Common Problems in Adolescent Medicine

Terez A. Yonan and Claudia Borzutzky

Abstract

Adolescence is a time of much change and growth. Though exciting, it can present as a challenging time for the youth as well as for her health-care provider. Adolescence begins with puberty; in addition to experiencing many physical changes, the adolescent patient also undergoes numerous ongoing mental and psychosocial changes as she transitions to adulthood. While it is expected that adolescence is the healthiest time in an individual's life, many common medical problems can arise during this time, especially with respect to sexual and reproductive health. These include abnormal menstruation, need for effective and confidential contraception, sexually transmitted infections, and intimate partner violence.

Keywords

Adolescent development • Confidentiality • Consent • HEADSS exam • Sexual development • Abnormal menstruation • Polycystic ovary syndrome • Contraceptive counseling • Sexually transmitted infections • Intimate partner violence

Contents

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1 Introduction

The care of the adolescent patient can be an overwhelming endeavor for providers who do not routinely work with this complex and interesting age group. Adolescence is a time of much growth and development, both physically and mentally, which makes caring for this age group at times perplexing, yet always rewarding. This chapter will discuss some of the more common concerns that arise when caring for the adolescent patient, from the expected elements of psychosocial and physical development to medical conditions and abnormalities. Furthermore, this chapter includes several resources and tools that providers can utilize when caring for the adolescent patient. As adolescent medicine encompasses a wide variety of disorders, this chapter will not address all aspects of adolescent health. Specifically, this chapter will not review certain conditions that providers may receive referrals for, such as pelvic pain due to mittelschmerz or ovarian cysts, ovarian torsion, uterine fibroids, and teen pregnancy. Providers can refer to "Cross-References" at the end of this chapter for recommended chapters within this text for further information on other conditions that affect adolescents, such as dysmenorrhea, premenstrual syndrome, acute and chronic pelvic pain, contraception and family planning, and congenital anomalies.

2 Consent

The ability to consent to care is a concern that arises commonly in the care of adolescents. Patients who are 18 years or older can consent to care independently, whereas those under age 18 years require parental consent for most aspects of their medical care. However, there are several legal exceptions by which minors can consent to care without parental involvement. The most common exceptions allow minors to legally consent to sensitive health-care services, including sexual and reproductive health care, mental health services, and alcohol and substance abuse treatment. Sexual and reproductive health care encompasses contraception, pregnancy-related care, and examination and treatment after sexual assault. The age of minor consent varies by state and individual treatment type, but in many states, minors 12 and older may consent to sexual health services (Guttmacher Institute 2015).

Providers should be familiar with the local laws pertaining to minor consent. Providers must be aware that the legal considerations for abortion services are not governed by the same laws as are other sensitive services. Most states require parental involvement for the minor seeking abortion services, and this varies from notification of one or both parents to obtaining parental consent to the procedure. Of note, Connecticut, Maine, and the District of Columbia do not have laws pertaining to abortion services for minors, and though parental consent or notification laws have been passed in California, Montana, Nevada, New Jersey, and New Mexico, those laws have been either temporarily or permanently enjoined by court order and are therefore not in effect. Providers practicing in states without minor consent laws for particular services often obtain patient consent for the service if the minor is mature and able to provide consent. The Guttmacher Institute website is a

useful resource that contains up-to-date information regarding minor consent laws across the United States (Guttmacher Institute 2015; Emans et al. 2005).

Throughout the United States, minors may consent for care based on their status and based on local or state laws. Few aspects of minor consent are governed by federal laws, with one exception pertaining to services funded by Medicaid or by the Title X Family Planning Program (English et al. 2010). This most often applies to minors who are seeking care for pregnancy. Additionally minors who are married, minors enlisted in the military, and minors who are financially independent of their parents and living on their own or are otherwise legally emancipated by a court, all commonly referred to as "emancipated minors," are able to consent to their own care, although the legal definition of this term varies by state. Legally emancipated minors can consent to any aspect of their care. Conditions that adolescents, emancipated or not, may otherwise consent to include pregnancy, communicable diseases of public health concern (such as sexually transmitted infections, including human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS)), and substance dependence (drugs or alcohol) (Emans et al. 2005). Parenting minors may be able to consent for their child, their own care, or both, but this varies by state as well, and providers should be familiar with local laws.

In addition to considerations pertaining to legal status, providers often utilize the "mature minor" doctrine (alternately, "self-sufficient minor") in obtaining consent from and providing care to adolescents. This doctrine is generally favorable or accepted in many courts across the United States, including some Supreme Court cases pertaining to adolescents. The courts find that "a physician is not liable for providing care without parental consent when the care is within the mainstream of medical opinion, is not high risk, and is provided in a non-negligent manner, as long as the minor is an older adolescent who is capable of giving informed consent to the care and does consent" (English et al. 2010).

The concept of informed consent is of great import with patients of any age. The ability to provide informed consent must be assessed by the medical provider by taking into account the procedure or treatment at hand, the minor's ability to understand the benefits and complications of the procedure or treatment as explained by the provider, and the minor's ability to understand the implications and/or outcomes of the procedure or treatment.

For sensitive services such as those described above to which minors may consent, providers must also respect patient confidentiality. In most states, information related to such conditions, intervention, and related results or outcomes cannot legally be shared with the minor's parent (s) unless permitted by the minor and documented in their record. In the United States, as discussed above, the laws vary by state, and most states have variable limitations in types of services that minors can consent to, but also variable ages at which minors can give consent. The Guttmacher Institute provides up-to-date, state-specific information on the legal limits pertaining to the whole spectrum of sensitive services (this information can be accessed via www.guttmacher.org) (Emans et al. 2005; Neinstein et al. 2008).

3 Confidentiality

Confidentiality is a common concern that the majority of minors have when seeking care.

Confidentiality pertains to the control of information held in the patient's medical record and whether information from the medical record can be shared with other providers, parents/guardians, or schools, etc. For the most part, minors who seek

sensitive services are ensured confidentiality; their medical information cannot legally be shared with any other entity unless the minor signs a release of information (Ford et al. 2004; Neinstein et al. 2008; The Center for Adolescent Health and the Law 2005). Adolescents, often unaware of their rights to confidentiality around such issues, are, as a general rule, hesitant to share sensitive information with their providers, especially at their initial visit. This hesitation can be managed by clearly and explicitly discussing confidentiality and its limits with the minor. Holding such discussions *early* in the patient-provider relationship helps to build rapport and gain the adolescent's trust, minor or not. Providers should also take time to encourage adolescents to include their parents in their care, and providers can assist by acting as a moderator for sensitive discussions. The situations that cross the limits of confidentiality generally include (1) if the adolescent is at risk of harming herself, (2) if the adolescent may harm others, and/or (3) if the provider suspects, or the adolescent discloses, sexual or physical abuse or neglect which requires legal reporting to child protective services. It is recommended that providers preemptively inform the adolescent that if confidentiality must be breached, the adolescent will be informed prior to releasing any information to their parents or the authorities. Such reporting laws also vary by state in their scope and detail, particularly with respect to minor sexual activity, and providers caring for adolescents should be familiar with their local laws and reporting agencies (Ford et al. 2004; Neinstein et al. 2008; The Center for Adolescent Health and the Law 2005).

4 Access to Care for Adolescents

Access to health-care services for adolescents and young adults is not always easy or possible. There are many barriers to care that affect this age group including financial difficulties, lack of or poor access to public transportation, inability to access care due to clinic hours coinciding with school hours, inability to make phone calls to clinics to schedule appointments, and inability to return for follow-up appointments (Advocates for Youth 2015).

These are only some of the many barriers to health care that adolescents cite and each one affects an individual differently, depending on her ethnicity, what community or city she lives in, her socioeconomic status, and so on.

Provider awareness of such barriers allows for accommodations to ease access to care for this vulnerable population. Clinics can offer extended office hours, dedicated adolescent help-line numbers, or vouchers or tokens for public transportation for patients in need (Advocates for Youth 2015). Furthermore, because they face so many barriers to care, adolescents seek out and benefit from low- or no-cost care with an integrated-service approach, where they can have all of their health-care needs met without having to travel between locations and providers. As previously discussed, privacy, confidentiality, and consent are important for all patients, but are essential to the adolescent patient. Adolescents often forgo seeking medical care because they perceive a lack of these basic health-care constructs (The Centers for Disease Control and Prevention 2013). Providers can also make their offices more adolescent-friendly by posting information relating to the adolescent population (especially, the office confidentiality policy or information on informed consent) in the waiting room as well as the patient rooms (Banikya-Leaseburg and Garrido-Fishbein 2015).

