

Mini-Review

Adolescent Chronic Pelvic Pain

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Abstract. The presentation of chronic pelvic pain in the adolescent can at times be quite daunting. A careful and insightful approach to obtaining the history and physical examination must be implemented while maintaining an appreciation of the various stages of adolescent development. The etiologies can range from gynecologic to nongynecologic causes. The ability to render an early diagnosis and appropriate treatment in this population of patients can significantly improve future reproductive health outcomes. The following minireview will outline a systematic approach to the adolescent with chronic pelvic pain.

Key Words. Adolescent gynecology—Chronic pelvic pain—Endometriosis—Dysmenorrhea

Introduction

Chronic pelvic pain is a common and significant problem in women and can be a challenging clinical problem for health care providers. It has a prevalence of 14–16% in the general population. It is the main indication in 12% of the 600,000 hysterectomies performed annually in the United States and accounts for up to 60% of laparoscopies.¹

In the adolescent population (ages 11 to 21) approximately 3–5% of all visits to a primary care provider are for complaints of abdominal pain.² Early adolescence is characterized by the onset of puberty, with changes in the body due to menarche, thelarche, and adrenarche. Concomitantly, psychological changes occur as the adolescent girl's sense of self and body image develops. It is also a time of increasing independence from parents. Chronic pelvic pain in adolescents poses more challenges for health care providers, because treatment of the adolescent requires knowledge

of the developmental stages of this population. Although, in young women, lower abdominal pain is usually attributed to gynecologic disorders, physicians are often reluctant to obtain gynecologic histories and perform pelvic examinations. This tends to compound the difficulty of dealing with adolescents. The provider-patient relationship is also affected, because the involvement of parents in the patient's care can lead to confidentiality issues.

The biological and psychosocial changes seen in the adolescent age group bring about both similar and very different etiologies to chronic pelvic pain when compared to adults. Gynecologic causes of pelvic or lower abdominal pains are rare in pre-pubertal children and infants. As a result, the following review will focus on the approach to the adolescent chronic pelvic pain patient and address some of the more common etiologies.

History and Physical Examination

In an ideal situation, the clinician has had the opportunity to develop a rapport with the adolescent patient prior to a visit for pelvic pain. Many times, however, a gynecologist or subspecialist may be meeting the patient and her family for the first time. In either situation, it is important to establish the fact that the teenager is the patient and her feelings and views are the most important. Most of the time parents will accompany the patient to the visit, and this gives the health care provider the opportunity to explain patient confidentiality to both the parents and the patient. The goal is to establish the trust of both the parent and the patient by being open about the fact that confidentiality will be maintained with both parties unless the situation is life-threatening.

The history of the present illness for an adolescent is very similar to that of an adult. Questions should include character, intensity, timing, location, radiation, and duration of the pain. The chronology of different symptoms is also important to ascertain. The relationship of pain to the menstrual cycle if present,

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gastrointestinal or urinary symptoms, and stress should also be determined. Any significant past medical history and family history should be obtained. A family history of endometriosis, depression, interstitial cystitis, lupus, or cancer is pertinent. A thorough history addressing sexual activity, dyspareunia, pregnancy, sexual or physical abuse, and alcohol or drug use must be obtained, but this history should be discussed with the patient alone in order to reiterate confidentiality regarding this aspect of her life, as well as to obtain honest answers. A teenager may not feel comfortable answering these questions on the initial visit. These questions may be deferred to subsequent visits after a trustworthy rapport is established. Previous medical or surgical treatments and the patient's response to them should be discussed. The impact of pain on the patient's school performance, extracurricular and social activity, sleep, mood, and family interactions should also be explored.

The physical examination will differ slightly for patients depending on the differential diagnoses determined by history. The abdominal examination should begin by asking the patient to point to the area of pain with a single finger. The abdomen should then be examined for any scars, hernias, masses, or trigger points. The back should be inspected to rule out a possible deformity such as scoliosis. A pelvic examination should be performed. The external genitalia, urethra, and hymen should be examined for any congenital abnormalities. Any lesions, point tenderness, or discharge should be noted. An appropriately sized speculum should be used to examine the vagina and cervix. Cultures and a Papanicolaou smear should be taken if the patient is sexually active. A bimanual examination should evaluate uterine size, the presence of masses, and tenderness. A single-digit or unimanual examination may be substituted for the bimanual examination if it is too uncomfortable for the patient. Lastly, a rectovaginal examination is performed in order to determine if there is nodularity of the uterosacral ligaments or posterior cul-de-sac.

