A Practical Overview of Managing Adolescent Gynecologic Conditions in the Pediatric Office

Alexa Kaskowitz, MD, MPH,* Elisabeth Quint, MD*

Department of Obstetrics-Gynecology, University of Michigan, Ann Arbor, MI

Practice Gap

Pediatricians caring for adolescent girls should know how to screen for high-risk behaviors and sexually transmitted infections and how to diagnose and treat vaginal discharge, vulvar ulcers, pelvic pain, and simple ovarian cysts.

Objectives

After reading this article, readers should be able to:

1. Recognize the need for confidential discussions with teenagers as part of general health care.
2. Identify, evaluate, and manage some vulvovaginal disorders in teenagers, including vaginitis, vulvar ulcers, and condyloma.
3. Describe the screening and treatment methods of the most common sexually transmitted infections in adolescents.
4. Identify and evaluate the most common gynecologic causes of pelvic pain in a teenager, including ovarian cysts and masses.

AUTHOR DISCLOSURE Drs Kaskowitz and Quint have disclosed no financial relationships relevant to this article. This commentary does contain a discussion of an unapproved/investigative use of a commercial product/device.

Written in collaboration with the North American Society for Pediatric and Adolescent Gynecology (NASPAG).

ABBREVIATIONS

BV	bacterial vaginosis
CDC	Centers for Disease Control and Prevention
HPV	human papillomavirus
HSV	herpes simplex virus
NAAT	nucleic acid amplification test
PID	pelvic inflammatory disease
STI	sexually transmitted infections

INTRODUCTION

The pediatrician plays an important role in the transition of female patients through puberty and will frequently be the first health care professional an adolescent turns to for gynecologic care and guidance. This review focuses on the evaluation and management of gynecologic issues seen by pediatricians. It addresses the following common gynecologic symptoms: vulvovaginal concerns, sexually transmitted infections (STIs), pelvic pain, and adnexal masses. Abnormal bleeding, a common reason for a teen to seek health care, and screening adolescent gynecology have been addressed in previous articles in *Pediatrics in Review.* (1)(2)

THE ADOLESCENT HISTORY

Adolescence is a transition time from childhood to adulthood and can be relatively smooth for some teens and difficult for others. During this time, the pediatrician should be open to discussing topics of adolescent development, such as risk-taking behavior and sexual issues. Usually at approximately age 11 to 12 years, the teen should be able to talk to her clinician about issues she may not feel comfortable

discussing in front of a parent, whether or not she is sexually active. Early during the visit, when the parent and teenager are in the office together, the purpose of a confidential part of the visit is explained to them. Some parents may find it hard to accept that private time with the clinician is something that all adolescents should have, so it is important to set up the expectation that regular private time between clinician and teenager is recommended. After the parent has left the room, it is important to explain the limits of confidentiality, that dangerous situations, such as abuse or physical harm would require the clinician to disclose this information to others. Screening for high-risk behaviors can be done using the HEADSSS (home, education, activities, drugs, sex, suicide, and safety) acronym. With rates of sexual activity at almost 50% by the end of high school and 1 in every 6 teens having had more than 4 partners, discussion of behavioral issues and screening for STI by the pediatrician is important. (3) Offering or referring for birth control if teens are sexually active should be done, per American Academy of Pediatrics guidelines, because nationally only 60% of teens used condoms at last intercourse and 1 in 8 teens used no birth control at all. (3) The pediatrician should be aware of the laws in their state because they may allow provision of birth control methods screening and treatment for STI without parental permission, as well as expedited partner treatment for STI.

GYNECOLOGIC EXAMINATION

A pelvic examination is rarely indicated in women younger than 21 years. Because the cervical cancer screening guidelines state that the first Papanicolaou smear in immunocompetent or human immunodeficiency virus–negative teens should be performed at age 21 years and STI screening can be performed by urinary and blood testing, the pediatrician will only occasionally perform a speculum or bimanual examination. Abnormal menstrual bleeding and starting a teenager on a birth control method are usually not indications for a pelvic examination.

An external genital examination should be performed at the annual physical examination and is indicated in those adolescents with vulvar issues and concerns, such as vaginitis, ulcers, and vulvar masses. When teenagers are concerned about the cosmetic appearance of their vulva, it is important to emphasize the great variability in size and shape of the labia minora. Only if it causes great distress or medical problems, such as ulceration due to chafing, is a referral to a gynecologist warranted because anatomical variety is wide and surgery is only rarely indicated. Bimanual examination is reserved only for those cases in which the examination would aid in diagnosis, for example, the concern for pelvic inflammatory disease (PID) in a sexually active teenager with pain and a fever or a concern for a foreign body or trauma. If a speculum examination is indicated, a narrow Pederson speculum should be used.

VULVOVAGINITIS

The most common causes of vulvovaginitis in adolescents are bacterial vaginosis (BV), *Candida* (yeast) infections, or the STI trichomoniasis. Vaginal discharge or irritation can also be a sign of other STIs.

The vagina normally has an acidic environment, with pH between 3.8 and 4.5. This level is maintained by the acid produced by the vaginal microbiome, dominated by lactobacillus. Some infections can change the acidity, which may aid in the diagnosis of the infection. A combination of history, symptoms, physical examination, and diagnostic tests can identify the causative agent in most cases. The following signs and symptoms were found to be the most helpful in identifying a cause of vaginitis: presence of erythema or inflammation makes candidiasis more likely, presence of fishy odor is highly predictive of BV, the lack of odor decreases the likelihood of BV and increases the likelihood of candidiasis, and the lack of itching makes candidiasis much less likely. (4)

Bacterial Vaginosis

The most common cause of vaginal discharge is BV. This occurs when the lactobacillus domination of the vaginal biome is overtaken by *Gardnerella vaginalis* and anaerobic bacteria, resulting in lower levels of hydrogen peroxide and organic acids and therefore elevation of vaginal pH and production of amines. It is more commonly seen in sexually active teenagers, especially if condoms are not used, but may also be present in non–sexually active teens.