Adopting a "sex-positive" and culturally competent approach helps to achieve optimal care for adolescents who seek sexual and reproductive health-care services (Banikya-Leaseburg and Garrido-Fishbein 2015). Providers can take a

sex-positive approach by asking about the patient's sexual orientation and practices (rather than basing counseling on assumptions) as well as about concerns they have about their sexual health. Providing free condoms in the office is another youth-friendly service that many medical clinics offer (Banikya-Leaseburg et al. 2015). Providers should strive to involve youth in any medical decision-making. This engages the young patient and builds on the patient-provider relationship (The Centers for Disease Control and Prevention 2013; Banikya-Leaseburg and Garrido-Fishbein 2015). When able, providers should encourage the adolescent to engage their parent(s) in their health-related discussions or care. This fosters an improved bond and communication between the patient and her parent(s). In addition, patients who have positive parental involvement have been found to have delayed coitarche, decreased substance abuse, improved self-directed care, decreased rates of mental health diagnoses, and improved school performance (Advocates for Youth 2015).

5 Getting to Know the Adolescent Through the HEADSS Exam

There are many nonclinical aspects of care that can strengthen the adolescent-provider relationship. Some of the basic concepts include taking interest in the adolescent as an individual and including the adolescent's family in her care. Additionally, for a patient who presents with her parents, taking time during the clinical visit to meet privately with the adolescent is also instrumental to the patient-provider relationship. This allows a safe and private space to discuss her lifestyle, answer any "embarrassing" questions, and discuss potential risk factors that may impact her health. The HEADSS exam is an interviewing tool that can be utilized by providers to facilitate such discussions in a nonthreatening way (Goldenring and Rosen 2004). As previously discussed, reviewing confidentiality and its limits with the adolescent (and her family, if they ask) prior to the private interview is recommended (Neinstein et al. 2008).

> The HEADSS exam is a progressive interviewing tool that addresses several psychosocial aspects of everyday adolescent life: home, education, activities, drugs, sex, and suicide. In more recent years, the HEADSS exam has been expanded into the HEEADSSS to include a review of eating habits and safety from injury and violence (Ginsburg and Kinsman 2014).

The interview progresses from less invasive questions regarding the adolescent's homelife to more personal questions about whom the adolescent spends time with and what activities she engages in, thereby building rapport with the adolescent. Once the provider and the adolescent are more comfortable, they can then engage in a discussion about even more sensitive topics, such as sexual identity and orientation, sexual behaviors, and emotional disturbances the adolescent may be experiencing. At times the HEADSS exam may need to be deferred until a follow-up visit, as the provider may need more time to build rapport with the adolescent and the family. In addition, the HEADSS exam can be performed in segments to allow the provider to address the medical reason for the office visit. Unaddressed aspects of the HEADSS exam can be completed at subsequent visits (Neinstein et al. 2008). For a list of sample questions, providers can refer to the article, "Getting into Adolescent Heads: An Essential Update" by Goldenring and Rosen; this article lists sample questions and also categorizes them from essential to optional to help tailor the provider-adolescent interview (Goldenring and Rosen 2004). An additional resource regarding this and many other psychosocial aspects of adolescent care is the textbook, *Reaching Teens: Strength-Based Communication Strategies to Build Resilience and Support Healthy Adolescent Development* by Ginsburg and Kinsman (2014).

6 Stages of Adolescent Sexual Development

It is important for providers to take into consideration an adolescent's stage of development at the time of the encounter and as they devise their treatment plan. Adolescence is a time of rapid change that affects an individual's overall physical and mental state and growth. There are three commonly referred-to stages of adolescent development: early, middle, and late. These stages occur in parallel with puberty, and, girls are often noted to have signs of psychosocial development earlier than boys.

- The first stage of adolescent sexual development, early adolescence, typically occurs between the ages of 9 and 13 years in girls (11–15 years for boys). This coincides with the beginning of puberty, and the early adolescent becomes quite concerned with the changes occurring in her body (Neinstein et al. 2008). Privacy becomes a major concern at this stage. Early adolescents are just beginning to leave childhood, but continue to be predominantly concrete thinkers; these young adolescents do begin to show some abstract thoughts (Monasterio et al. 2010). During this stage, the adolescent female may begin to show interest in other teens at school and have "crushes" that reflect her sexual orientation, which may come with concerns about parental acceptance for those who show interest in the same sex (ACT for Youth Center for Excellence 2015). Most young adolescents in this stage of development are focused on determining, "Am I normal?" They tend to spend much time exploring their bodies and the changes that have started to occur. Because of this, sexual fantasies and masturbation are common in this stage of development. Sexual intercourse, however, is not common this early on (Kann et al. 2014; Monasterio et al. 2010).
- The second stage of adolescent sexual development, middle adolescence, typically occurs between the ages of 13 and 16 years in girls (15–17 years for boys). The middle adolescent is able to think more abstractly (Neinstein et al. 2008). She is more interested in her appearance, takes a strong interest in her peers' opinions, and is focused on determining, "Am I liked?" During this stage, she is beginning to experiment with relationships and is dating. Sexual activity becomes more common during middle adolescence. Centers for Disease Control and Prevention's (CDC) Youth Risk Behavior Surveillance data shows that slightly fewer than 50% of 10th graders and slightly more than 50% of 11th graders are sexually active (Kann et al. 2014). The sexually active adolescent is aware of the risk of pregnancy and/or STI, but typically feels that neither is likely to happen to her. It is important for providers and parents to note that sexual behavior at this stage does not always match sexual orientation (Monasterio et al. 2010).
- The third stage of adolescent sexual development, late adolescence, typically occurs between the ages of 16 and 21 years in girls (17–21 years for boys). The late adolescent is more aware of her identity, both personal and sexual. This adolescent is fully capable of abstract thinking (Neinstein et al. 2008). She is concerned about her future. This adolescent is focused on answering the question, "Am I loved?" She is able to have a trusting relationship, can show mutual respect, and has feelings of love and passion (Monasterio et al. 2010).

7 Pubertal Development

Pubertal development progresses with a typical course in most individuals. This section will focus on normal puberty in females, as a precursor to the subsequent sections on adolescent gynecology. Abnormal pubertal patterns such as precocious puberty and delayed puberty will not be discussed; for information on these, providers can refer to pediatric or adolescent medicine texts, such as *Nelson's Textbook of Pediatrics* or Neinstein's *Adolescent Health Care: A Practical Guide*.

Many changes occur during puberty, including the development of secondary sex characteristics and the development of reproductive capabilities,

as well as physical growth, characterized by changes in body habitus and increase in stature (Kliegman et al. 2016). The initiation of puberty is related to the maturation of the hypothalamic-pituitary-ovarian axis, leading to both increased production of and change in the secretory pattern of the gonadotropins, luteinizing hormone (LH) and follicle-stimulating hormone (FSH). Prior to the initiation of puberty, LH and FSH secretion is pulsatile, mainly occurring during sleep. With puberty, the secretion of LH and FSH becomes more consistent, secondary to positive feedback from increasing levels of the sex steroids, estrogen and testosterone. These increasing estrogen and testosterone (as well as other androgens) levels herald the development of the body's adult form (Neinstein et al. 2008).

Providers often utilize the sexual maturity rating (SMR) scale or Tanner stages to document the progression of puberty. The typical course of puberty in females begins with thelarche, or the appearance of breast buds and subsequent breast development, followed by pubarche or pubic hair development (though in a small subgroup of girls, pubarche precedes thelarche). Menarche, or onset of menses, is the next stage of pubertal development. It typically occurs 2–2.5 years after thelarche at an average age of 12.5 years (range 9–15 years) (Neinstein et al. 2008). Physiologic leukorrhea may be noted prior to menarche. Linear growth is also a part of puberty and accelerates during SMR 2–3 in females; linear growth acceleration typically occurs later in males during SMR 3–4. A peak height velocity of 8–9 cm per year is noted for girls and typically occurs about 6 months prior to menarche (Kliegman et al. 2016). Once menarche occurs, linear growth slows down significantly, and girls are anticipated to have approximately 7.5 cm of linear growth remaining. Other changes that occur during the progression of puberty include growth of the female genital tract and ovaries as well as of the external genitalia, including the labia and clitoris (Neinstein et al. 2008).

The typical initial finding of puberty, thelarche, or breast bud development, commonly occurs around age 11. Variations in age at thelarche have been noted, with age at thelarche decreasing in more recent years. Additionally, racial variations are also noted, with the average age of thelarche occurring for African-American girls at 8.87 years and for Caucasian girls at 9.96 years. Several factors are thought to contribute to the earlier onset of puberty in certain groups, including increased rates of obesity, improvements in nutrition, environmental factors, and hormonal exposures (Neinstein et al. 2008; Kliegman et al. 2016; Emans et al. 2005).