For some teenagers it will be their first pelvic examination, so it is important to take the time to explain what will happen. The patient may or may not want the parent in the room during the examination. It may be helpful to determine the patient's preference during the confidential interview so that the burden of asking the parent to step out of the room is on the health care provider, not the patient. In addition, the patient should understand that if at any time during the examination she does not want to proceed, the examination will be stopped.

Laboratory studies should include a pregnancy test. A urinalysis and culture may identify a urinary source of pain. As noted above, genital cultures should be obtained in sexually active patients. An ultrasound

evaluation is helpful when one cannot perform a pelvic examination or one suspects an anomaly or mass. Magnetic resonance imaging is extremely useful in the evaluation of genital anomalies, but due to its expense should only be ordered when there is a reasonable clinical suspicion. The early use of diagnostic laparoscopy in more refractory cases of chronic pelvic pain can often lead to a more precise diagnosis when less invasive methods fail (Table 1).³

Dysmenorrhea

Dysmenorrhea is defined as severe, cramping pain in the lower abdomen that occurs during and/or prior to menses. Pain may occur in the lower back and upper thighs and may be associated with nausea, vomiting, and headache. Dysmenorrhea is a common problem in adolescent females with a reported prevalence ranging from 40% to over 90%. This range is likely due to the subjective nature of symptom reporting. A cohort study of 586 19-year-old females in Sweden reported a prevalence of 72%.⁴ Of these 34% reported mild symptoms, 23% reported moderate symptoms, and 15% reported severe. Klein and Litt conducted a population based study of dysmenorrhea that included young adolescents and reported a prevalence of 40% with 9% of adolescents reporting severe dysmenorrhea.⁵ They found that the youngest adolescents had a lower prevalence of severe dysmenorrhea, suggesting that dysmenorrhea is related to the presence of ovulatory cycles.

Studies have shown that dysmenorrhea is a significant cause of school and work absence as well as activity restriction in adolescent girls. According to Schroeder and Sanfilippo, it is the single most common cause of school absence in teenage girls.⁶ This was confirmed by Klein and Litt who found that 14% of U.S. adolescents ages 12–17 years old frequently missed school because of cramps.⁵ A study of Swedish girls ages 14–19 years old revealed that 15% reported being unable to participate in normal activities and 10% reported school absence.⁷ In addition, a prospective study of college students ages 17–19 years old showed that 42% of girls missed

Table 1. Laparoscopic Findings in Adolescents with Chronic Pelvic Pain

| Finding | Rate |
|-------------------------|--------|
| Normal pelvis | 25–40% |
| Endometriosis | 38–45% |
| Ovarian cyst | 2–5% |
| Uterine malformations | 5–8% |
| Postoperative adhesions | 4–13% |
| Pelvic inflammation | 5–15% |
| Others | 2% |

any activity due to dysmenorrhea and 25% of the girls missed school due to dysmenorrhea.⁸

Dysmenorrhea is classified as primary when no pelvic pathology is evident to cause painful menstruation. It is a diagnosis of exclusion that is made primarily in young women under 20 years old. The rate of dysmenorrhea increases with age in adolescence and is attributable to the establishment of ovulatory cycles.

The pathogenesis of dysmenorrhea has been attributed to the presence of prostaglandins via the cyclooxygenase and lipooxygenase pathways. These prostaglandins are produced by the endometrium in order to promote vasoconstriction and myometrial contraction. This subsequently leads to ischemia of the endometrial lining that controls bleeding as the lining sloughs. Other factors that are associated with dysmenorrhea are family history, early menarche, increased duration of menses, and smoking.

Patients with primary dysmenorrhea usually present with symptoms 6 to 12 months following menarche when ovulatory cycles begin. Pain is associated with menstrual flow and does not usually begin before menses. Symptoms range from cramping pain to a dull, throbbing pain. The pain is usually located in the lower abdomen and can radiate to the back and thighs. Patients may also experience nausea, headache, vomiting, diarrhea, and fatigue. A pelvic examination should be performed to evaluate for any other etiology of dysmenorrhea, such as a pelvic infection or congenital anomaly.

