



Pediatric Vaginal Bleeding

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Abstract

This series of cases in pediatric gynecology seeks to improve both the clinical knowledge base and confidence of providers addressing complaints of vaginal bleeding in the pediatric population.

Introduction

While the clinical significance of vaginal bleeding in adolescent girls is based on interval and quantity of blood loss, any vaginal bleeding in early childhood is clinically important regardless of duration or quantity. Such bleeding may arise from local vulvovaginal lesions, trauma, infection, or may arise from manifestations of precocious puberty. Rarely, prepubertal bleeding may have an anatomic or endocrine-mediated etiology [1].

Physiologic endometrial shedding during the first few weeks of life is common in neonates. This occurs as the female newborn responds to the decline of maternal estrogens by initiating production of endogenous hormones, albeit of low quantity. The most obvious effect includes breast budding and some degree is seen in nearly all infants born at term. However, vaginal discharge and/or bleeding are also common as the stimulated endometrial lining is shed. This should only occur up to the tenth day of life [1].

Basics in pediatric gynecologic history and physical

When a prepubertal child presents with a genital complaint, the healthcare provider should start with a patient history, during which, they should illicit details that will inform what information needs to be obtained from the physical examination and if further diagnostic studies may be warranted. While parent is present, the interview should be conducted while the child is fully clothed to convey the message that the genital area is a private area of the body. The examination itself relies on obtaining the patient's compliance by promising to do no physical harm. Giving the child a sense of control over the exam in this way and committing to avoid discomfort sets the stage for the provider to obtain maximum information as possible and for providing age-appropriate guidance. It is advisable to have some communication regarding the chief complaint with the patient's caregivers prior to the meeting. In some instances, if a lot of time is spent obtaining history with the child present, the child may become increasingly anxious. This can best be avoided by having the parents complete a questionnaire before the patient meets the provider. The questionnaire should include length of time the problem has existed, signs/symptoms, presence of environmental irritants, past treatments and diagnoses, and any skin and/or allergic conditions of patient and family [2]. Once the child is more at ease, however, it may be beneficial to directly ask the child some age-appropriate clarifying questions.

Several methods have been suggested to reduce patients' anxiety and gain cooperation. One such method is the use of a hand-held mirror before and during the exam so that she may see her external genitalia. The mirror can be held by the patient herself, nurse, or parent. The use of video eyeglasses showing a movie to the patient during the exam has also been proven to reduce stress [2].

For the examination, the patient should be offered a drape as most will not know to request it on their own. Use of a drape again conveys the message that the genital area is a special part of the body. The patient should be in the supine position for the examination, with her head slightly elevated so maintain constant communication with the examiner. The examiner should be comfortably

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seated with good light for visualization. The child's feet can be placed in stirrups or frog-legged with feet resting on the exam bed or the examiner's lap. The child may also sit on her parent's lap with her legs spread apart and draped across the parent's thighs while the parent sits on the exam table. The child should also be encouraged to then assume a knee-chest position if she can tolerate it, as this position allows better visualization of the hymen and vaginal canal. When a pathologic condition is strongly suspected, an adequate examination is warranted and may require sedation. Forcing a genital examination on any child, or conducting an examination under inadequate sedation, sends a dangerous message and can traumatize a patient. Furthermore, the examination itself will be inadequate [2].

Important aspects of the exam are assessment of development and confirmation of normal anatomy. Begin the exam with evaluation of the mons and labia majora. Note the Tanner stage of pubic hair and state of hygiene. Assess the appearance of the clitoral hood and clitoral size, particularly if concerned about androgen excess. Also assess the appearance of the hymen, which may vary from annular to crescentic or may present with an anomaly (such as a septum or micro-perforate opening). In order to visualize the vestibule, the labia majora may need to be spread laterally and posteriorly. A child who is extremely anxious should be allowed to use her own hands to laterally spread the labia. The examiner may also gently grasp the posterior aspect of the labia majora and retract laterally and upwards or downwards to allow for adequate visualization of the introitus [3]. Care should be made, however, to avoid contacting the sensitive pre-pubertal hymen. If visualization of the vaginal canal is needed in an unanesthetized patient, care should be taken to make the exam as atraumatic as possible, taking into consideration that children typically have atrophic vaginal mucosa and sensitive hymen. The instrument of choice is the flexible fiberoptic endoscope with irrigating capacity or an otoscope. At each stage, the examination should not proceed until the patient is forewarned and she expresses reassurance that the exam is not painful. An office speculum exam should be avoided in a prepubertal girl as the required contact with unestrogenized hymen would be painful [3]. An exam under anesthesia may be required when an office exam and ultrasonography do not provide adequate diagnostic information [4]. In general, an anesthetized exam is preferred if visual assessment of the proximal vagina and cervix is required in a pre-pubertal child.