Symptoms. The anaerobic bacteria produce amines that result in a malodorous, "fishy," thin, gray-white discharge.

Diagnosis. The diagnosis can be made by the presence of 3 of 4 Amsel criteria: (1) thin, homogenous vaginal discharge, (2) vaginal pH greater than 4.5, (3) positive whiff test result (fishy odor when 10% potassium hydroxide solution is added to specimen), or (4) at least 20% clue cells on wet mount (epithelial cells with shaggy borders caused by adherent coccobacilli). The most useful of these criteria are elevated pH and a positive whiff test result, both of which can be obtained via a cotton-tip swab placed in the vagina or at the introitus if discharge is visible, without the need for a speculum.

Treatment. The following treatments are all equally efficacious: oral metronidazole, 500 mg twice daily for 5 days; oral clindamycin, 300 mg twice daily for 7 days; metronidazole gel,

5-g applicator intravaginally each night for 5 days; or clindamycin, 2% cream 5-g applicator intravaginally each night for 7 days. Partner treatment is not recommended, but abstinence, or at least condom use, is recommended during treatment. BV recurrence is common, and treatment can be with another course of the same medicine or alternate treatment. For the treatment of multiple recurrences, suppressive metronidazole gel twice a week for 4 to 6 months or intravaginal boric acid is an option. (5)

Candida Infection

A yeast infection can affect the vagina or vulva. It can be a result of untreated diabetes mellitus or if the patient has recurrent or recent systemic antibiotic use.

Symptoms. The patient usually has burning or itching in the vulvovaginal area. In an acute infection, the vulva is often erythematous and can be edematous with characteristic red satellite papules. Patients may experience clumpy, white vaginal discharge. With chronic infection, the patient may have fissures or excoriations. Patients can have external dysuria or burning at the urethra or vulva.

Treatment. A wet preparation is often used to diagnose a yeast infection and reveals buds or pseudohyphae on a slide with saline and 10% potassium hydroxide, but the sensitivity is only 65% to 85%. (6) A yeast culture can be obtained by swabbing the vulva, especially in the sulcus between the labia majora and minora. If yeast is confirmed or strongly suspected, treatment is recommended in the symptomatic patient. Most yeast infections are caused by *Candida albicans* and are easily treated with topical or oral antifungals. Topical azole cream for a 3- or 7-day course is equally effective as a 1-dose 150-mg oral fluconazole tablet, which can be taken again once 72 hours later, both of which are more effective than nystatin cream. Teenagers may prefer the oral medication. Over-the-counter effective topical formulations are available. These treatments are effective against most candidal species aside from *Candida glabrata*. Chronic documented yeast infections warrant a yeast culture and a referral to a gynecologist.

SEXUALLY TRANSMITTED INFECTIONS

Neisseria gonorrhea, Chlamydia trachomatis, and *Trichomonas vaginalis*

The Centers for Disease Control and Prevention (CDC) has estimated that nearly 20 million new STIs are diagnosed every year, with more than half of those in people ages 15 to 24 years. (5) This is the result of many behavioral, social, biological, and epidemiologic factors. Chlamydia, caused by the intracellular parasite *Chlamydia trachomatis,* is the most prevalent STI in the United States, followed by gonorrhea, caused by the intracellular diplococcus *Neisseria gonorrhea*. *Trichomonas vaginalis* is a common cause of vaginitis.

Chlamydia and Gonorrhea

C trachomatis and *N gonorrhea* are often asymptomatic in females, unlike in males, and if untreated can result in PID, which can lead to infertility, adhesions, and pelvic pain, causing great personal distress and a large public health burden.

Symptoms. Because most *C trachomatis* and *N gonorrhea* infections are asymptomatic, the CDC recommends annual screening for chlamydia in all sexually active women younger than 25 years and at-risk women for gonorrhea (risks include age younger than 25 years, other STDs, new or multiple sex partners, and inconsistent condom use). Symptomatic patients present with mucopurulent vaginal discharge that is white or yellow and may be accompanied by pruritus, irritation, erythema, burning, or dyspareunia. Dysuria may also be a presenting symptom and can lead to misdiagnosis of a urinary tract infection. Incubation period is between 2 and 14 days in *N gonorrhea* and 7 to 21 days in *C trachomatis*. Disseminated disease is rare but can include arthritis-dermatitis syndrome with *N gonorrhea* or reactive arthritis (previously called Reiter syndrome, including uveitis, urethritis, dermatitis, and arthritis) with *C trachomatis*.

Diagnosis. History should include number and frequency of sexual partners, history of other STI or PID, and condom use. New testing methods have been introduced, such as nucleic acid amplification tests (NAATs), that can be performed on vaginal (self-administered), urine (first void, nonclean catch), rectal, or endocervical specimens. Because NAATs are the most specific and sensitive testing method, the CDC recommends them for *C trachomatis* and *N gonorrhea* testing in both symptomatic and asymptomatic patients.