Secondary dysmenorrhea presents similarly to primary dysmenorrhea, but tends to start at a later age. Secondary dysmenorrhea is diagnosed when there is pelvic pathology that is believed to be the etiology of pain with menstruation; it is more common in women over 20 years old. Obtaining a history of prior cervical surgery, menorrhagia, or excessive vaginal discharge can help determine secondary causes of dysmenorrhea. The timing of the onset of pain can also help determine the cause of dysmenorrhea. Common causes of secondary dysmenorrhea in adolescents are endometriosis, congenital malformations (e.g. imperforate hymen), cervical stenosis, and pelvic infections.

Oral contraceptive pills (OCP) are a first-line option in the medical management of primary dysmenorrhea. OCPs suppress ovulation, which decreases prostaglandin release as well as uterine activity. This treatment is ideal especially in adolescents desiring contraception. Nonsteroidal antiinflammatory drugs (NSAID) that inhibit prostaglandin synthetase have also played a significant role in the treatment of dysmenorrhea. In a metaanalysis including 63 randomized controlled trials, NSAIDs were found to be significantly more effective for pain relief than placebo (OR 7.91).⁹ NSAIDs are typically started at the

onset of pain and continued on a regular schedule until the pain ends. Initially, NSAIDs should be taken on an as-needed basis; however, in those cases in which pain is inadequately controlled, it may be more useful to proceed with a trial of scheduled dosing. Several different NSAIDs have been found to be effective, and if a patient is not responding to one, it is worthwhile to consider changing to another. Side effects can include heartburn, gastrointestinal irritation, nausea, vomiting, headache, and allergic reactions. The development of COX-2 specific inhibitors has allowed for effective analgesia with fewer GI side effects; however, their safety profile has come into question lately.

Endometriosis

Endometriosis can be one of the most frustrating gynecologic diagnoses for a physician. Neither the exact etiology nor the incidence is known. Endometriosis in the adolescent population was first described in the 1970s via culdoscopy and laparoscopy.¹⁰ The estimated incidence of endometriosis in postmenarchal females ranges from 4% to 17%.¹¹ Of those adolescents with pelvic pain not controlled with medical management, the incidence has been shown to be as high as 60% to 70% at the time of laparoscopy.^{12,13} A study from Boston Children's Hospital found that teenagers typically presented with early stages of endometriosis, with 77% presenting with Stage 1 and 23% at Stage 2.¹⁴

Several theories have been proposed in an attempt to explain the pathogenesis of endometriosis. No single theory can explain all cases of endometriosis, and likely the etiology is multifactorial. The most popular and widely accepted theory is that of Sampson, who proposed that during menstruation, viable endometrial cells reflux through the fallopian tubes and implant on the surrounding pelvic viscera.¹⁵ Most normally menstruating women, however, experience some retrograde menstruation with each cycle, so the theory requires modification to explain why some women are predisposed and others protected.

Other theories relate to lymphatic or vascular transport of endometrial fragments as well as the involvement of coelomic metaplasia in which mesothelial cells undergo metaplastic transformation into endometrial cells as a result of some unspecified stimulus. Another hypothesis suggests that embryonic rests of Mullerian tissue respond to estrogenic stimulation and differentiate into functional glands and stroma. More recent research proposes a genetic predisposition to implantation and others a dysfunction of the immune system.¹³

Adolescents can present with either acyclic or cyclic pelvic pain, as opposed to adult women who

typically present with cyclical pain.¹³ Dysmenorrhea, abnormal uterine bleeding (with concomitant cramping), and deep dyspareunia are other common presenting symptoms. Gastrointestinal symptoms such as abdominal pain, nausea, diarrhea, and constipation, as well as bladder symptoms, may also be present.¹² These pain symptoms are usually severe enough that the adolescent has missed school or other activities and many have presented to a physician or emergency department for evaluation. An important point to note during history acquisition is that teenagers are unlikely to present with the classic triad of dysmenorrhea, dyspareunia, and infertility. However, there is a high incidence of endometriosis in adolescents with cyclical pain, especially if it radiates to the back or lower extremities or is accompanied by gastrointestinal symptoms (Table 2).^{12,16}

The pelvic examination may not detect abnormalities early in the disease process and can range from normal to generalized pelvic tenderness. Occasionally an adnexal mass is palpated; however, endometriomas are less common in females under 20 years old. The rectovaginal exam may reveal focal tenderness in the posterior cul-de-sac or nodularity of the uterosacral ligaments.