Breast development SMR staging consists of five stages (Fig. 1). Sexual maturity rating stage 1 refers to the preadolescent chest, and SMR 2 describes palpable breast bud development with a slight increase in areolar size. As the breasts continue to develop, there is an increase in the amount of breast tissue and enlargement of the areola, and SMR 3 is characterized by such enlargement without change in breast contour. Sexual maturity rating stage 4 is characterized by a "mound on mound" appearance as the areola and the papilla form a secondary mound. Mature, SMR 5 breasts are characterized by nipples that protrude from the breast and areolae that are part of the breast contour (Neinstein et al. 2008; Kliegman et al. 2016).

Pubic hair development consists of five stages as well (Fig. 2). The preadolescent, SMR 1, has no pubic hair noted on exam. With pubarche, SMR 2 pubic hair is noted and is characterized by few, thin, lightly pigmented hairs that are noted along the medial border of the labia and on the mons pubis. With continued development to SMR 3, the pubic hair becomes darker, begins to curl, and increases in number. In SMR 4, the pubic hair is thick, coarse, and curly and covers the mons pubis. The final stage, SMR 5, is characterized by extension of the pubic hair to the medial thighs (Neinstein et al. 2008; Kliegman et al. 2016).

8 Normal Menstruation

Menstrual patterns vary from individual to individual. Many young women are unaware of what constitutes a normal menstrual pattern. Additionally, many young women accept abnormal menstrual patterns as "normal" based on familial patterns, when comparing their own menstrual

Fig. 1 Sexual maturity ratings of breast changes (Originally published in: Kliegman et al. 2016; with kind permission of © Elsevier, Inc.)

pattern to that of their mothers, sisters, aunts, etc. From a medical standpoint, the menstrual cycle is considered normal in length if it occurs every 24–38 days. "Frequent menstruation" occurs more often than every 24 days, and "infrequent menstruation" occurs less often than every 38 days (American Congress of Obstetricians and Gynecologists 2014a; Granada et al. 2013).

Young women often present to the medical provider when they note variations in how often they have menses. Even still, many young women become concerned about the regularity of their cycle when they note that, "it always starts on a different day." An individual's menstrual pattern can vary widely. Cycle length can increase or decrease by 2–20 days from the start of the previous menses and still be considered a "regular" cycle (American Congress of Obstetricians and Gynecologists 2014; Granada et al. 2013). If a patient's menstrual cycle persistently varies by more than 20 days, she is considered to have irregular menstrual cycles and to warrant investigation.

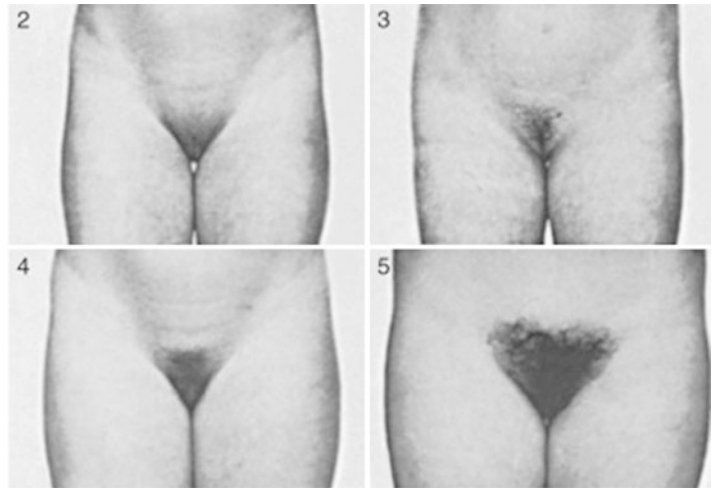

Fig. 2 Sexual maturity ratings of pubic hair changes (Originally published in: Kliegman et al. 2016; with kind permission of © Elsevier, Inc.)

Further, if an adolescent experiences no menstrual bleeding for a 90-day period, it is considered "absent menstrual bleeding," or amenorrhea, and also warrants investigation (American Congress of Obstetricians and Gynecologists 2014b).

Normal duration of menstrual flow is 4.5–8 days (American Congress of Obstetricians and Gynecologists 2014b; Granada et al. 2013). Typically, with normal menses, women experience the heaviest flow on days 1–3. The majority of the uterine content (about 90%) is expelled in the first 3 days of the menses. Normal menstrual flow requires three to six pads or tampons per day. If menstrual bleeding lasts less than 4.5 days, more specifically no longer than 2 days, this is considered to be shortened menstrual bleeding. Menstrual bleeding lasting more than 8 days is considered prolonged menstrual bleeding, and a diagnosis of abnormal uterine bleeding and related work-up should be considered (American Congress of Obstetricians and Gynecologists 2014a).

9 Specific Patterns of Abnormal Menstruation

There are several patterns of abnormal menstruation that commonly present during adolescence. This section will focus on amenorrhea. Although not an abnormal menstrual pattern, dysmenorrhea is quite common during adolescence and often leads to missed school days and can contribute to difficulty in school performance. Dysmenorrhea is usually primary in nature in this age group. Secondary dysmenorrhea is less common, but endometriosis, which was previously thought to occur only in older women, is found in this age group as well.

Abnormal uterine bleeding (AUB), previously known as dysfunctional uterine bleeding, occurs frequently in this age group. When evaluating a patient with AUB, it is important to thoroughly review the pattern of bleeding the patient is experiencing. In evaluating AUB it is essential to determine whether the heavy and/or prolonged vaginal bleeding is a new occurrence or if it has been present since menarche. If heavy menstrual bleeding has been present since menarche, this may indicate an underlying bleeding diathesis, most commonly von Willebrand disease (American Congress of Obstetricians and Gynecologists 2014a). Table 1 lists other symptoms that support further work-up for bleeding diathesis.

10 Amenorrhea

Amenorrhea is defined as the absence of menstruation and can be a sign of various underlying conditions. Amenorrhea can be either primary or secondary. Primary amenorrhea is defined as the

Table 1 Initial screening for underlying bleeding diathesis

History of one or more of the following:	History of two or more of the following:
Postpartum hemorrhage	Increased or easy bruising
Surgery-related bleeding	Petechiae
Bleeding related to dental procedure	Epistaxis
	Hematuria or hematochezia 1–2 times per month
	Frequent gum bleeding
	Family history of bleeding symptoms

Adapted from American Congress of Obstetricians and Gynecologists (2014a)

absence of menses past age 15, in the presence of secondary sexual characteristics. Secondary amenorrhea is the absence of menstruation for 3–6 months in a post-menarchal patient (Neinstein et al. 2008). A thorough history and physical are important in the evaluation of a patient with amenorrhea.

- When obtaining the patient's medical history, a provider should also obtain a detailed menstrual history as well as the menstrual history of close female relatives (Emans et al. 2005).
- It is important to document the patient's course of pubertal development thus far, any history of chronic illness, medication use, history of surgeries, as well as possible treatments for malignancies, endocrine abnormalities, or immunologic conditions.

There are several important aspects of the review of systems to address in patients with amenorrhea.

- These include any history of headaches, visual disturbances, disordered eating, fluctuations in weight, and degree of involvement in sports or exercise and history of acne or hirsutism (Emans et al. 2005).

The exam findings can assist in identifying the underlying cause, whether it is related to hormonal abnormalities originating along the hypothalamic-pituitary-ovarian axis, to a condition that affects the function of the reproductive organs, or to a structural abnormality (Emans et al. 2005).

- The evaluations of the vital signs, height and weight, are useful assessment tools in the evaluation of a patient with amenorrhea. Patients who are underweight may have malnutrition as a consequence of many underlying etiologies, such as neglect or eating disorder; the body mass index (BMI), or the weight in kilograms divided by the square of the height in meters, is an important measurement that can be used in this initial assessment; percentile curves for BMI for girls ages 2–18 have been published by CDC. Short stature and decreased height velocity are often indicators of endocrine abnormality, such as thyroid dysfunction or hypopituitarism; they can also indicate inflammatory bowel disease or other malabsorption syndromes. Signs of Turner syndrome, congenital adrenal hyperplasia, or Cushing syndrome should also be noted (Emans et al. 2005).
- Tanner or SMR staging is necessary for evaluating the presence of secondary sexual characteristics, via breast exam as well as external genital exam (Neinstein et al. 2008; Emans et al. 2005). Compression of breast tissue is recommended to evaluate for galactorrhea, as this may go unnoticed by the patient.
- The external genital exam should include an assessment for clitoromegaly, hymenal patency, and presence of estrogenization of vaginal tissues. The presence of estrogen leads to pink, moist vaginal mucosa, while estrogen deficiency leads to reddened, thin mucosa. In a patient with normal pubertal development and amenorrhea, imperforate hymen typically presents as a bluish bulging mass on external exam or hematocolpos. Menstrual flow can also be prevented by the presence of a transverse vaginal septum, vaginal agenesis, or other müllerian defects. The bimanual exam with insertion of a single finger for cervical and uterine palpation can assist in evaluation for anatomical abnormalities (see chapter "► Gynecologic History and Examination of the Patient").