Treatment. For the most up-to-date treatment regimens, see the CDC STD Treatment Guidelines (http://www.cdc.gov/STD/treatment/). The *C trachomatis* treatment regimen is azithromycin, 1 g orally in a single dose. Dual treatment for *N gonorrhea* is always recommended and a frequently used antibiotic is ceftriaxone, 250 mg intramuscularly once. The adolescent should refrain from sexual intercourse for 7 days and until their partner has been treated.

Cephalosporin resistance to *N gonorrhea* is becoming more prevalent, so treatment options often change. Antibiotic resistance has not developed with *C trachomatis*; therefore, unless the patient is pregnant, a test-of-cure is not necessary except in the cases where compliance was in question. If a subsequent test is necessary, it should be performed more than 3 weeks from the completion of therapy to prevent false-positive test results. The adolescent patient should be retested to evaluate for *subsequent infection* from an untreated sexual

partner or a new partner in 3 months. Expedited partner therapy can be considered, if this is legal in the clinician's state, which involves delivery of antibiotics to patients or a prescription for their partners. This has been associated with lower rates of subsequent infection. For more information, see http://www.cdc.gov/STD/ept/default.htm.

Trichomoniasis

Trichomoniasis is caused by the protozoa *T vaginalis* and is usually sexually acquired.

Symptoms. Many patients with *T vaginalis* are asymptomatic. There is increased evidence that *T vaginalis* infection may enhance human immunodeficiency virus transmission and that treatment for *T vaginalis* decreases viral shedding. (5) Therefore, screening for *T vaginalis* should occur in any sexually active female seeking care for vaginal discharge but also annually in any patient at high risk of infection (new or multiple partners, history of STI, exchange sex for payment, or injection drug users). Females with symptomatic trichomoniasis usually present with diffuse, frothy, green, white, or gray, malodorous, watery discharge and vulvar irritation. Incubation time is between 4 and 20 days.

Diagnosis. Vaginal pH is typically greater than 5.0 with trichomoniasis. The traditional method of diagnosis is the saline wet preparation, which may reveal flagellated, moving organisms under the microscope. This test has low sensitivity but high specificity compared with the gold standard culture. NAATs used for *C trachomatis* and *N gonorrhea* can also detect *T vaginalis* and are among the most sensitive and specific method for detection. If these are not available, a rapid point-of-care antigen test is also commercially available.

Treatment. Metronidazole, 2 g, or tinidazole, 2 g orally in a single dose, is used for treatment. Subsequent infection is common (17% at 3 months) secondary to lack of partner treatment, so retesting at 3 months can be considered. There is a low rate (2%–5%) of mild resistance of *T vaginalis* to metronidazole, so higher-dose treatment may be needed if symptoms persist. (5) See the CDC STD Treatment Guidelines (http://www.cdc.gov/STD/treatment/for the latest treatment regimens.

BARTHOLIN GLAND CYSTS AND ABSCESSES

The Bartholin glands or greater vestibular glands are located at the lower opening of the vagina in the 5 and 7 o'clock locations (Figure 1). These glands produce mucus and lubrication for the vulva and vagina. They have a narrow outlet, making them prone to obstruction and leading to cysts and sometimes abscesses. Infection is usually caused by mixed vaginal flora (bacteroides, *Escherichia coli*, and *Staphylococcus aureus*) but can also be from *C trachomatis* and *N gonorrhea*.

Symptoms

Patients present with a mass or swelling in the posterior labia between the vestibule and labia majora. There is usually unilateral pain, erythema, and, if infected, green or malodorous discharge. It can expand anteriorly up to the mons pubis.

Treatment

In a sexually active adolescent, gonorrhea and chlamydia testing should be performed. If the lesion is small, a course of antibiotics effective against mixed flora, hot compresses, and sitz baths 3 times a day can be used initially. Larger lesions that are clearly infected or persist after conservative measures after 2 weeks should be treated with an incisional and drainage procedure, leaving a small catheter in place to allow for reepithelialization of the tract. Antibiotics are added if there is evidence of cellulitis because incisional procedures are usually all that are necessary.

VULVAR ULCERS

Genital ulcers can be caused by direct cytotoxic effects or from an inflammatory response to a systemic illness. Genital ulcers in adolescents can be divided into sexually and non–sexually transmitted ulcers. The most common cause of sexually transmitted genital ulcers is genital herpes. The most common cause of non–sexually transmitted genital ulcers is aphthous ulcers, also known as Lipschütz ulcers. In the teen who presents with vulvar ulcers, it is important to obtain a thorough medical history, including a sexual history and abuse screen. The onset and duration of symptoms are important, as is whether it is the primary incident or a recurrence. The review of systems should include systemic symptoms, other skin lesions, history of oral ulcers, and gastrointestinal, genitourinary, neurologic, and ocular symptoms. Family history for autoimmune or inflammatory bowel disease can also be helpful.

The physical examination should evaluate the external genitalia, including the perirectal area, as well as the entirety of the skin and the oropharynx to look for other ulcers. A speculum examination is usually not necessary because the presence of vaginal ulcers would not change management. Table 1 presents the causes of genital ulcers.