At the time of the exam, it is imperative that the provider explains that the examination was sanctioned by the guardian who was present. This is also an opportunity for the provider to explain that no one else should look at or touch her genital area, and she should inform a trusted adult immediately if someone attempts to do so [2,3].

Early Sexual Development

A 7-year-old female presents to the pediatrician with 5 months of bilateral breast enlargement, accompanied by monthly vaginal bleeding. Exam is revealing of coarse pubic hair. No café au lait spots are noted.

Differential diagnosis

Precocious puberty is defined as pubertal changes, such as breast bud development, pubic hair, or vaginal bleeding, before 8 years of age (more than 2.5 standard deviations earlier than the mean). It can be due to a number of conditions that fall into two categories: central (gonadotropin dependent) and peripheral (gonadotropin independent). Puberty, whether physiologic or pathologic, is

initiated by pulsatile GnRH secretion, which leads to activation of the Hypothalamic-Pituitary-Ovarian (HPO) axis and subsequent development of secondary sex characteristics. Central, or true, Precocious Puberty (CPP) is due to early maturation of the HPO axis. In contrast, Peripheral Precocious Puberty (PPP) is owing to endogenous or exogenous estrogen [5].

Common causes of CPP include Central Nervous System (CNS) tumors, such as optic gliomas, astrocytomas, and hypothalamic hamartomas. Hamartomas are non-neoplastic, congenital lesions, containing GnRH neurons. They are seen more frequently in children who present with CPP before 4 years of age. Children who have received cranial radiation for malignancy are also at higher risk of CPP. Other CNS pathologies are also observed in a small number of girls with CPP. These include hydrocephalus, meningomyelocele, and neurofibromatosis. However, the majority of CPP in girls is idiopathic.

Causes of PPP include states of estrogen excess, such as McCune-Albright syndrome, ovarian tumors (such as juvenile granulosa cell tumors or sex cord stromal tumors), or idiopathic etiologies. McCune-Albright syndrome manifests with café au lait spots, polyostotic fibrous dysplasia and PPP. This should be considered in children who present with recurrent ovarian follicular cysts and irregular vaginal bleeding. In addition, primary hypothyroidism may manifest with thelarche and vaginal bleeding in girls without accelerated growth (i.e. bone age is not advanced and is typically delayed). Some may have elevated prolactin, galactorrhea or ovarian cysts. Rarely, PPP may also be caused by an increase in adrenal androgens from adrenal tumors or congenital adrenal hyperplasia.

Evaluation

Evaluation of the mechanism and potential for progression of precocious puberty is recommended in girls who have precocious breast development, particularly with additional signs such as increased growth velocity, symptoms or signs of CNS dysfunction, or signs of PPP [6]. The work-up should be adjusted depending on age of presentation and rate of progression of physical changes [7].

Initial evaluation should include a detailed medical history, including the onset of symptoms, rate of progression, growth, and any family history of PP. Physical examination should include anthropometry and pubertal staging. When assessing breast development, particularly in overweight or obese girls, the chest should be palpated for glandular breast tissue, as the breast prominences may be mostly composed of adipose tissue [7]. Presence of pubic hair is reflective of increased androgens in the setting of CPP. Pubic hair in the absence of breast development in females is suggestive of adrenal disorders, premature pubarche, or androgen exposure. The physical exam should also include an assessment of signs of specific causes of precocious puberty. A psychological evaluation may also be beneficial, as precocious puberty is often a source of high levels of anxiety in girls [6].

The endocrine evaluation should include measurements of Luteinizing Hormone (LH), Follicle Stimulating Hormone (FSH), Estradiol (E2), GnRH stimulation test (gold standard), and pelvic ultrasound of the ovaries and uterus. Additional lab work may include 17-hydroxyprogesterone (17-OHP), dehydroepiandrosterone sulfate (DHEA-S), Thyroid Stimulating Hormone (TSH), and insulin levels. Levels of sex steroids should be obtained in the morning, with the use of ultrasensitive assays that are adapted to pediatric values.