- If there is concern for anatomical abnormality, if the examination is technically difficult to perform, or if the patient is too uncomfortable with examination, pelvic ultrasound is a useful adjunct to assess anatomy. Although transvaginal ultrasound may provide more detailed images than transabdominal ultrasound, it is not recommended in pre-coitarchal patients. In addition, patients with poor estrogenization may have small reproductive structures that may be difficult to assess with ultrasound. Should the ultrasound demonstrate an abnormality or be inconclusive, magnetic resonance imaging will provide detailed images of the structures in question (Neinstein et al. 2008; Emans et al. 2005).

Patients with secondary amenorrhea should undergo a similar examination. However, because patients with secondary amenorrhea demonstrated previous menstrual flow, the concern for anatomical abnormalities is low (Emans et al. 2005). The index of suspicion for pregnancy should always be high for patients with secondary amenorrhea, as well as for patients with delayed menarche. In addition to the aforementioned approach to the patient with amenorrhea, the use of a short course of progestin is helpful in assessing for the presence of estrogen and an estrogen-primed uterus in patients with amenorrhea and a negative pregnancy test. The "progestin challenge" is not indicated in patients with pubertal delay or in those with estrogen deficiency. Two progestin regimens commonly used are:

- Medroxyprogesterone 5–10 mg PO once daily for 5–10 days
- Micronized progesterone 200–300 mg PO once daily for 10 days

Bleeding usually occurs 2–3 days after completing the progestin course, but can take up to 10 days to occur. Menstruation in response to progestin challenge indicates normal estrogen levels. Of note, patients with ovarian insufficiency or with prolactinoma may have normal menstrual flow after progestin challenge.

- Estradiol level can be obtained as an adjunct, but levels vary depending on which time in the menstrual cycle the level is drawn, and is therefore less helpful (Emans et al. 2005).

Laboratory tests are often indicated in the work-up for amenorrhea (Emans et al. 2005; Neinstein et al. 2008).

- The initial tests include urine or serum human chorionic gonadotropin (HCG) test, a complete blood count (CBC), urinalysis, thyroid-stimulating hormone (TSH), FSH, and prolactin; these should ideally be drawn prior to starting hormones or progestin challenge.
- In patients in whom chronic illness is the suspected etiology for amenorrhea, the initial diagnostic laboratory work-up should also include sedimentation rate, renal function, electrolyte panel, and celiac panel.
  - The HCG level is recommended for primary and secondary amenorrhea work-up, as, although rare, pregnancy can occur prior to menarche. The FSH level will assist in determining whether ovarian function is intact. High FSH levels (typically >20) indicate ovarian insufficiency. Patients with high FSH level should have a repeat level checked in 2 weeks before ascribing this diagnosis; repeat level is not necessary in patients known to have received chemotherapy or radiation. Low or normal FSH levels indicate primary hypothalamic dysfunction or hypothalamic dysfunction that is related to chronic illness, endocrine abnormality, eating disorder, stress, or a central nervous system tumor (Emans et al. 2005; Neinstein et al. 2008) (Fig. 3).

11 Eating Disorders and Disordered Eating in the Adolescents

Disordered eating patterns are common among women of all ages and can go unnoticed by healthcare providers. Disordered eating can progress to eating disorders as defined by the fifth edition of the

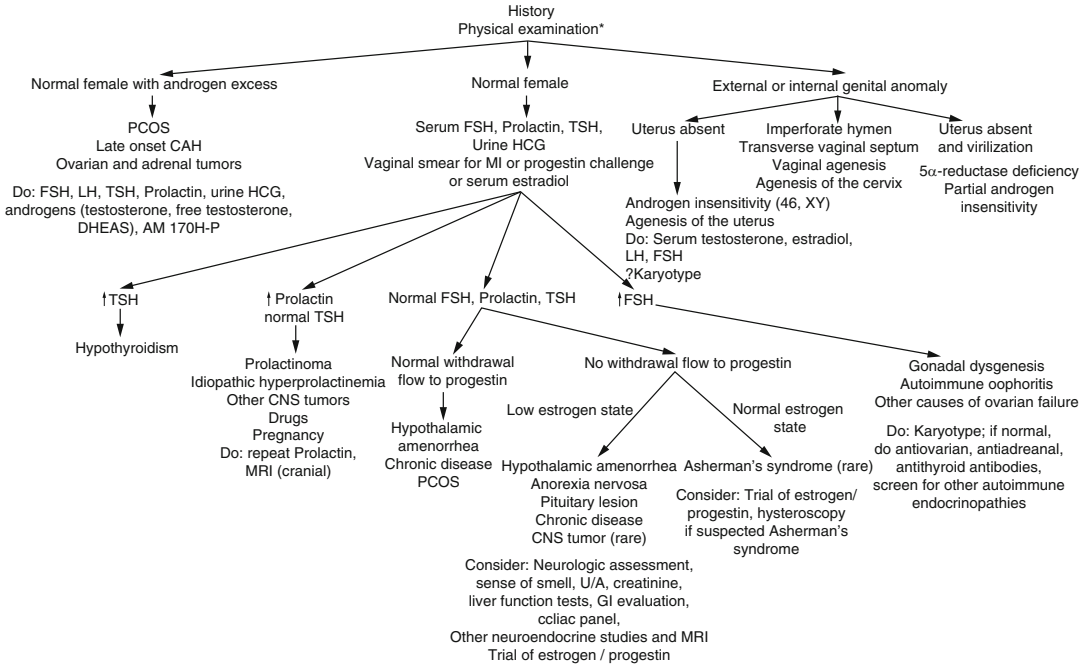

Fig. 3 Summarizes the varied differential for amenorrhea and findings associated with each underlying cause (Originally published in: Emans et al. 2005; with kind permission of © Lippincott Williams & Wilkins)

Diagnostic and Statistical Manual of Mental Disorders (DSM-5), including anorexia nervosa, other restrictive eating patterns, and bulimia nervosa, all of which may lead to oligomenorrhea or amenorrhea. In early adolescence, girls are frequently preoccupied with the appearance of their bodies, especially when compared to their peers; when extreme, this can manifest as an eating disorder. This is also an issue for older teenagers, secondary to anxiety related to separation from their family or support system, and decision-making around career, life goals, etc. (Emans et al. 2005).

> Providers should keep a high index of suspicion for eating disorders in young women with menstrual abnormalities, even in patients with normal body mass indexes, but noted weight loss (Golden et al. 2003).

In addition, providers should be aware of the changes made to the diagnostic criteria of several eating disorders with the publication of the DSM-5. This discussion will focus on the changes related to diagnosis of anorexia nervosa, as those related to the other eating disorders are minor. It is recommended that providers become familiar with the DSM-5 diagnostic criteria, as the diagnosis of an eating disorder can be made with more certainty with the new criteria, and early diagnosis brings hope of appropriate treatment sooner for these patients.

Anorexia nervosa (AN) is characterized by significant fear of gaining weight or becoming fat (American Psychiatric Association 2013). It occurs often in young women and leads to abnormal perception of their body habitus. This leads to difficulty in employing healthy eating habits and often manifesting as either persistent restriction of intake or binging with purging in order to maintain low weight and to prevent weight gain (American Psychiatric Association 2013). The physical manifestations of AN include malnutrition, cachexia, dry skin with poor integrity, hair loss,

thyroid dysfunction, cardiac arrhythmia (most often bradycardia), gastrointestinal dysmotility, constipation, dehydration, electrolyte abnormalities, and, classically, amenorrhea (Rosen 2010; Golden et al. 2003). The DSM-5 removed amenorrhea from the diagnostic criteria for AN for several reasons. First, this criterion was removed to be more inclusive of male patients, as AN has been increasingly recognized in males. Additionally, the diagnosis of AN can be made in premenarchal girls as well as in women using oral contraceptives, which can be used to either induce menses in those with low body mass index or to skip menses with extended cycle dosing. Furthermore, some patients with AN continue to menstruate despite rapid weight loss or low body mass (American Psychiatric Association 2013). The data on the effect of hormone replacement in the treatment of eating disorders is scant and does not provide much clarity.

