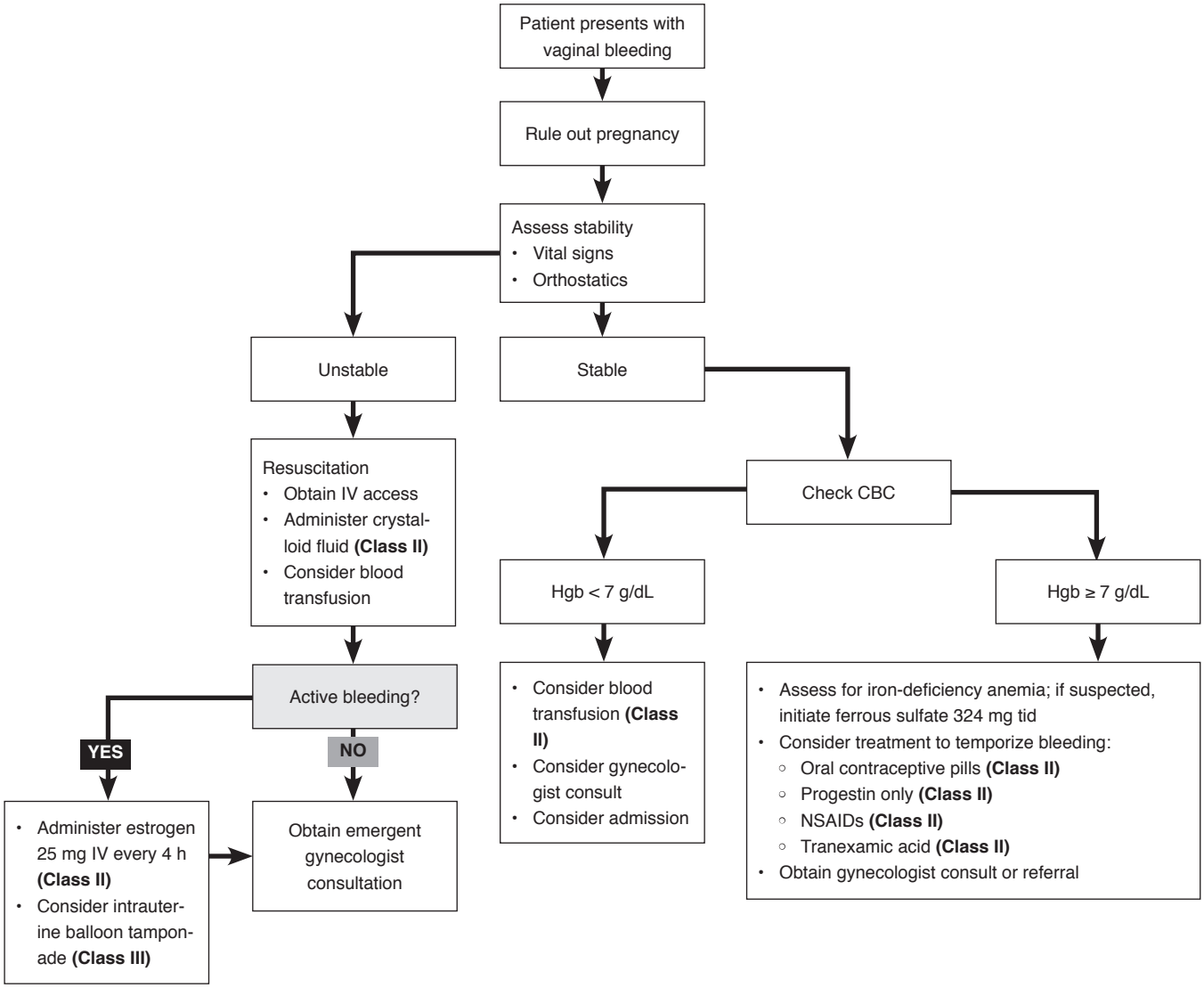
Pathogens	Nonpathogens
• *Streptococcus pyogenes*	• *Enterococcus* species
• *Haemophilus influenzae*	• Coagulase-negative staphylococci
• *Staphylococcus aureus*	• *Escherichia coli*
• *Streptococcus pneumoniae*	• *Viridans streptococci*
• *Moraxella catarrhalis*	• *Corynebacterium*
• *Escherichia coli*	• *Proteus mirabilis*
• *Neisseria meningitidis*	• *Pseudomonas aeruginosa*
• *Shigella* species	