The empiric treatment of endometriosis includes OCP and NSAIDs. Oral contraceptive pills can be taken continuously to avoid dysmenorrhea.¹⁷ A 30 or 35 microgram monophasic pill is more efficacious than the low dose or tricyclic pills and is less likely to cause breakthrough bleeding. Other medical therapies include medroxyprogesterone acetate, and gonadotropin-releasing hormone agonists, although these modalities can incur greater side effects, costs, and disruption of the normal endocrinologic process.

In cases where pain persists despite the use of oral contraceptive pills and NSAIDs, laparoscopy is warranted. Laparoscopy can provide a definitive diagnosis through the visualization and biopsy of endometriotic implants as well as treatment via the excision and/or ablation of lesions. Although endometriotic lesions vary and change with increasing age,¹⁸ clear papules and red lesions are more likely to be found in younger

patients. The subtlety of these lesions requires vigilant inspection of the pelvis during laparoscopy.

Ovarian Cysts

Ovulation begins 6 to 12 months after menarche. The period following the initiation of ovulation is associated with dysfunctional ovulation and ovarian cysts. Preovulatory follicles measuring less than two centimeters are commonly found in the adolescent. A study of 139 adolescents who underwent serial ultrasounds during the follicular phase found cysts in 17 of the girls, with all except two resolving over time.¹⁹

Adolescents may present with cyclical pain, irregular menses, or dysmenorrhea. A pelvic examination, pregnancy test, and cultures should be performed in order to rule out pregnancy or sexually transmitted diseases. Weight loss, nausea, bloating, or a palpable mass could suggest a neoplasm. The most common ovarian tumor in young women is a mature teratoma. The sudden onset of acute abdominal pain could suggest ovarian torsion and is a surgical emergency. Ultrasonography is useful for the evaluation of a suspected mass as well as for observation of a mass over time.

Adnexal masses should be conservatively managed in adolescents. Most functional cysts will usually regress after two or three cycles, including those that are greater than 5 cm in diameter.²⁰ Although practitioners often reflexively prescribe OCPs, hormonal therapy has been not been shown to improve the regression rates of ovarian cysts compared to those followed expectantly.^{20,21} For those ovarian cysts that do not regress after several cycles, a surgical diagnosis is warranted with the goal of ovarian preservation during the course of treatment.

Musculoskeletal

The musculoskeletal system can often contribute to chronic pelvic pain; however, there is very little regarding this in the pediatric and adolescent literature. Dysfunction may develop as a response to an initial gynecologic problem or it may develop primarily. Common problems include shortening and spasm of the psoas muscles, shortening of the abdominal muscles, and/or a general abnormal posture including increased lumbar lordosis and an anterior tilt of the pelvis. As pain increases, patients develop splinting and cessation of physical activities such as exercise.

If left untreated, this musculoskeletal dysfunction may induce tissue damage that results in the development of trigger points. Trigger points are hyperirritable areas that are locally tender to palpation and can cause referred pain. Slocumb found trigger points in 75% of 177 patients referred to a pelvic pain clinic.²²

Table 2. Presenting Symptoms of Endometriosis in Adolescents

| Symptom | Incidence |
|------------------------------|-----------|
| Cyclic and acyclic pain | 62–95% |
| Acyclic pain | 28% |
| Cyclic pain | 9.4% |
| Dysmenorrhea | 95% |
| Deep dyspareunia | 29% |
| Irregular menses | 9–25% |
| Gastrointestinal pain/nausea | 34–43% |
| Urinary symptoms | 12.5% |
| Vaginal discharge | 6% |

Myofascial trigger points, also known as myofascial pain syndromes, occur within taut bands of skeletal muscle. The subsequent referred pain may be visceral and can present as dysmenorrhea, dyspareunia, bladder or gastrointestinal symptoms.