> The use of hormone replacement for the osteopenia associated with eating disorders has been shown to lead to premature closure of the adolescent growth plates and growth arrest (Golden et al. 2003).

Additionally, the use of hormonal contraceptives for the management of amenorrhea in the context of AN is not recommended by the Society for Adolescent Health and Medicine, as medication-induced monthly menses is counterproductive to the ED treatment plan and falsely reassures patients that they are at a healthy weight (Golden et al. 2003). The best treatment for amenorrhea related to ED or disordered eating, including female athlete triad, is improved nutrition and increase in body mass index.

12 Female Athlete Triad

Although not classified as an eating disorder, the female athlete triad (triad) is an important diagnosis to consider in young female athletes with amenorrhea. The triad is a constellation of findings common to competitive athletes and consists of disordered eating, amenorrhea, and osteoporosis (Drinkwater et al. 2005). It can occur in young women participating in any sport, but is more commonly noted in ballet dancers, gymnasts, and runners. Amenorrhea in the triad is most often caused by hypothalamic hypofunction that occurs as the body redirects energy to maintain essential bodily functions such as cardiac output and blood flow to the brain, in those participating in intense athletic activity and training (Witkop and Warren 2010). Interestingly, the time of onset of sports participation with respect to menarche can be a factor in the development of the triad. Girls who begin athletic training prior to menarche are noted to have a delay in menarche by 5 months for each year of athletic training. Conversely, the rate of amenorrhea is lower for girls who begin athletic training after menarche (Emans et al. 2005; Nattiv et al. 2007).

At-risk athletes develop a preoccupation with improving their performance and often employ disordered eating patterns to decrease their body mass or body fat. Disordered eating can be the result of restrictive eating by means of a frank eating disorder, such as AN or bulimia nervosa, or by periodic purging, binging, fasting, or subclinical eating (dieting) (Emans et al. 2005). Alternatively, athletes can increase their energy expenditure to achieve weight loss by increasing the intensity of their training regimen without increasing nutritional intake (Drinkwater et al. 2005). Although weight loss can be intentional, often adolescent athletes develop the triad unintentionally as they are unaware of the need for increased intake to support their metabolic needs while training for sports; typically, their intake would be sufficient for an adolescent who does not engage in sports.

- Providers can assist athletes in preventing or reversing this effect by reviewing nutritional recommendations to maintain healthy weight and to prevent energy deficits in those with intensive training regimens (Nattiv et al. 2007; Drinkwater et al. 2005).

As previously discussed, pubertal changes are also associated with increase in vertical growth and height (Neinstein et al. 2008). This growth is supported by good nutrition, including adequate protein intake, as well as various other nutrients (Kliegman et al. 2016). The nutrients that are important to bone growth are calcium and vitamin D; estrogen also plays a large role in bone growth (Witkop and Warren 2010). In addition to lower-than-expected BMI, poor nutrition in the triad leads to osteopenia or osteoporosis, increasing the risk for and incidence of stress fractures (Nattiv et al. 2007).

- Providers should have a high index of suspicion for osteopenia and should consider evaluating bone mineral density (BMD) with dual energy X-ray absorptiometry scan or equivalent method in order to make recommendations regarding bone health in the adolescent athlete with amenorrhea (Emans et al. 2005).
  - As expected, risk of osteoporosis can be decreased with adequate intake of calcium and vitamin D (Nattiv et al. 2007). Improved body weight with good nutrition leads to increased bone formation. Additionally, bone resorption decreases once the adolescent notes return of regular menstruation, which is also achieved with good nutrition (Witkop and Warren 2010). Because these young women experience a period of poor bone growth, the reversal in BMD after treatment remains below average when compared to healthy peers in the long term (Drinkwater et al. 2005).

13 PCOS in the Adolescent

In more recent years, increasing rates of obesity have highlighted metabolic changes in adolescents that often lead to secondary amenorrhea and increased consideration of polycystic ovary syndrome (PCOS) as an underlying diagnosis (Auble et al. 2013). However, there is much controversy with respect to ascribing this diagnosis to adolescents. The current diagnostic criteria outlined by Rotterdam, the National Institute of Health, and the Androgen Excess Society cannot be applied to adolescents. The reason for the controversy is multifactorial. During adolescence, and more specifically, during puberty, an individual typically undergoes many normal changes that may be confused with PCOS. This can lead to either overdiagnosis of PCOS in patients experiencing natural fluctuations in function that occur with puberty or underdiagnosis of PCOS in patients who are thought to be experiencing puberty-related changes well after the usual timeline of events (Auble et al. 2013).

> Amenorrhea, oligomenorrhea, and other patterns of irregular menstruation secondary to anovulatory cycles are common in the first few years after menarche (Hardy and Norman 2013).

Another confounder that complicates PCOS diagnosis is obesity, which often leads to anovulatory cycles in this age group. The majority of young women, about 95%, have regular menstrual cycles (see definitions under Sect. 8) once they reach a gynecologic age of 3 years (gynecologic age = current age – age of menarche). This information may be helpful in diagnosing PCOS more accurately by restricting its application to young women who have a higher gynecologic age, thereby removing normal post-menarchal menstrual variability as a confounder (Hardy and Norman 2013).

An ultrasound of the ovaries is often obtained in an effort to diagnose PCOS in adult women (Auble et al. 2013; Hardy and Norman 2013). However, a polycystic appearance of the ovary on ultrasound is common during adolescence. Ovarian volume increases with menarche, as does the antral follicle count, leading to a "polycystic appearance" when visualized by ultrasound. These changes persist for some time after menarche, and the size of the ovaries and the number of antral follicles slowly decrease as a woman ages.

Therefore, while ultrasound for identification of "polycystic ovaries" may be more useful for diagnosis of PCOS in older women, it is generally not indicated in adolescents (Auble et al. 2013; Hardy and Norman 2013).

Hyperandrogenism typically manifests as acne, hirsutism, hair loss, and/or male pattern baldness (Hardy and Norman 2013). Regarding hirsutism, it is important to take into account the patient's ethnic background, as well as familial patterns of hair growth. The Ferriman-Gallwey score (see graphic in chapter "▶ Workup and Management of Polycystic Ovary Syndrome") is typically used to grade the degree of hirsutism across different areas of the body; however, this tool was validated in use for Caucasian women and may not be applicable to patients from other ethnic backgrounds. Evaluation for hyperandrogenism involves clinical exam as well as assessing for elevated serum androgen levels, including free and total testosterone and dehydroepiandrosterone sulfate (DHEAS) and, in some cases, 17-beta-OH-progesterone and androstenedione. Documented evidence of hyperandrogenemia is the "most useful diagnostic feature in adolescents given that menstrual irregularity, ovarian morphology and clinical hyperandrogenism do not correlate strongly with PCOS in this population" (Hardy and Norman 2013).

Obesity can complicate some of the relevant natural changes seen in puberty. Hormonal abnormalities seen in early puberty can persist past puberty in patients, leading to increased peripheral estrogen production and menstrual abnormalities (Kansra and Menon 2013; Khan 2007). In addition, obesity often leads to hyperinsulinism and insulin resistance, which may manifest as acanthosis nigricans. Insulin is a hormone with gonadotropic effect that synergizes LH activity. Thereby, hyperinsulinism can disturb normal ovarian function, lead to menstrual abnormalities, and disrupt fertility. In addition, hyperinsulinism decreases hepatic production of sex hormone-binding globulin, resulting in increased free testosterone levels, again manifesting in signs of hyperandrogenism such as acne and hirsutism, and altering menstruation (Kansra and Menon 2013; Khan 2007).

Although diagnosis can be difficult in this age group, providers continue to diagnose and treat PCOS or adolescents "at risk for PCOS" in an effort to decrease the long-term risk of cardiovascular morbidity and mortality secondary to comorbid conditions such as insulin resistance, type 2 diabetes mellitus, dyslipidemia, metabolic syndrome, cardiovascular disease, and endometrial cancer (Auble et al. 2013; Hardy and Norman 2013; Kansra and Menon 2013). Treatment modalities utilized by providers include weight management through lifestyle modification, contraceptives, antiandrogens, and/or metformin. Other special considerations in the adolescent population include increased rates of poor self-image, cosmetic issues, and the impact of these on the development of depression and anxiety in patients diagnosed with PCOS. As with older patients, adolescents with PCOS are also concerned with the effect of their diagnosis on their fertility, even though they may not be seeking pregnancy in the near future. In addition to counseling patients related to its diagnosis and treatment, providers should take time to counsel adolescents with or at risk for PCOS about comorbid conditions and related outcomes (Auble et al. 2013; Hardy and Norman 2013; Kansra and Menon 2013).