Herpes Simplex Virus

Genital herpes is primarily caused by herpes simplex virus (HSV) 2, but HSV-1, previously thought to be responsible for

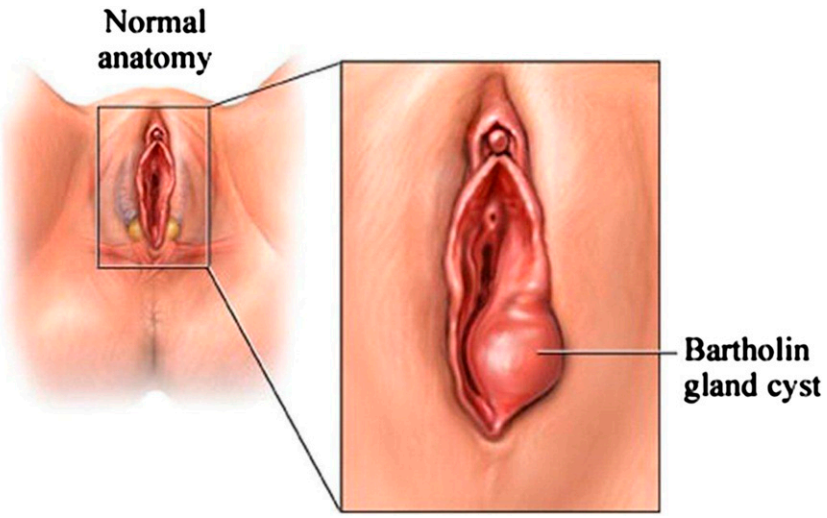

Figure 1. Bartholin gland cyst. Reprinted with permission from Bora SA, Condous G. Bartholin's, vulval and perineal abscesses. *Best Pract Res Clin Obstet Gynaecol*. 2009;23 (5):661–666.

oral ulcers only, has increasingly been found to be the causative agent for genital herpes.

Symptoms. Genital HSV infections typically present with multiple, painful vesicles or ulcers (Figure 2). They are often on an erythematous base. The separate lesions may coalesce. A primary infection may be accompanied by fevers, myalgias, headaches, and malaise, as well as inguinal lymphadenopathy. Recurrent infection may only manifest itself genitally with a burning or tingling prodrome followed by genital lesions. HSV-2 recurs more frequently than HSV-1. Many HSV infections are asymptomatic, but patients can shed the virus even when not having symptoms.

Figure 2. Cluster of genital herpes lesions. Reprinted with permission from Drake S, Taylor S, Brown D, Pillay D. Improving the care of patients with genital herpes. *BMJ*. 2000;321(7261):619–623.

TABLE 1. **Causes of Genital Ulcers**

Sexually transmitted
Herpes simplex virus
Syphilis
Lymphogranuloma venereum
Chancroid
Human immunodeficiency virus
Non–sexually transmitted
Herpes simplex virus
Epstein-Barr virus
Cytomegalovirus
Influenza A
Paratyphoid
Systemic illnesses
Autoimmune diseases (Crohn disease, Behçet disease)
Cutaneous drug reactions
Idiopathic aphthosis.

Diagnosis. The preferred method to diagnose HSV is testing the lesion with either NAAT of HSV DNA or cell culture. The highest yield is with NAAT on the fluid of an acute ulcer by unroofing the vesicle and swabbing at the base of the lesion. If the patient has healing or persistent ulcers and a negative culture result or when only a clinical diagnosis was obtained, serum testing of type-specific HSV may be helpful but is usually not indicated.

Treatment. Antivirals are the main treatment for HSV genital ulcers to lessen the severity and the duration of the outbreak and reduce transmission rates. They can also be used on a daily basis for suppression of outbreaks in patients who have recurrent symptoms. (5) Three antivirals are used and have similar efficacy: acyclovir, valacyclovir, and famciclovir. However, there is a difference in cost and dose frequency, which may affect compliance in teenagers. Dosages for treatment, suppression, and prophylaxis can be found at http://www.cdc.gov/std/treatment/2010/toc.htm. Because HSV ulcers are painful, treatment should also consist of pain control. Occasionally, urination is too painful in a primary outbreak, and teens need to be admitted for urinary catheter placement and pain control.

Other Sexually Transmitted Genital Ulcers

Other sexually transmitted ulcerations occur less commonly, depending on the patient population. Syphilis presents with a single, painless ulcer with sharply demarcated edges. Lymphogranuloma venereum is characterized as a single, often painful papule with tender lymphadenopathy, caused by *Chlamydia*. Chancroid presents with painful genital ulcers and tender suppurative inguinal adenopathy.

Diagnosis. Syphilis is classically screened via a nontreponemal test, such as the rapid plasma reagin or VDRL serum tests, and confirmed by a serological treponemal test, such as the fluorescent treponemal antibody absorbed tests, although reverse testing (treponemal testing followed by nontreponemal testing of positive results) is becoming more common. Lymphogranuloma venereum is diagnosed using NAATs for *Chlamydia* in urine. Chancroid is diagnosed by exclusion of other STIs in the presence of painful genital ulcers and tender inguinal adenopathy.

Treatment. Specific treatments can be found at http://www.cdc.gov/std/treatment/2010/toc.htm.

Non–Sexually Transmitted Genital Ulcers

Systemic infectious illnesses can manifest as genital ulcers. The history will give many clues to the origin. There is often a prodrome of symptoms, such as fevers, malaise, headaches, myalgias, or upper respiratory tract infection symptoms. Epstein-Barr virus, cytomegalovirus, and *Mycoplasma pneumoniae* have been associated with acute genital ulcers. (7)

Symptoms. Symptoms include painful lesions on the vulva or vagina that can be erythematous, edematous, single, or multiple.

Diagnosis. HSV testing; a complete blood cell count to look for anemia, neutropenia, or thrombocytopenia; and serologic testing for Epstein-Barr virus and cytomegalovirus should be performed. If all test results are negative, the diagnosis is aphthous or Lipschütz ulcers.