In girls, serum estradiol levels are highly variable and have a low sensitivity for the diagnosis of precocious puberty. However, very high estradiol levels may indicate an ovarian cyst or tumor. LH is typically elevated in CPP (5-8 IU per L), while both LH and FSH are suppressed in PPP [6].

Pelvic ultrasound can assess ovarian volume, uterine morphology/volume, and endometrial thickness. Symmetrically enlarged ovaries and an enlarged uterus are noted with CPP. By contrast, ovaries can be asymmetrically enlarged in PPP in the setting of an ovarian cyst/lesion [6].

Cranial Magnetic Resonance Imaging (MRI) should also be obtained in cases of CPP to exclude CNS pathology [6].

Radiographs to determine bone age are also necessary to evaluate possible effects of sex steroids on epiphyseal maturation. The bone age of patients with precocious puberty is generally greater than that of their chronologic age [6].

It is important to note that there are benign variants of incomplete precocious puberty, including premature thelarche and premature adrenarche. Premature thelarche is most common seen in girls between the ages of 1 to 3 years old and may present as unilateral or bilateral breast buds in the absence of accelerated growth or advanced bone age. The breast buds may regress or remain stable until the typical age of pubertal onset. With isolated premature adrenarche, early activation of the Hypothalamic-Pituitary-Adrenal (HPA) axis leads to early appearance of acne, apocrine odor, and axillary/pubertal hair. This occurs in the absence of breast development. Some girls with premature adrenarche may be at increased risk for developing insulin resistance and polycystic ovarian syndrome [8].

Management

Treatment decisions are partly based on the child's age at diagnosis, predicted height, anxiety about early menarche, and psychological and behavior problems. Generally, children with progressive CPP should be treated, as they are at greater risk for obesity, cardiovascular diseases and diabetes mellitus [2]. The mainstay of CPP treatment is GnRH analogues to halt the pulsatile GnRH secretion from the hypothalamus. In the case of McCune Albright syndrome, anti-estrogens or aromatase inhibitors may be used [5].

Surgical resection is indicated for any gonadal tumors found in a pediatric patient. For large ovarian cysts (>20 mL in volume/3.4 cm in diameter), resection or aspiration should be considered on a case by case basis in light of the risk for adnexal torsion. Finally, any exposure to exogenous sex steroids should be removed from the child's immediate environment [6].

Vaginal and Vulvar Bleeding

A 5-year-old female presents after complaining to parents of intermittent vaginal bleeding and vulvar pain for 3 weeks. This has been accompanied by itching and foul odor.

Differential diagnosis

Vaginal bleeding accompanied by itching, discharge, and/or odor can point to several inflammatory and/or traumatic etiologies. Vulvovaginitis is the most common gynecological disorder in children [1]. This is due to inadequate perineal hygiene and thin atrophic vaginal mucosa in young girls, making them susceptible to infection. Irritative vaginal discharge causes the child to scratch the area to the point of bleeding, though the bleeding is usually minimal.

Foreign bodies, too, cause an intense inflammatory reaction and result in blood-stained, odorous discharge. Most commonly, the object consists of rolled pieces of toilet paper that appear as amorphous gray material when extracted [1]. Lichen sclerosus is another potential cause of vulvar bleeding in a pre-pubertal girl, due to ecchymoses and erosions from excoriations, and bleeding perineal fissures [9]. Occasionally, vulvar bleeding may be the result of urethral prolapse. The urethral mucosa protrudes through the meatus and forms an annular mass around the urethral orifice [1].

Genital trauma is also a potential cause of bleeding. This can include blunt injury; fall on sharp object that penetrates the perineal body or vagina, or sexual abuse. Therefore, it is essential that the provider determine the exact cause of injury and remove the child from any potentially unsafe environments. In the case of blunt injury, a hematoma may form under the skin causing tenderness and swelling of the area. Hymenal injury should be suspected along with any injury to the vaginal mucosa. However, there is usually very little bleeding from hymenal injury alone, thus any bleeding greater than that is indicative of vaginal penetration [1].