14 Adolescent Sexuality

Sexuality is a complex construct. It is a manifestation of the physical development and emotional maturation noted during puberty and encompasses a secure sense of self and the manner in which one interacts with others (ACT for Youth Center for Excellence 2015; Emans et al. 2005). Sexuality and sexual orientation become important as an adolescent completes puberty, but gender identity develops much sooner. Gender identity develops very early in childhood and refers to a person's sense of self as male, female, etc. For the majority of humans, gender identity is aligned with their physical sexual characteristics or genitalia or their gender assigned at birth. For

the small subset of people with gender dysphoria, there is a mismatch. Persons who identify as female but were born with male genitalia are termed transgender female. Likewise, transgender male refers to those who identify as male but were born with female genitalia. Although the two are often conflated, gender identity is a basic defining characteristic that is completely independent of sexual orientation. Sexual orientation refers to one's sexual or romantic attraction to others and can manifest as attraction to the opposite gender, same gender, both genders, etc. During adolescence, it is common for youth to experiment with partners from either the same or opposite gender. Such behaviors during adolescence do not predict behaviors, preferences, or identities in adulthood.

- The provider can utilize the HEADSS interview to discuss the adolescent's sexuality and sexual practices, as well as counseling pertaining to all aspects of sexual health; gender identity can also be addressed during the HEADSS exam when it presents as a concern (ACT for Youth Center for Excellence 2015; Emans et al. 2005).

15 Helping Adolescents Choose Effective Contraception

The increased use of contraceptives in the adolescent population has been paramount in decreasing the teen pregnancy rate in the United States (Centers for Disease Control and Prevention 2011). According to the most recent data from the CDC, there has been a 60% decrease in the overall birthrate between 1991 and 2013 (Centers for Disease Control and Prevention 2015a). Despite this decrease, the United States still has one of the highest teen birthrates among industrialized nations. The vast majority of teen pregnancies are unintended and about one-third end in termination (Centers for Disease Control and Prevention 2015a). Teen pregnancy and teen childbearing cost the US health-care system billions of dollars per year (The National Campaign to Prevent Teen and Unplanned Pregnancy 2015b).

Many medical societies including ACOG and the American Academy of Pediatrics recommend the use of long-acting, top-tier contraceptive methods for sexually active adolescents (American College of Obstetricians and Gynecologists 2012a; American Academy of Pediatrics 2014).

There are many benefits for the adolescent in using a top-tier contraceptive method. These include highly effective contraception, increased rates of continuation of contraception, the use of a discrete contraceptive method, and greatly increased ease of use (American College of Obstetricians and Gynecologists 2012a; American Academy of Pediatrics 2014). The data from the Contraceptive Choice Project provides evidence that supports the use of long-acting contraceptive methods, as long-term contraceptive use was also associated with lower pregnancy and termination rates. The study demonstrated that when women of all ages were provided with structure contraceptive counseling discussing methods in order of efficacy, women were most likely to choose a top-tier method for contraception (an intrauterine device or the hormonal implant) (Diedrich et al. 2015). In addition, the Contraceptive Choice Project demonstrated that the continuation rate for long-term, top-tier contraceptive methods was significantly higher compared to methods other than the IUDs/implant (Diedrich et al. 2015).

Providers must take into consideration the patient's needs and assist the patient in choosing a method that suits her lifestyle. Providers can utilize the Centers for Disease Control and Prevention's Reproductive Life Plan Tool with adolescent and young adult women, just as with older women (Centers for Disease Control and Prevention 2014). Importantly, asking young women to provide an answer to the question "When do you plan on having your first (or next) child?" often prompts young women to consider contraception. The Adolescent Health Working Group recommends initiating the discussion on contraception by discussing what methods the adolescent patient is aware of and what method she is interested in

(Monasterio et al. 2010). When providing contraceptive counseling, CDC and ACOG recommend that providers present the patient with a "menu of options" of contraceptive methods (American College of Obstetricians and Gynecologists 2012a).

- These organizations also recommend discussing contraceptive options from most effective to least effective at preventing pregnancy, including a discussion of their associated benefits and side effects.

The National Campaign to Prevent Teen and Unintended Pregnancy reiterates the above contraceptive counseling recommendations, with additional recommendations collected via focus groups with women of reproductive age to help providers increase utilization of long-acting contraceptive methods (The National Campaign to Prevent Teen and Unplanned Pregnancy 2015a). In addition to reviewing a young woman's reproductive life plan, providers should discuss the patient's needs, concerns, and expectations about the contraceptive methods they are interested in. This is paramount in aiding her to choose the best method for her and should be assessed early in the conversation.

Providers should focus on the hormonal implant and the IUDs first in contraceptive counseling, emphasizing that these methods are "low maintenance" and require no further action by the patient after placement.

It is recommended that providers relay other women's experiences with the methods discussed to provide information on how it will feel for the patient herself, as well as for her partner(s). Discussing the reversibility of the contraceptive method and counseling the patient on when fertility will return with discontinuation of the method are quite important, especially to young women (The National Campaign to Prevent Teen and Unplanned Pregnancy 2015a). Providers are encouraged to refer to the National Campaign's website for contraceptive counseling tips as well as the chapters in this text which review contraceptive methods, for full details regarding use, benefits, contraindications, and side effects.

16 Emergency Contraception

Emergency contraception (EC) is a contraceptive method used to prevent pregnancy after unprotected intercourse.

- Its use is indicated in sexual assault, unprotected vaginal intercourse, and contraceptive failures, including inappropriate use of hormonal contraceptives and barrier method malfunction (Committee on Adolescence 2012; American College of Obstetricians and Gynecologists 2015). Hormonal contraceptive efficacy decreases greatly when oral contraceptive pills are missed for three consecutive days, when the contraceptive patch is off for more than 24 h, or the contraceptive ring is out for more than 3 h.

There are three commonly used forms of EC that can be utilized within 5 days or 120 h of unprotected intercourse: the levonorgestrel tablet, the ulipristal acetate tablet, and the copper IUD (Monasterio et al. 2010; American College of Obstetricians and Gynecologists 2015).

- The levonorgestrel tablet is available under several brand names and is available for use by prescription or over the counter. Levonorgestrel is a progestin that is effective as EC when given as a single 1.5 mg oral dose within 120 h of unprotected intercourse (Committee on Adolescence 2012; American College of Obstetricians and Gynecologists 2015). Levonorgestrel is 98.9% effective when taken within 72 h of unprotected intercourse. Efficacy decreases somewhat between 72 and 120 h after unprotected intercourse, but studies show it is still effective as EC. The side effects noted with levonorgestrel when used as EC include nausea, vomiting, heavier menstrual bleeding, and spotting (Committee on Adolescence 2012; American College of Obstetricians and Gynecologists 2015).

- Ulipristal acetate is a selective progesterone receptor modulator that prevents follicular development and ovulation (Committee on Adolescence 2012; American College of Obstetricians and Gynecologists 2015). It also decreases the thickness of the endometrial lining and may affect implantation. One dose of ulipristal 30 mg orally within 120 h of unprotected intercourse is just as effective as levonorgestrel as EC. Unlike levonorgestrel, however, ulipristal's efficacy remains high as EC when administered between 72 and 120 h after unprotected intercourse; it also may be used in women with BMI up to 30 kg/m^2, without a decrease in efficacy (American College of Obstetricians and Gynecologists 2015). The most common side effects noted with ulipristal are headache, nausea, and abdominal pain. If vomiting occurs within 3 h of administration, it should be re-dosed. Of note, animal studies have shown fetal loss in the first trimester with ulipristal; however no human data is available. There are no reports of fetal malformation with ulipristal use (Committee on Adolescence 2012; American College of Obstetricians and Gynecologists 2015; Fisher and Lara-Torre 2013).
- The copper IUD can be used for EC in a patient who is seeking EC and is also interested in long-term contraception (Monasterio et al. 2010). Providers should consider the copper IUD for EC in overweight or obese patients, as effectiveness of levonorgestrel may be decreased in overweight (BMI $\geq$25 kg/m^2) or obese (BMI $\geq$30 kg/m^2) patients and the effectiveness of ulipristal acetate may be decreased in obese patients (American College of Obstetricians and Gynecologists 2015). The copper IUD can be placed for EC within 5–7 days of unprotected intercourse and should not be affected by patient weight or BMI. As with routine IUD placement, use is contraindicated in patients with symptoms of cervicitis/PID, current diagnosed sexually transmitted infection (STI), history of STI in the last 3 months, or at high risk of contracting STI. Please refer to chapter "▶ Contraception and Family Planning" for more information on IUD placement (Monasterio et al. 2010).