Treatment. The treatment focuses on pain control. Topical anesthetics, such as lidocaine gel, 2%, and oral pain medications can be helpful. An oral steroid taper with prednisone or methylprednisolone for 7 to 10 days can be used if the systemic illness is severe. A potent topical steroid, such as clobetasol ointment, 0.05%, can be used twice daily for 7 to 10 days. The lesions usually resolve in approximately 3 weeks. If the ulcers are recurrent, then a search for another underlying cause, such as Behçet disease (Figure 3; association with recurrent oral ulcers and uveitis) or Crohn disease, is warranted.

GENITAL WARTS

Genital warts are a common, highly infectious disease most often caused by human papillomavirus (HPV) types 6 and 11. Transmission generally occurs by sexual contact (Figure 4). There has been a reduction in genital warts in the United States among females age 15 to 24 years between 2003 and 2010, postulated to be a consequence of the HPV vaccine. (8) In adolescents with poor hygiene due to diaper use or

Figure 3. Non–sexually transmitted genital ulcer from Behçet's disease. Reprinted with permission via open access under the terms of the Creative Commons Attribution Non-Commercial License from Alpsoy E, Zouboulis CC, Ehrlich GE. Mucocutaneous lesions of Behçet's disease. *Yonsei Med J.* 2007;48(4):573–585.

being developmentally delayed, pseudoverrucous papules, a form of irritant contact dermatitis, may mimic warts from HPV and condyloma acuminata.

Symptoms

Single or multiple papules can be found on the vulva, perineum, perianal area, vagina, anus, or urethra. The symptoms include itching, burning, bleeding, or vaginal discharge and may or may not be painful. They may appear flat, verrucous, pedunculated, hyperpigmented, or hypopigmented and may be large or small.

Diagnosis

Diagnosis is made by visual inspection alone, but if the papules appear uncharacteristic or respond poorly to therapy, a vulvar biopsy may be required.

Treatment

The indication for treatment of condyloma is eradication of discomfort. Condyloma is not hazardous and does not affect fertility, so it can be managed conservatively. Spontaneous regression occurs in many cases, although recurrence is common. (5) Medical treatment for small to moderate lesions is usually successful. Chemical treatments can be applied in the office, such as liquid nitrogen, podophyllin, or trichloroacetic acid. If the patient is willing and responsible, self-applied treatments can be used, such as imiquimod, podofilox, or sinecatechins. Larger lesions (>10 cm^2) will likely require surgical or destructive therapy and would necessitate a referral to a gynecologist. Most genital warts respond to treatment in 3 months. Imiquimod has been approved for use in children 12 years or older, but the safety and efficacy of podofilox have not been established in adolescent patients. All patient-applied therapies can decrease the effectiveness of condoms, so sexual contact should be avoided while any of the chemical treatments are present on the skin. Prevention of HPV infections should be offered to all teenagers via immunization with the HPV vaccine. There are 2 vaccines (bivalent and quadrivalent) currently available that are effective in reducing the risk of cervical cancer by 70% through their effectiveness against HPV-16 and -18. (8) The quadrivalent (types 6, 11, 16, and 18) vaccine also protects against condyloma acuminata. The vaccine should be offered to all patients (male and female) ages 11 to 26 years, optimally before the onset of sexual activity, even if condyloma acuminata have already been diagnosed.

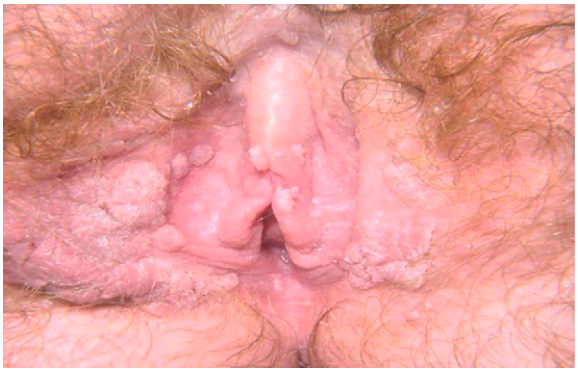

Figure 4. Genital condyloma acuminata. Reprinted with permission from Hatch KD. Clinical manifestations of HPV infection: section A: benign manifestations of HPV infection: A. anogenital condylomas. *Int J Gynaecol Oncol.* 2006;94(1):S32–S55.

PELVIC PAIN

Pelvic pain is a common symptom in teenagers and may be the presenting symptom of numerous gynecologic and nongynecologic disorders.

In this section, we discuss the most common gynecologic causes of pelvic pain (Table 2), including ovarian cysts, masses or torsion, PID, ectopic pregnancy, and endometriosis. The history is important in discerning the cause of pelvic pain: acute vs chronic, pain characteristics, associated symptoms, menstrual status, cyclic vs noncyclic pain, and sexual and contraception history. If the pain is long term (lasting more than 3 to 6 months), it may be helpful to have patients complete a pain diary, especially in relation to menses, eating, voiding, and bowel movements. For the teenager who presents with pelvic pain, a complete physical examination is indicated, with special attention to the abdomen, external genitalia, and the pelvis in a sexually active teenager. Obstructive vaginal or uterine anomalies are rare but may present with severe pelvic pain and should be considered if initial treatments do not alleviate symptoms.

The external genitalia can be examined to assess Tanner stage, followed by gentle separation of the labia majora laterally and posteriorly to help open the introitus to evaluate for hymenal patency and the presence of a potential obstruction in the form of a vaginal bulge. If unclear, the clinician can take a lubricated sterile cotton-tip swab to carefully see whether it passes into the vagina. Thin, white, nonmalodorous discharge may be normal in an otherwise asymptomatic patient (leukorrhea).