Evaluation

In the case of penetrative vaginal injury, a detailed exam is necessary to exclude injuries to the upper vagina. In a pre-pubertal girl, this vaginal exam would be done under sedation/anesthesia. In the case of vulvovaginitis, inspection may reveal erythema that may be minimal or extend laterally onto the thighs and posteriorly to the anus. When infection is suspected, wet mount specimens and cultures may be useful to confirm the diagnosis, but care should be made to avoid hymenal contact when obtaining the specimens. In a child with persistent, copious, foul-smelling, brown-tinged discharge, vaginoscopy is necessary to exclude a vaginal foreign body. The child usually will not recall or admit to inserting a foreign object. Because most foreign bodies are not radiopaque, radiographs are of limited value [1]. As noted earlier, disintegrating toilet paper is the most common foreign object to cause foul-smelling vaginal discharge.

Management

Management depends on the cause of bleeding and centers around repair of any injured mucosa and/or the control of infection.

In all instances, proper instruction on genital hygiene should be given to both the patient and the parents [1]. In the case of non-specific vulvovaginitis; special emphasis should be placed on improving genital hygiene, hand hygiene, and voiding with legs apart to prevent urine trapping in the vagina [10].

In general, broad spectrum antibiotics are useful for a confirmed infection. Vaginal irrigation can be performed in the awake patient in the office setting for suspected retained toilet paper. Foreign bodies in the lower third of the vagina can be removed by washing out with warm saline. However, vaginoscopy may be necessary to remove other foreign objects from the vagina and to exclude other causes of bleeding [1].

In the case of urethral prolapse, a 2 to 6 week course of therapy with topical estrogen cream is beneficial if the lesion is small and urination is not obstructed [11]. Attention should also be focused on treating underlying constipation, which is often associated with urethral prolapse. Recurrent or larger lesions may need to be surgically resected [1,11]. For lichen sclerosus, topical high potency corticosteroids, such as clobetasol, are frequently used. Topical calcineurin inhibitors, such as pimecrolimus and tacrolimus, have

also been used to treat lichen sclerosus. Additional supportive care may include topical emollients, sitz baths, and anti-histamines [9].

Genital Tumors

A 7-year-old girl presents with progressively worsening vaginal bleeding. Examination reveals a mass protruding from the vagina.

Differential diagnosis

Although uncommon, genital tumors should be considered when a child presents with a chronic genital ulcer, traumatic swelling of the vulva, tissue protruding from the vagina, or foul-smelling bloody discharge. Benign tumors of the vulva, particularly hemangiomas, typically cause minimal bleeding and can resolve on their own. By contrast, cavernous hemangiomas, made up of larger visible vessels, can cause serious hemorrhage if ruptured or injured [1].

Rhabdomyosarcoma, an embryonal carcinoma of the vagina, is the most common soft tissue sarcoma in children [12]. It presents as the vaginal mucosa bulges into a series of polypoid growths that protrude through the vaginal orifice [1].

Evaluation

Initial evaluation will include detailed medical history, including the onset of symptoms, rate of progression, growth, and family history. A detailed exam is necessary to visualize all possible sources of bleeding. Histological evaluation of a biopsy specimen is necessary to confirm the diagnosis if rhabdomyosarcoma is suspected [1].

Management

In the case of capillary hemangiomas, no treatment is necessary, as they typically resolve on their own. However, cavernous hemangiomas may require surgical excision or vessel occlusion [1].

Curative therapy for rhabdomyosarcoma depends on control of the primary tumor, which can arise at many distinct anatomical sites [12]. In pre-pubertal girls; rhabdomyosarcoma is often vulvovaginal in etiology. In adolescent girls, rhabdomyosarcoma more frequently arises from the cervix [13]. Treatment may include wide local excision and chemotherapy. These tumors are typically responsive to Vincristine, d-Actinomycin, and Cyclophosphamide (VAC). Historically, neo-adjuvant chemotherapy is given, followed by surgical resection. Ideally, surgical resection will preserve the bladder and rectum. If the tumor remains unresectable after chemotherapy, radiotherapy helps to shrink the tumor and control its growth. Postoperative irradiation has resulted in survival rates above 85% [1].

Summary

Vaginal bleeding in the pediatric patient requires a detailed history from the parent or care giver and proceeding with an adequate examination. Should the latter not be feasible in an office setting sedation should be provided to allow adequate assessment.

Emphasis is placed on assessment of development and confirmation of normal anatomy. Assessment for any aspect of precocious puberty is important with appropriate Tanner staging. Endocrinologic evaluation and determination of etiology of abnormal development is of paramount importance. Vaginal and vulvar bleeding in this age group may require vaginoscopy and ruling out trauma related etiologies. Genital tumors require prompt recognition and evaluation and oncological consultation as required on a case by case basis.

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