Providers should use visits for EC as an opportunity to discuss the patient's reproductive life plan, to discuss more reliable contraceptive methods, and to screen for sexually transmitted infections. When prescribing EC, providers should counsel patients on the indication, use, and side effects (Committee on Adolescence 2012). In addition, for patients who prefer to use barrier method or are unable to choose more reliable methods of contraception, it is recommended that the provider prescribe EC for immediate use in case of future unprotected intercourse; levonorgestrel is commonly prescribed and covered by most medical insurance. Studies have shown that providing adolescents with advanced prescriptions increases the likelihood of EC use, decreases the rate of teen pregnancy, and does not increase risky sexual behavior (American College of Obstetricians and Gynecologists 2015; Sanfilippo and Lara-Torre 2009).

17 Sexually Transmitted Infections: Special Considerations in Adolescents

The rates of sexually transmitted infections (STIs) in the United States are highest among those ages 15–24 years (Workowski and Bolan 2015). The high prevalence of STIs in this age group is attributable to high-risk sexual behaviors commonly observed in adolescents. Although adolescents often have many sequential short duration sexual relationships, they also may continue to have multiple sexual partners; they may engage in sexual intercourse while under the influence of various substances, and consequently they often have low rates of condom use. The most incident STI in this age group is human papillomavirus (HPV), followed by chlamydia, and then gonorrhea (see chapter on STI for more information). Most often, patients who are symptomatic seek care and obtain treatment. However, because chlamydial infections, and at times gonorrheal infections,

are often asymptomatic, they frequently go unnoticed, again increasing the STI burden in this population. For this reason, CDC recommends that asymptomatic adolescents should have chlamydia and gonorrhea screening once a year. Recommended STI screenings for sexually active adolescent females are summarized in the table below. These recommendations are based on CDC recommendations published in the 2015 STI treatment guidelines (Workowski and Bolan 2015). Providers should refer to the chapter on STIs for a full review of symptoms, screening, and management (Table 2).

In addition to high-risk sexual behavior, research has shown that there are several biological and anatomical factors that contribute to the higher rates of STIs in adolescents (Hwang et al. 2009). During puberty, the cervical epithelium undergoes squamous metaplasia by which the columnar epithelial tissue transforms into squamous epithelial tissue. The transformation zone, or ectropion, is visible at the cervical os in early adolescence and becomes less visible with pubertal maturation. The columnar cells of the cervical epithelium are typically the site of infection with chlamydia and gonorrhea. Interestingly, the transformation zone is also the target for HPV infection, as the cells undergo frequent replication and differentiation (Hwang et al. 2009).

During puberty, the vaginal pH shifts from a less acidic to a more acidic pH, less than 4.5 (Moscicki et al. 2001). This physiologic change is thought to trigger squamous metaplasia.

It is thought that prevention of this pH change delays cervical maturation; one theory is that frequent exposure to alkaline conditions, such as bacterial vaginosis or semen, can lead to delay of cervical maturation and increase risk for STIs.

In addition to pubertal changes, several external factors have been noted to affect cervical maturation. Cervical maturation has been noted to progress more quickly in the presence of STIs secondary to inflammation, which also increases susceptibility to more infection (Moscicki et al. 2001). Conversely, hormonal contraceptive use and smoking have been noted to delay cervical

Table 2 Routine STI screening for adolescent females (noted in table already)

Routine STI screening for adolescent females	
Chlamydia trachomatis	Annual screening for all sexually active females <25 years
	More frequent testing (every 3–6 months) for symptomatic patients and for high-risk patients:
	Multiple sexual partners
	STI clinic patients
	Adolescent clinics
	Correctional facilities
Neisseria gonorrhoeae	Annual screening for all sexually active females <25 years
	More frequent testing (every 3–6 months) for symptomatic patients and for high-risk patients:
	Multiple sexual partners
	STI clinic patients
	Adolescent clinics
	Correctional facilities
Human immunodeficiency virus (HIV)	Annual screening for all sexually active females <25 years
Treponema pallidum (syphilis)	Screening only recommended for pregnant females
	Testing recommended for symptomatic patients
Human papillomavirus (HPV)	Routine HPV screening not recommended
	Initial Papanicolaou (Pap) test recommended at age 21[a]
Other STIs:	Screening not recommended for asymptomatic patients
Hepatitis B	Testing recommended for symptomatic patients
Hepatitis C	
Herpes simplex virus	

Adapted from Workowski and Bolan (2015)
[a]Based on harmonized ACOG, American Cancer Society and US Preventive Services Task Force recommendations

maturation and prolong the presence of the cervical ectropion, again prolonging increased risk for STI transmission (Moscicki et al. 2001; Hwang et al. 2009).

18 Expedited Partner Therapy in Adolescents

The treatment of sexual partners of patients diagnosed with chlamydial or gonorrheal infections is known as expedited partner therapy (EPT) and is endorsed by CDC (Centers for Disease Control and Prevention 2015c).

The practice of EPT is quite important in the care of adolescents, as access to care can be difficult for this age group as discussed above. The use of EPT is also paramount for the prevention of the spread of infections, as well as decreasing rates of reinfection. The practice of EPT is permissible in the majority of the United States. The CDC provides up-to-date information on the legal status of EPT, including those states that prohibit the practice and those states in which it is permissible or potentially allowable. By June of 2015, EPT remained prohibited in only four states: Florida, Kentucky, Ohio, and West Virginia (Centers for Disease Control and Prevention 2015c).

CDC has several recommendations for ways in which providers can provide services to partners and recommends treatment for male partners of female patients with gonorrheal or chlamydial infections (Centers for Disease Control and Prevention 2015c).

- Firstly, it is recommended that the patient receive treatment in the office as well as educational material, discussion of ways in which infections can be prevented in the future, and discussion of how to approach their sexual partner(s) so that they may also be treated. Providing the patient with information for her partner has been shown to increase rates of the partner seeking and receiving treatment for STI.
- If the patient is to return to the office for positive results and treatment, it is recommended that the provider contact the patient before the visit, notify her of the positive result(s), and encourage her to return for treatment with her partner; this facilitates evaluation and in-office treatment for the patient's sexual partner. This may be difficult for patients who have multiple sexual partners; CDC recommends providing educational material on STI and resources for STI testing and treatment to be issued to all partners in such cases. These methods can be employed for chlamydial, gonorrheal, syphilis, and HIV infection (Centers for Disease Control and Prevention 2015c).

With respect to chlamydial and gonorrheal infections, a method of EPT called patient-delivered partner therapy (PDPT) can be utilized for treating male partners of female patients (Centers for Disease Control and Prevention 2015c; Workowski and Bolan 2015).

- Providers can treat the patient in the office with the appropriate antibiotics: azithromycin 1 g orally once in the office for chlamydial infection.
- Ceftriaxone 250 mg intramuscularly once plus azithromycin 1 g orally once in the office for gonorrheal infection.

Where legal, the provider can then provide PDPT to the patient that she will then deliver to her sexual partner(s). The PDPT consists of medication that is packaged and labeled with instruction on use as well as treatment instructions, warning about medication use (for partners who are pregnant or have medication allergy), educational material on the STI, and material recommending that the partner seek care for any STI symptoms.

- The medications used for PDPT include azithromycin 1 g orally once for chlamydia

treatment or cefixime 400 mg orally once and azithromycin 1 g orally once for gonorrhea treatment (Centers for Disease Control and Prevention 2015c; Workowski and Bolan 2015).

19 Cervical Cancer Screening in Adolescents

Infection with human papillomavirus (HPV) is quite common in sexually active young women. Despite this, the recommendations for cervical cancer screening with the Papanicolaou (Pap) test have changed in recent years (American College of Obstetricians and Gynecologists 2010; Snook et al. 2012).

Pap testing for cervical cytology in healthy young women is not recommended until age 21 years. In addition, routine HPV testing is not recommended when screening adolescents. This recommendation is based on the high rates of HPV infection in this age group and the high rates of spontaneous resolution; 90% of HPV infection in this age group will resolve without treatment.