A pelvic or bimanual examination is indicated in those teens who are sexually active with pelvic pain to exclude PID. A narrow Pederson speculum can be used, and a cervical swab for *C trachomatis* and *N gonorrhea* can be collected. For the bimanual examination, a single-digit examination is preferred. Assess for cervical motion tenderness, which is indicative of possible PID. If the teen is having cyclic pain

TABLE 2. **Causes of Pelvic Pain**

Nongynecologic causes
Gastrointestinal: appendicitis, gastroenteritis, inflammatory bowel disease, constipation
Genitourinary: nephrolithiasis, urinary tract infection, pyelonephritis
Musculoskeletal: iliopsoas muscle spasm
Neurologic: nerve entrapment
Psychiatric: history of sexual abuse, psychosomatic
Gynecologic causes
Adnexal
Ovarian: cyst, mass, torsion
Fallopian tube: torsion, hydro- or pyosalpinx
Pregnancy related: ectopic pregnancy, miscarriage
Infection: endometritis, pelvic inflammatory disease
Cyclic: mittelschmerz, dysmenorrhea, endometriosis, obstructive mullerian anomalies

with or without menses but with other pubertal developmental signs, she may have a complete or partial outflow tract obstruction. Palpation for a mass in the vagina or with a gentle rectal examination is important to assess for possible imperforate hymen vs obstructed vaginal septum. At the time of the rectal examination, the clinician can also evaluate for stool impaction.

Dependent on the diagnostic suspicion after the history and physical examination, the following laboratory tests can be helpful: a pregnancy test in all sexually active patients, complete blood cell count for leukocytosis or anemia, and urinary or cervical NAAT for *C trachomatis* and *N gonorrhea*. In terms of imaging, pelvic ultrasonography is recommended to assess for masses and anatomy.

Ovarian Cysts, Masses, and Torsion

There are many different kinds of ovarian cysts and masses (Table 3). A functional cyst, either complex or simple, is a physiologic phenomenon and can be a normal part of the menstrual cycle. Finding a small cyst in an adolescent with pain does not preclude the need to look for other causes of her pain. A simple cyst is unilocular, anechoic, and thin-walled on ultrasonography. If the cyst is complex, it may represent a hemorrhagic cyst. If the ovarian mass is more complex with septations, excrescences, or solid components, ovarian tumors (germ cell tumors or hormone-secreting tumors) are in the differential diagnosis. Ovarian tumors are usually benign, such as a dermoid or serous cystadenoma, but malignant tumors should be taken into consideration. (9) Serum tumor markers can be ordered, usually lactate dehydrogenase, α-fetoprotein, and human chorionic gonadotropin, with inhibin levels if the suspicion for an estrogen-producing granulosa cell tumor is significant (association with very heavy cycles).

Symptoms. Ovarian cysts may present with abdominal pain, pelvic fullness, irregular vaginal bleeding, urinary frequency, or constipation but are often asymptomatic and found on imaging for another reason. Ovarian cysts and masses can be painful if they rupture, grow quickly, hemorrhage inside the cyst, or hemorrhage with ovarian torsion. Cyst rupture is usually self-limited but may also cause an intraperitoneal hemorrhage, which can be a potential emergency, leading to significant blood loss. Ovarian

TABLE 3. **Causes of Benign and Malignant Ovarian Masses**

Nonneoplastic
Follicular
Simple
Corpus luteum
Neoplastic
Benign
Mature teratoma (dermoid)
Cystadenoma
Borderline cystadenoma
Fibrothecoma
Struma ovarii
Sclerosing stromal tumor
Malignant
Germ cell
Yolk sac tumor
Immature teratoma
Dysgerminoma
Mixed germ cell tumor
Epithelial
Invasive mucinous cystadenocarcinoma
Sex-cord stromal
Sertoli-Leydig cell tumor
Juvenile granulosa cell tumor
Gonadoblastoma

torsion, twisting around its blood supply, can lead to ovarian necrosis if the blood supply is compromised for too long. If there is a cyst or mass on imaging that makes the total ovarian size greater than 5 cm, this places the ovary at risk for torsion. Torsion of the ovary or fallopian tube usually presents with the sudden onset of severe pain in the lower abdomen. The pain can be constant or can wax and wane if the ovary intermittently torses. This can be accompanied by nausea or vomiting.

Diagnosis. The diagnosis of an ovarian cyst, mass, or torsion is based on pain on abdominal examination in the lower quadrants and confirmed by pelvic ultrasonography.

Treatment. If a simple cyst is found on initial ultrasonography, the cyst is smaller than 6 to 7 cm, and the patient is not in any significant pain, additional ultrasonography after 2 to 3 menstrual cycles is indicated to evaluate for resolution of cyst, with warnings to the patient about the signs of torsion. Extreme exercise activities should be curtailed. If initial ultrasonography identifies a simple cyst larger than 6 to 7 cm or a complex or solid mass, a referral to a gynecologist is indicated for further evaluation. Tumor markers as discussed above may be ordered before the referral. If severe pain is noted in combination with an ovarian mass, an urgent evaluation is in order.

Pelvic Inflammatory Disease

PID involves infection of the female upper genital tract and is often caused by *C trachomatis* and *N gonorrhea*.

Symptoms. Women who have symptoms of PID most commonly have lower abdominal pain. Other signs and symptoms include fever, unusual vaginal discharge that may have a foul odor, painful intercourse, painful urination, irregular menstrual bleeding, and pain in the right upper abdomen (rare).