The physical examination of the abdomen should attempt to isolate areas of hypersensitivity. Single-finger palpation should be applied to find trigger points starting in the dermatomal area closest to the area of pain. When pain is reproduced, the lower extremity should be elevated to flex the rectus abdominus muscle. Pain of visceral origin is usually not reproduced in this way. Trigger points may also be identified during a single digit pelvic examination of the lateral wall of the vagina and the lateral fornices.

The injection of 0.25% bupivacaine into the trigger points can be both diagnostic and therapeutic. Slocumb found that in 122 patients undergoing trigger-point injections with 3–5 ml of 0.25% bupivacaine, 89% had relief or improvement in the pain with no further treatment required.²² Pain relief may last for weeks or months. Studies have also shown that physical therapy with an emphasis on the pelvis can be beneficial in the treatment of musculoskeletal pain.²³

Pelvic Inflammatory Disease

Pelvic inflammatory disease (PID) is a major cause of infectious morbidity in females 15–25 years old.²⁴ PID refers to an acute infection of the upper genital tract structures in women, involving any or all of the uterus, oviducts, and ovaries as well as other pelvic organs such as bowel. PID is a community-acquired infection initiated by a sexually transmitted agent.

Adolescents are at particular risk for several reasons. First, physiologically they have lower levels of protective antibodies due to a lack of exposure to pathogens, cervical ectopy, and a higher prevalence of *N. gonorrhoea* and *C. trachomatis* in the younger population.²⁴ Secondly, adolescents demonstrate higher risk behavior, for example, less consistent use of condoms or concurrent use of alcohol or drugs during sexual activity.²⁵ In addition, the incidence of PID doubles in young women with coitarche prior to 16 years old.²⁶

The sequelae of PID include chronic pelvic pain, adhesions, tubal occlusion, and an increased risk of ectopic pregnancy. Therefore, it is important to aggressively prevent, diagnose, and treat PID in order to avoid these outcomes in a population that has just started reproductive life.

Pelvic Adhesive Disease

The role of adhesions in chronic pelvic pain is controversial. Pelvic adhesive disease is commonly detected

at the time of surgical exploration of patients with chronic pelvic or abdominal pain. Pelvic adhesions can occur secondary to a previous operation; however, adolescents typically have an unremarkable past surgical history. Other more likely causes are acute or chronic pelvic infections, a ruptured appendix, or endometriosis.

The prevalence rate of adhesions in asymptomatic women undergoing laparoscopic tubal sterilization is approximately 14%.²⁷ Though adhesions may play an etiologic role in chronic pelvic and/or abdominal pain, they do not always produce pain. Adhesions may be more likely to play an etiologic role when they limit the mobility of intra-peritoneal organs or when their location correlates with the location of the pain.²⁸

Treatment with adhesiolysis has been controversial. One clinical trial that randomized 24 women with adhesions to laparotomy with adhesiolysis and no treatment found no difference with regard to pelvic pain at the 9–12 month follow-up. They did, however, note that women with dense bowel adhesions had significantly less pain at the 2–3 month follow-up following adhesiolysis.²⁹ Goldstein reported 89% of adolescents with pelvic pain and adhesions had improvement of symptoms after adhesiolysis.³⁰ Steege and Stout reported 67% of women experienced relief after laparoscopic adhesiolysis; however, only 40% of women with a chronic pain syndrome reported improvement in their pain.³¹

Irritable Bowel Syndrome

Irritable bowel syndrome (IBS) is one of more than 20 functional GI tract disorders. It is defined as chronic abdominal pain (usually in the lower segment) and disturbed defecation in the absence of structural or biochemical abnormalities. Approximately 15–20% of adolescents have symptoms consistent with IBS.³² The pathophysiology of IBS remains unclear; however, several studies have generated insights that have allowed for an improved understanding of this complicated syndrome. The physiologic mechanisms underlying the abdominal pain and altered bowel habits of IBS patients are thought to be a result of the dysregulation of brain-gut interactions leading to altered perceptions of pain.³³ In addition, biochemical factors such as 5-hydroxytryptamine (5-HT), cholecystokinin, substance P, neurotensin, and cytokines are also potential participants in the transmission of painful and nonpainful sensations and in the regulation of mood and behavior.