- Special considerations apply to patients with HIV infection, immunocompromised states (such as organ transplant) or on chronic immunosuppressants, as such patients require alternate screening schedules. Adolescents with HIV infection require two Pap test in the first year following infection (every 6 months) and annually thereafter if the previous Pap tests were normal.
- Immunocompromised adolescents should also have two Pap tests within the first year after first intercourse, then annually if the Pap tests were normal (American College of Obstetricians and Gynecologists 2010; Snook et al. 2012).

20 HPV Infection and Vaccination

Infection with HPV is the most common STI in sexually active patients (Centers for Disease Control and Prevention 2015b; Workowski and Bolan 2015). There are about 100 types of the HPV virus, 40 of which lead to genital infections. Most HPV infections are asymptomatic and are easily cleared by the body. A sexually active individual may become infected with HPV several times because of this (Workowski and Bolan 2015). Despite this, there are several high-risk strains of HPV that can lead to persistent genital infection. These strains are associated with anogenital warts as well as several types of malignancy, including oropharyngeal, penile, cervical, vaginal, and anal cancers. A vaccine was developed in an attempt to decrease the burden of disease associated with high-risk HPV infection (Centers for Disease Control and Prevention 2015b). There are now three HPV vaccines available that are given as a series of three shots over 6:

- Gardasil® 9, approved in 2014, protects against HPV types 6, 11, 16, 18, 31, 33, 45, 52, and 58.
- Gardasil® 4, approved in 2006, protects against HPV types 6, 11, 16, and 18.
- Cervarix®, approved in 2009, protects against HPV types 16 and 18. Cervarix® is only recommended for female patients.

By providing protection against infection with HPV types 16 and 18, the vaccines protect against infection with the strains that cause 66% of cervical cancers. The addition of the five strains in Gardasil 9 adds protection against infection with strains associated with 15% of cervical cancer. The vaccines that contain strains 6 and 11 provide protection against HPV strains that cause 90% of anogenital warts, which can progress to cancers of the affected areas as listed above (Centers for Disease Control and Prevention 2015b; Workowski and Bolan 2015).

The HPV vaccines are generally well tolerated and are very effective at preventing HPV infection (Centers for Disease Control and Prevention

2015b). The vaccine series is generally recommended for patients between the ages of 9 and 26 years and is covered by most health insurance plans. There are few reported side effects with the HPV vaccine. These include pain at the injection site, fever, headache, fatigue, nausea, and muscle and joint pain (Centers for Disease Control and Prevention 2015b).

21 Special Consideration: Intimate Partner Violence and Sexual Assault

Most often, despite the fact that adolescence is a time when many individuals begin to show romantic interest in others and begin dating, little is discussed with them by providers about healthy relationships (Monasterio et al. 2010).

The provider can be an important role model for the adolescent who can discuss what a healthy relationship means. The Adolescent Health Working Group recommends that providers relay simple messages about healthy relationships to adolescents by discussing some of the following:

- Two people who are partners in a relationship together are equals.
- Partners should be flexible with each other, especially regarding role behaviors.
- Partners should not assume an attitude of ownership toward the other.
- Partners should be encouraging toward each other and avoid manipulating or exploiting each other.

Often it is difficult for adolescents (and providers) to discuss such personal information on the initial office visit. These aspects of sexual history can and should be revisited at each office visit, especially as rapport improves. By discussing sexuality and healthy relationships openly, providers can help to prevent the adolescent from experiencing intimate partner violence, sexual assault, or sexual abuse (Monasterio et al. 2010; American College of Obstetricians and Gynecologists 2012b).

Intimate partner violence (IPV) affects both women and men from all age groups, socioeconomic groups, ethnicities, religion, sexual orientation, and levels of educational background (American College of Obstetricians and Gynecologists 2012b). The American College of Obstetricians and Gynecologists (ACOG) defines IPV as "a pattern of assaultive behavior and coercive behavior that may include physical injury, psychological abuse, sexual assault, progressive isolation, stalking, deprivation, intimidation, and reproductive coercion." These behaviors can be carried out by someone who is, was, or wishes to be in an intimate relationship with the victim. In addition, these behaviors occur as a means of exerting control over the victim. Adolescents are at high risk of IPV, as they are at a developmental stage where they seek relationships before they have a firm grasp of their personal identity. This trait makes them susceptible to manipulation by their partners. It is reported that one in ten high school females who are dating and one in five who are sexually active have experienced IPV in a given year; this includes IPV as defined above, as well as verbal and emotional abuse. Strikingly, these females are at increased risk of pregnancy, STI, substance use or abuse, and mental health issues, including suicidal ideation and attempt (Monasterio et al. 2010). Adolescents are manipulated by partners in many ways, including:

- Monitoring cell phone or social media use
- Digital dating abuse:
  - Posting sexual content (photos and/or videos) on social media against one's will
  - Stalking and/or humiliating through social and online networks
- Dictating what clothing is worn or even one's school attendance
- Manipulating contraception use (condoms as well as hormonal methods)

During adolescence, IPV perpetrators are equally likely to be male or female. In this age

group, mutual aggression is common, and females are likely to be victims of physical abuse, while males are likely to be victims of psychological abuse (Monasterio et al. 2010). In addition, adolescents are commonly victims of IPV when their partners are older. Other factors that put adolescents at risk include substance abuse, low self-esteem, previous history of IPV, engaging in intercourse before age 15, having multiple partners, and pregnancy (Moscicki et al. 2001; American College of Obstetricians and Gynecologists 2012b).

Because IPV is so common, it is important for providers to routinely screen patients for IPV (American College of Obstetricians and Gynecologists 2012b). Once IPV is identified, providers should assess the safety of the patient and discuss involving the parents in the discussion and care. The provider can also use this encounter to educate the patient on IPV and ways to prevent it from recurring. If the adolescent is a minor, it is important for the provider to consider reporting the case as child abuse to child protective services. For adolescents over age 18, providers can report IPV in certain states, and providers should be aware of local laws pertaining to IPV (Moscicki et al. 2001; American College of Obstetricians and Gynecologists 2012b).

Sexual abuse or sexual assault can occur as IPV or they can be independent of IPV (Moscicki et al. 2001; American College of Obstetricians and Gynecologists 2012b). Sexual abuse typically refers to the performance of a sexual act on a minor that is perpetrated by an adult. Though sexual abuse will not be discussed in this section, providers should be aware that they are mandated to report sexual abuse to child protective services. Sexual assault is any sexual contact that is nonconsensual and may include rape. Providers should be aware of local definitions as they vary by state (Kaufman 2008). Sexual assaults of adolescents are typically perpetrated by someone known to the adolescent, and victims commonly report substance use around the time of assault. It is estimated that 44% of rape victims are minors and in these cases, reporting is mandatory.

For those over age 18, cases can be reported to local police; however some victims may not want to file a police report. Providers should be prepared to refer victims of sexual assault for a forensic exam within 72 hours to collect specimens if they are not equipped for and/or trained in such procedures; forensic exams are often performed at hospitals. Providers should provide EC to female victims as well as empiric treatment for chlamydial and gonorrheal infections and offer postexposure prophylaxis for possible HIV infection. The provider should also consider referral to mental health services, as posttraumatic stress disorder is common in victims of sexual assault (Moscicki et al. 2001; American College of Obstetricians and Gynecologists 2012b; Kaufman 2008).

22 Conclusion

Adolescence is a dynamic period of life with many physical and emotional variations. This makes the care of the adolescent or young adult patient intriguing and satisfying. The gynecologic care of adolescents includes conditions common to adult women, as well as conditions unique to the adolescent physiology. The adolescent is greatly affected by psychosocial factors, and this effect is more notable because of the adolescent's inherent inclination toward risk taking. Despite their independent nature, adolescents often look to providers as trusted adults to whom they can turn for advice and guidance, as well as for management of both common and unique medical conditions. Providers are encouraged to engage with their adolescent and young adult patients and to utilize the resources outlined in this chapter in their care.

23 Cross-References

- ▶ Abnormal Vaginal Bleeding During the Early Reproductive Years
- ▶ Anatomy of the Female Genital System

- Congenital Adrenal Hyperplasia in the Adolescent
- Contraception and Family Planning
- Diagnosis and Management of Endometriosis
- Gynecologic History and Examination of the Patient
- Hyperandrogenism: Acne and Hirsutism
- Management of Acute Pelvic Pain: Torsion, Infection, and Rupture of Tubal or Ovarian Mass
- Management of Pelvic Pain, Dyspareunia, and Endometriosis
- Preconception Care: In the Continuum of Women's Healthcare
- Sexually Transmitted Diseases: Diagnosis and Work-Up (GC, Chlamydia, Herpes, HPV)
- Workup and Management of Polycystic Ovary Syndrome

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