Diagnosis. Because of nonspecific symptoms, PID can be difficult to diagnose. The CDC recommends that empiric treatment for PID should be initiated in sexually active young women and other women at risk for STIs if they are experiencing pelvic or lower abdominal pain, if no cause for the illness other than PID can be identified, and if one or more of the following minimum criteria are present on pelvic examination: cervical motion tenderness, uterine tenderness, and/or adnexal tenderness. The presence of signs of lower genital tract inflammation (predominance of leukocytes in vaginal secretions, cervical exudates, or cervical friability), in addition to 1 of the 3 minimum criteria, increases the specificity of the diagnosis (http://www.cdc.gov/std/treatment/2010/pid.htm). Outpatient treatment is as effective as inpatient treatment, unless the patient is systemically ill, is pregnant, has an abscess, or is unlikely to comply with treatment. A revisit in several days is needed to assess treatment response.

Ectopic Pregnancy

An extrauterine location for a pregnancy can be a life-threatening emergency if it ruptures.

Symptoms. If a patient has adnexal tenderness and vaginal bleeding or spotting, it is imperative to perform a pregnancy test. Pain from an ectopic pregnancy may be located anywhere in the pelvis, abdomen, or back or referred to the shoulder if ruptured and blood is irritating the diaphragm. The patient may have associated breast tenderness, missed period(s), nausea or vomiting, urinary frequency, or fatigue.

Diagnosis. If the teen has a positive pregnancy test result in combination with pain and/or bleeding, an ectopic pregnancy should be assumed until proven otherwise.

Treatment. A timely referral to an obstetrician/gynecologist is recommended so ultrasonography can be performed to establish the location of the pregnancy.

Dysmenorrhea

A comprehensive review of dysmenorrhea was recently presented in *Pediatrics in Review*. (1) Patients with dysmenorrhea typically present with pain with menses that may start a few days before bleeding begins and can last through part of or the entire menstrual period.

Endometriosis

Endometriosis is the extrauterine location of endometrial glands and stroma that causes peritoneal inflammation, subsequent pain, and possible infertility. Endometriosis can be found in up to 73% of adolescents with chronic pelvic pain that is not responsive to nonsteroidal anti-inflammatory drugs or hormonal contraception. (10)

Symptoms. Adolescents often do not present with classic cyclic abdominal pain with menses, worsening with each month; instead, they may have irregular, constant, or intermittent pain. Adolescents may have dyspareunia or pain associated with voiding or defecating. There may be a positive family history. (10)

Diagnosis. Although the diagnosis can only definitively be made by laparoscopy, the combination of cyclic or acyclic pelvic pain with exclusion of other causes is highly suggestive of endometriosis in adolescents.

Treatment. Hormonal treatment to suppress menses is the first-line treatment for presumed endometriosis. Combined hormonal contraceptives, oral, the patch, or the ring, can be used cyclically or preferably continuously. The progesterone-only methods are also effective, including

the long-acting intramuscular medroxyprogesterone, the implantable rod, or the levonorgestrel intrauterine system. Many teens are unable to use a daily method consistently, so it is important to discuss that a longer-term method may be better, especially if the teen also uses it for birth control. If the first-line treatment does not give adequate relief, then a referral to a gynecologist is recommended.

Summary

- On the basis of strong research evidence, the 3 most common causes of vaginitis are bacterial vaginosis, *Candida* infection, and trichomoniasis. These conditions can be diagnosed based on the following signs and symptoms: presence of erythema or inflammation makes candidiasis more likely, presence of fishy odor is highly predictive of bacterial vaginosis, the lack of odor decreases the likelihood of bacterial vaginosis and increases the likelihood of candidiasis, and the lack of itching makes candidiasis much less likely. *Trichomonas vaginalis* symptoms include diffuse frothy, green, white, or gray, malodorous, watery discharge and vulvar irritation. (4)(6)
- On the basis of strong research evidence, chlamydia and gonorrhea are often asymptomatic but can be characterized by mucopurulent vaginal discharge. They are effectively tested using nucleic acid amplification tests from a nonclean catch urine void or a self-collected vaginal swab. There is increasing cephalosporin resistance in gonorrhea, so the most updated antibiotic regimen must be used. (5)
- On the basis of strong research evidence, genital ulcers are commonly caused by herpes simple virus but also have numerous nonsexually transmitted origins. Treatment is largely symptomatic. (5)(7)
- On the basis of strong research evidence, the human papillomavirus vaccine should be offered to all adolescents between ages 11 and 26 years, optimally before the onset of sexual activity, to decrease the risk of cervical cancer and genital warts. (8)
- On the basis of strong research evidence, pelvic pain has a wide differential diagnosis and a variety of gynecologic origins, including ovarian cysts and masses, ovarian torsion, pelvic inflammatory disease, ectopic pregnancy, dysmenorrhea, and endometriosis. (9)(10)
- On the basis of some research evidence and consensus, pelvic inflammatory disease can be diagnosed on the basis of pelvic pain and cervical motion tenderness and adnexal or uterine pain when no other source of illness can be identified. Cervical motion tenderness and adnexal or uterine tenderness are most accurately examined via a bimanual examination. (5)