Reprinted from *Clinical Pediatric Emergency Medicine*, Volume 10, Issue 1. Jill M. Jasper. Vulvovaginitis in the prepubertal child. Pages 10-13. Copyright 2009, with permission from Elsevier.

Figure 7. American Academy Of Pediatrics Guidelines For The Evaluation Of Sexual Abuse In Children

Scan the QR code above with your smartphone or go to: http://pediatrics.aappublications.org/content/103/1/186.full

Clinical Pathway For Vaginal Bleeding In Nonpregnant Patients



Abbreviations: CBC, complete blood count; Hgb, hemoglobin; IV, intravenous; NSAIDs, nonsteroidal anti-inflammatory drugs; tid, 3 times per day.

Class Of Evidence Definitions

Each action in the clinical pathways section of *Emergency Medicine Practice* receives a score based on the following definitions.

Class I
- Always acceptable, safe
- Definitely useful
- Proven in both efficacy and effectiveness

Level of Evidence:
- One or more large prospective studies are present (with rare exceptions)
- High-quality meta-analyses
- Study results consistently positive and compelling

Class II
- Safe, acceptable
- Probably useful

Level of Evidence:
- Generally higher levels of evidence
- Nonrandomized or retrospective studies: historic, cohort, or case control studies
- Less robust randomized controlled trials
- Results consistently positive

Class III
- May be acceptable
- Possibly useful
- Considered optional or alternative treatments

Level of Evidence:
- Generally lower or intermediate levels of evidence
- Case series, animal studies, consensus panels
- Occasionally positive results

Indeterminate
- Continuing area of research
- No recommendations until further research

Level of Evidence:
- Evidence not available
- Higher studies in progress
- Results inconsistent, contradictory
- Results not compelling

Significantly modified from: The Emergency Cardiovascular Care Committees of the American Heart Association and representatives from the resuscitation councils of ILCOR: How to Develop Evidence-Based Guidelines for Emergency Cardiac Care: Quality of Evidence and Classes of Recommendations; also: Anonymous. Guidelines for cardiopulmonary resuscitation and emergency cardiac care. Emergency Cardiac Care Committee and Subcommittees, American Heart Association. Part IX. Ensuring effectiveness of community-wide emergency cardiac care. *JAMA*. 1992;268(16):2289-2295.

deep or complicated lacerations, gynecologic or surgical consultation is required. Incorrectly closed genital wounds place the woman at risk for continued pain, sexual dysfunction, and urinary or bowel incontinence. If there is any doubt about the severity or complexity of the injury, it is prudent to consult a gynecologist before attempting repair. Data from women sustaining vaginal injuries during childbirth suggest that the most superficial lacerations require no treatment.[107,108] If there is need for tissue reapproximation or hemostasis, superficial lacerations can be repaired under local anesthesia using synthetic absorbable sutures.[109]

Controversies And Cutting Edge

In 2013, the results of a pilot clinical trial using a new progestogen-only treatment regimen for acute bleeding episodes were released. Ammerman and Nelson treated 48 women with acute bleeding with a depot medroxyprogesterone acetate 150 mg intramuscular injection followed by medroxyprogesterone acetate 20 mg orally every 8 hours for 3 days. All patients had cessation of bleeding at 5 days, with a mean time of 2.6 days.[110] More data are needed, but this treatment could potentially have a future role in the ED management of nonpregnant vaginal bleeding.