The hallmark of IBS is abdominal pain or discomfort associated with a change in the consistency or frequency of stools and relieved by defecation. Patients may also complain of the passage of mucus or

abdominal bloating. Symptoms can occur in clusters or individually, in addition to exhibiting variable frequency among patients.

The disorder is unique in that it has no structural, biochemical, or physiologic diagnostic markers and is a diagnosis of exclusion. According to diagnostic criteria developed for the pediatric population these symptoms should be present for at least twelve weeks and not necessarily consecutively for the past twelve months (Table 3).³⁴ The combination of these criteria and a normal physical examination and growth increase the diagnostic accuracy of IBS allowing for a more conservative work-up.

Psychosocial factors such as early life experiences, conditioning factors, physical stress, personal and social coping systems, and psychological stress influence the expression of symptoms and illness behavior. A high prevalence of prior physical and sexual abuse has been reported in women with IBS compared with women with organic disorders.³⁵ Psychiatric co-morbidities such as anxiety, depression, and impaired psychosocial adjustment are more prevalent in patients with IBS than controls.^{36,37} Although these factors are etiologic, they are relevant to an understanding of the patient's adjustment to IBS and to the development of a treatment plan.

The interplay of physiologic and psychosocial factors in IBS requires an integrated approach to treatment. Treatment should be aimed at both reassurance and symptom relief. Education and reassurance can help patients and parents understand that IBS sufferers have real symptoms, but that the symptoms are not life-threatening. Reviewing the role of stress and anxiety in IBS will also help the family to understand why the pain occurs as well as its triggers. It is important for patients and families to understand that IBS is a condition that can be managed, but not cured.

Medical management is directed at alleviating the most predominant symptoms. Antispasmodics are the most frequently used medication. The anticholinergic effects of these medications relax smooth muscle. Tricyclic antidepressants (TCA) and selective serotonin reuptake inhibitors are also used for the symptomatic treatment of pain, but are reserved for

patients with severe or refractory pain.³⁸ Low dose tricyclic antidepressants have been shown to improve symptoms in adults³⁹; however, there is limited data regarding their use in the pediatric population for chronic abdominal pain. Side effects of the antispasmodics and TCAs such as dry mouth and drowsiness can limit their use.

Fiber bulking agents are also useful for those patients with constipation. Osmotic laxatives may also be prescribed if fiber bulking agents are not helpful. Recently the FDA approved a selective partial 5-HT₄ agonist, tegaserod (Zelnorm[®], Novartis), for the treatment of women with constipation-predominant IBS.

Antidiarrheals such as loperamide are typically prescribed for the diarrhea-predominant IBS patient.⁴⁰ These agents slow intestinal transit and enhance intestinal water and ion absorption, thereby resulting in decreased stool frequency and improved stool consistency.

Psychological and behavioral options for IBS include cognitive-behavioral therapy, psychotherapy, hypnosis, relaxation training, and family or group therapy. A disadvantage of these techniques is that patients and parents can be quite resistant to referral to a mental health specialist. As a result, the initial approach to the patient with IBS should involve dietary, educational, and pharmacological measures. If these fail after an adequate trial, then referral to a psychologist or psychiatrist should be made.

Conclusion

Chronic pelvic pain is a significant problem for women that when present in adolescents can pose a significant challenge to health care providers. In the adolescent population, the evaluation and management of pelvic pain requires not only knowledge of the various etiologies, but also insight into the stages of adolescent development. Establishing a good rapport with an adolescent patient can facilitate a thorough history and physical and thereby provide a good deal of information to determine the etiology of the pain without extensive diagnostic studies. Both gynecologic and non-gynecologic diagnoses should be considered. The early diagnosis and appropriate management of adolescent pelvic pain can improve daily functioning and improve future reproductive health outcomes in a population of patients whose formative years are extremely important.

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Table 3. Diagnostic Criteria for Irritable Bowel Syndrome in Children and Adolescents

At least 12 weeks (not necessarily consecutive) within the last 12 months of:

- (1) Abdominal discomfort or pain with two out of three features:
 - Relieved with defecation
 - Onset associated with change in frequency of stool
 - Onset associated with change in form of stool
- (2) No structural or metabolic abnormalities to explain the symptoms

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