References

1. Gray SH. Menstrual disorders. *Pediatr Rev.* 2013;34(1):6–17
2. Cavanaugh RM Jr. Screening adolescent gynecology in the pediatrician's office: have a listen, take a look. *Pediatr Rev.* 2007; 28(9):332–342
3. Youth Risk Behavior Surveillance System. http://www.cdc.gov/healthyyouth/yrbs/pdf/us_overview_yrbs.pdf. Accessed November 1, 2013
4. Anderson MR, Klink K, Cohrssen A. Evaluation of vaginal complaints. *JAMA.* 2004;291(11):1368–1379
5. Workowski KA, Berman S; Centers for Disease Control and Prevention (CDC). Sexually transmitted diseases treatment guidelines, 2010. *MMWR Recomm Rep.* 2010;59 (RR-12):1–110
6. Hainer BL, Gibson MV. Vaginitis. *Am Fam Physician.* 2011; 83(7):807–815
7. Huppert JS. Lipschütz ulcers: evaluation and management of acute genital ulcers in women. *Dermatol Ther.* 2010;23(5):533–540
8. Flagg EW, Schwartz R, Weinstock H. Prevalence of anogenital warts among participants in private health plans in the United States, 2003–2010: potential impact of human papillomavirus vaccination. *Am J Public Health.* 2013;103(8):1428–1435
9. Zhang M, Jiang W, Li G, Xu C. Ovarian masses in children and adolescents: an analysis of 521 clinical cases. *J Pediatr Adolesc Gynecol.* 2013;27(3):1–5
10. Brosens I, Gordts S, Benagiano G. Endometriosis in adolescents is a hidden, progressive and severe disease that deserves attention, not just compassion. *Hum Reprod.* 2013;28(8):2026–2031

Suggested Reading

Centers for Disease Control and Prevention. Sexually transmitted diseases, with links to specific diseases, treatment guidelines and adolescent health. http://www.cdc.gov/std/default.htm

Emans SJ, Laufer M. *Pediatric & Adolescent Gynecology.* 6th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2012

Parent Resources from the AAP at HealthyChildren.org

- English: http://www.healthychildren.org/English/health-issues/conditions/genitourinary-tract/Pages/Menstrual-Disorders.aspx
- Spanish: http://www.healthychildren.org/spanish/health-issues/conditions/genitourinary-tract/Paginas/Menstrual-Disorders.aspx
- English: http://www.healthychildren.org/English/ages-stages/gradeschool/puberty/Pages/Pelvic-Exams.aspx
- Spanish: http://www.healthychildren.org/spanish/ages-stages/gradeschool/puberty/Paginas/Pelvic-Exams.aspx

PIR Quiz

1. You meet for the first time with a 16-year-old girl and her mother. The girl has come in for a health assessment. You know that private time with an adolescent alone provides a significant, often indispensable, opportunity to learn in a timely and reasonably accurate way about risk behaviors your adolescent patient may be sampling. You are aware that a promise of confidentiality is essential for most adolescents to open themselves up to you. The specifics of laws regarding confidentiality and consent vary from state to state, but in all states you MUST ALWAYS inform another adult when an adolescent shares with you his or her:
    A. Desire for absolutely confidential birth control.
    B. Frequent skipping of classes.
    C. Homosexuality or bisexuality.
    D. Intention to harm another person.
    E. Usually unprotected intercourse.
2. You are reviewing with a pediatric resident the indications for a pelvic examination. You correctly state that a pelvic examination is MOST USEFUL in a previously healthy girl who has:
    A. Asymptomatic vaginal discharge.
    B. Acute severe pelvic pain.
    C. Infrequent periods.
    D. Just reached age 18 years and needs her first Papanicolaou smear.
    E. A desire to start oral contraceptive pills.
3. A 15-year-old girl has had a foul-smelling, thin, gray-white vaginal discharge for 2 weeks. She has no abdominal pain or itching. The discharge has a pH of 5.5. The whiff test result is positive. Results of nucleic acid amplification tests on the discharge are negative. You can treat this condition appropriately with oral:
    A. Azithromycin.
    B. Cephalexin.
    C. Fluconazole.
    D. Metronidazole.
    E. Penicillin V.
4. A 17-year-old girl has had a fever, headache, and severe vulvar pain on voiding for 3 days. On inspection of her vulva, you note grouped vesicles and painful ulcers on her clitoris and scattered around the introitus. Appropriate treatment of this condition requires oral:
    A. Azithromycin.
    B. Fluconazole.
    C. Metronidazole.
    D. Prednisone.
    E. Valacyclovir.
5. A previously well 18-year-old woman experiences sudden onset of severe, crampy unilateral pelvic pain. Her periods have been monthly, the last ending 3 days ago. She is afebrile. On external examination, the labia are normal and you see no vaginal discharge. A bimanual examination reveals no cervical, uterine, or adnexal tenderness, The MOST LIKELY diagnosis is:
    A. Bartholin gland cyst.
    B. Ectopic pregnancy.
    C. Endometriosis.
    D. Ovarian torsion.
    E. Pelvic inflammatory disease.

REQUIREMENTS: Learners can take *Pediatrics in Review* quizzes and claim credit online only at: http://pedsinreview.org.

To successfully complete *2014 Pediatrics in Review* articles for *AMA PRA Category 1 Credit™*, learners must demonstrate a minimum performance level of 60% or higher on this assessment, which measures achievement of the educational purpose and/or objectives of this activity. If you score less than 60% on the assessment, you will be given additional opportunities to answer questions until an overall 60% or greater score is achieved.

A Practical Overview of Managing Adolescent Gynecologic Conditions in the Pediatric Office

Alexa Kaskowitz and Elisabeth Quint

Pediatrics in Review 2014;35;371
DOI: 10.1542/pir.35-9-371

Pediatrics in Review®
AN OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

A Practical Overview of Managing Adolescent Gynecologic Conditions in the Pediatric Office

Alexa Kaskowitz and Elisabeth Quint

Pediatrics in Review 2014;35;371
DOI: 10.1542/pir.35-9-371