A relatively new method of treating heavy uterine bleeding is the levonorgestrel-intrauterine system (LNG-IUS). The LNG-IUS is a device that is implanted into the uterus and releases a low dose of progestogen locally to suppress endometrial activity. The device can be left in the uterus for up to 5 years. The LNG-IUS has been shown to reduce menstrual blood loss by up to 94%.[111] A recent randomized controlled trial by Gupta et al found that LNG-IUS was significantly better at reducing the effects of heavy bleeding on quality of life compared to tranexamic acid, mefenamic acid, combined estrogen–progestogen, or progesterone alone.[112] A Cochrane review found that LNG-IUS is as effective as surgical treatment at improving quality of life.[113] Currently, there is no role for LNG-IUS in the ED treatment of vaginal bleeding; however, it is important for emergency clinicians to be aware of this therapy, as it is gaining popularity with gynecologists and patients.

Disposition

The majority of patients presenting with vaginal bleeding can be safely discharged home and referred to a gynecologist for outpatient follow-up. Adolescents with abnormal bleeding most likely have immaturity of the hypothalamic-pituitary-ovarian axis causing anovulatory cycles, but they should be evaluated for possible bleeding disorder. Adolescents and women with a history suggestive of anovulatory cycles are likely to respond to a short course of estrogen and progestin. Patients with ovulatory bleeding may have relief from NSAIDs or tranexamic acid. All patients must have gynecology follow-up, as ED treatment is only intended to get the patient through the acute bleeding episode. Perimenopausal and menopausal women with abnormal bleeding should be considered to have a malignancy until proven otherwise by a gynecologist; therefore, their follow-up should be expedited. Vaginal bleeding in prepubertal girls is rare, but it may be a sign of serious underlying pathology. Unless a simple cause is readily apparent in the ED (ie, maternal estrogen withdrawal, foreign body), girls must be referred to a pediatric gynecologist for a complete workup. In cases of suspected sexual abuse, the emergency clinician should have a low threshold for admission if a safe environment cannot be absolutely assured for a child. Any patient with significant bleeding should be considered for admission. In general, this includes patients who require resuscitation either with fluids or blood products. Patients with bleeding secondary to a known or suspected bleeding disorder should also be admitted.

Summary

Many women experience abnormal vaginal bleeding throughout their lives, and it can be distressing and inconveniencing. Abnormal bleeding may also be the first sign of serious underlying disease such as cancer. The ED management of a patient presenting with abnormal vaginal bleeding centers on determining whether the patient is stable or not and on ruling out pregnancy. Knowledge of the underlying physiology is essential to identifying a likely cause of bleeding (anovulatory, ovulatory, or structural) and determining an appropriate initial therapy. Emergency clinicians should feel comfortable initiating treatment in order to temporize an acute bleeding episode until the patient can follow up with her gynecologist.

Case Conclusions

The 23-year-old woman had moderate bleeding originating from her cervical os but had an otherwise unremarkable physical exam. You checked the CBC, and it was within normal limits. You determined that, given her history of chronic irregular menstrual periods, she likely had anovulatory bleeding and would benefit from a short taper of oral contraceptive pills. She had no contraindications to estrogen, so you prescribed her 1 oral contraceptive pill 2 times/day for 5 days, then 1 pill/day until the pack was finished. Additionally, you gave her a referral for outpatient gynecology follow-up.

Risk Management Pitfalls For Vaginal Bleeding In Nonpregnant Patients

1. **"The patient denied being sexually active, so I didn't think I needed to do a pregnancy test."**
   All patients of reproductive age with vaginal bleeding must have a pregnancy test. Many patients participate in activities that they do not consider "sexual activity" but that may result in pregnancy. Vaginal bleeding in pregnancy can be life-threatening, as in the case of ectopic pregnancy, and cannot be missed.

2. **"The patient was from a nursing home, and the caregiver had noted blood in the patient's underwear when changing her. I performed a vaginal examination and didn't see any bleeding, so I discharged her back to the nursing home."**
   Patients and caregivers often assume that blood seen in underwear or on a diaper is pelvic in origin, but this is not always the case. If no blood is found on pelvic examination, a rectal examination and hemoccult test of stool is indicated as well as urinalysis for hematuria.

3. **"The patient said that oral contraceptive pills had helped stop a bleeding episode in the past, so I started her on an oral contraceptive pill taper even though she was 40 years old and smoked."**
   Use of estrogen-containing oral contraceptive pills increase the risk of developing thromboembolism, and they are contraindicated in women aged > 35 years who smoke.

4. **"The 51-year-old patient had been having intermittent vaginal bleeding for the past few months. I told her it was likely the beginning of menopause and that she shouldn't be concerned."**
   Anovulatory cycles are physiologic as a woman approaches menopause; however, perimenopausal and postmenopausal women with abnormal bleeding should be considered to have a malignancy until proven otherwise, and they should be referred to see a gynecologist as soon as possible.

5. **"A mother brought her 5-month-old daughter in for vaginal bleeding. I found a foreign body which was the likely cause, so I discharged the patient after removing it."**
   Sexual abuse must always be considered when evaluating a young girl with vaginal bleeding. A 5-month-old child would be unable to insert a foreign body into her vagina on her own. In such cases, Child Protective Services should be contacted, and the patient should be admitted if a safe environment cannot be guaranteed.

6. **"The child had a vulvar hematoma from a straddle injury. She said she didn't have to urinate while in the ED, so I discharged her."**
   Patients with vulvar hematomas should demonstrate the ability to void while in the ED prior to discharge. If the patient is unable to urinate, a urinary catheter should be placed, and the patient may require admission.

7. **"The vaginal laceration was deep and complex, but I thought I could repair it in the ED and avoid transferring the patient."**
   Deep or complex genital lacerations require evaluation by a gynecologist or surgeon, and they are usually repaired in an operating room where appropriate lighting and anesthesia can help visualize all injured structures. Incorrectly closed genital wounds place the woman at risk for continued pain, sexual dysfunction, and urinary or bowel incontinence.

8. **"The patient said that the bleeding wasn't heavy, so I didn't think I needed to do a pelvic examination."**
   A pelvic examination is required for all patients complaining of vaginal bleeding. The provider must confirm that the bleeding is pelvic in origin and assess for trauma, masses, and signs of infection.

9. **"The patient was taking warfarin, but she said her international normalized ratio (INR) had been checked recently and it was therapeutic, so I didn't think I had to repeat it."**
   Any patient presenting with abnormal vaginal bleeding who is anticoagulated should have coagulation studies performed in the ED. Drugs such as warfarin interact with many different medicines and foods, and a patient's INR can easily become supratherapeutic.

10. **"Even though the patient was hypotensive and tachycardic when she checked in, she felt so much better after a few liters of intravenous fluid that I discharged her."**
    Any patient with bleeding requiring significant fluid resuscitation or blood products should be admitted for observation and gynecology consultation.

The bleeding 42-year-old woman was quite ill upon arrival to the ED, with blood pressure of 96/52 mm Hg, heart rate of 124 beats/min, respiratory rate of 17 breaths/min and oxygen saturation of 97% on room air. Two large-bore peripheral IVs were placed, and fluid resuscitation with normal saline boluses was started. On physical exam, she was bleeding heavily from the cervical os, and her uterus was large, firm, and irregularly shaped. A pregnancy test was negative. You started treatment with conjugated equine estrogen 25 mg IV. Her initial CBC showed a hemoglobin of 6.8 g/dL, and she was transfused with 2 units of packed red blood cells. After receiving the normal saline boluses and packed red blood cells, there was improvement in her vital signs. Her bleeding began to slow, and after a second dose of IV estrogen 4 hours later, the bleeding stopped completely and she was admitted to the gynecology service in stable condition. As the patient had completed child-bearing and had had little success with medical management of her heavy bleeding in the past, she elected for hysterectomy, which was performed the next day.

References

Evidence-based medicine requires a critical appraisal of the literature based upon study methodology and number of subjects. Not all references are equally robust. The findings of a large, prospective, randomized, and blinded trial should carry more weight than a case report.

To help the reader judge the strength of each reference, pertinent information about the study will be included in bold type following the reference, where available. In addition, the most informative references cited in this paper, as determined by the authors, are noted by an asterisk (*) next to the number of the reference.

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Time- And Cost-Effective Strategies

- Every female of reproductive age presenting with vaginal bleeding must have a pregnancy test. Consider having it sent from triage by nursing if the wait time to be seen is long. Also, whole blood may be substituted for urine in a standard bedside pregnancy test for unstable patients where urine may not be readily available.[114]
- In the vast majority of cases, pelvic imaging can be deferred for outpatient workup.

Risk Management Caveat: Be sure all women being sent home have timely follow-up with a gynecologist. Postmenopausal women with vaginal bleeding are at increased risk for malignancy. If the patient does not have a gynecologist or the ability to be seen by one expeditiously, consider pelvic ultrasound in the ED.

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CME Questions

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1. Bleeding is considered abnormal when the quantity per menstrual period exceeds:
a. 60 mL
b. 80 mL
c. 100 mL
d. 120 mL

2. Which of the following is true of adolescents with abnormal vaginal bleeding?
a. The most common cause of abnormal vaginal bleeding is immaturity of the hypothalamic-pituitary-ovarian axis.
b. Structural causes (such as cervical polyps and fibroids) are common causes of abnormal bleeding.
c. Adolescents with abnormal bleeding are likely to have cancer.
d. Adolescents are not likely to benefit from hormonal therapy.

3. Women with a history of irregular menstrual periods who are obese, have acne, have other signs of androgen excess, and present with abnormal bleeding likely have:
a. Ovulatory cycles
b. Anovulatory cycles
c. Cervical polyps
d. Leiomyomas

4. The most common cause of abnormal bleeding in a postmenopausal woman is:
a. Endometrial carcinoma
b. Cervical carcinoma
c. Endometrial atrophy
d. Leiomyomas

5. **Which diagnostic study should be routine in cases of abnormal vaginal bleeding in a non-pregnant patient?**
   a. Coagulation study
   b. Ultrasound
   c. CBC
   d. Stool guaiac test

6. **Estrogen helps stop an acute bleeding episode by:**
   a. Suppressing ovulation
   b. Causing endometrial atrophy
   c. Promoting rapid endometrial growth, covering denuded bleeding areas
   d. Reducing endometrial prostaglandin levels

7. **Contraindications to estrogen include:**
   a. Age > 35 years
   b. History of prior thromboembolism
   c. Smoking
   d. Kidney disease

8. **Combination oral contraceptive pills used to treat abnormal uterine bleeding should contain at least 35 mcg of ethinyl estradiol.**
   a. True
   b. False

9. **The most effective NSAID for reducing menstrual bleeding is:**
   a. Ibuprofen
   b. Naproxen sodium
   c. Mefenamic acid
   d. No difference has been found between individual NSAIDs

10. **Studies show that the most common mechanism for genital injuries in young girls is:**
    a. Penetrating injury
    b. Injury during sexual activity
    c. Straddle injury
    d. Motor vehicle collision

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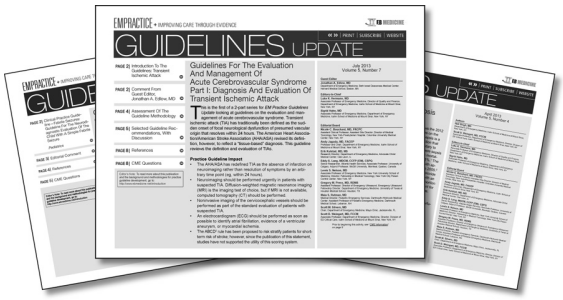

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Emergency Medicine Practice (ISSN Print: 1524-1971, ISSN Online: 1559-3908, ACID-FREE) is published monthly (12 times per year) by EB Medicine (5550 Triangle Parkway, Suite 150, Norcross, GA 30092).