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ACUTE PELVIC PAIN IN THE ADOLESCENT: A CASE REPORT

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Abstract

Diagnosis and treatment of acute pelvic pain in the adolescent female requires differentiating among a broad differential diagnosis that includes potentially serious illness across several organ systems. The case presented provides an illustration of the assessment and management of acute pelvic pain, and key teaching points about important potential causes.

Keywords

Pelvic pain; sexual assault; ovarian torsion; ectopic pregnancy

A 14 year old female presented to the pediatric emergency department with abdominal pain. She reported the pain was in her left lower quadrant. The pain was sudden in onset and associated with nausea, although she has not had any episodes of vomiting. She reported normal bowel movements and no recent fevers. Her last menstrual period was 4 weeks ago.

She was previously healthy, with no surgical history. She reported no medications or allergies and her immunizations were up to date. She lives at home with her family and is doing well in school.

The differential diagnosis for pelvic pain in an adolescent female is broad, and contains many conditions that can present with very similar symptoms. The clinician is required to think through a differential diagnosis including gynecologic causes, complications of pregnancy and other non-gynecologic sources of pelvic pain.

Potential gynecologic causes include ovarian cyst or cyst rupture, mass, or ovarian torsion. Infectious causes such as endometritis or pelvic inflammatory disease can also cause acute pelvic pain, as hormonal etiologies such as mittelschmerz, dysmenorrhea and endometriosis. In the setting of an unknown or positive pregnancy test, ectopic, miscarriage and pain from pregnancy are also on the differential. In addition, pelvic pain can arise from a

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gastrointestinal source such as appendicitis, constipation or inflammatory bowel disease. Renal or urinary system pathology such as nephrolithiasis, urinary tract infection or pyelonephritis can cause acute pelvic pain. Acute pelvic pain can also be due to trauma, muscle strain, nerve entrapment or, as a diagnosis of exclusion, psychiatric causes.

The prioritization of the evaluation of acute pelvic pain is based on the history and physical exam to determine the relative likelihood of the various diagnoses, but also, importantly, on the rapidity with which they need to be diagnosed. Ovarian torsion, ectopic pregnancy, appendicitis and complications of trauma require more urgent consideration than many of the other potential etiologies.

On physical exam, the patient's vital signs were as follows: blood pressure 140/72 mmHg, pulse rate 88, respiratory rate 18, temperature 36.8 °C, and O₂ saturation 100%. Her cardiovascular and pulmonary exams were normal. Her abdomen was soft and non-distended and she had mild tenderness in the left lower quadrant.

Based on the sudden onset of symptoms, and the location in the left lower quadrant, the team was primarily concerned for ovarian torsion.

Ovarian torsion is a rare diagnosis with an estimated incidence of 4.9 per 100,000 in women less than 20 years of age.¹ In the initial stages, the twisting of the ovary on its vasculature causes blockage of the venous drainage of the ovary, resulting in edema. Subsequently, arterial blood flow is reduced with resultant necrosis and peritonitis,² which can result in permanent loss of the ovary if not corrected.

The classic presentation is intense abdominal pain. The pain can be described as dull or sharp, constant or intermittent, and may be associated with nausea and vomiting.^{2,3} However, ovarian torsion is a difficult diagnosis to make, because of the lack of specific or sensitive historical or physical exam factors. A recent retrospective chart review of 82 cases of adnexal torsion found that most patients presented with 24 hours of severe, intermittent pain, and commonly reported nausea, vomiting, and abdominal tenderness on exam.⁴ This larger study was consistent with findings from smaller, previous studies. Similarly, a retrospective study of 94 patients found that the presence of intermittent pain and non-radiating pain were statistically associated with the diagnosis of torsion.⁵

While laboratory studies can assist in the diagnosis of other entities causing abdominal pain, when there is high suspicion for ovarian torsion a pelvic ultrasound is the primary diagnostic modality. An enlarged ovary with peripheral follicles is highly concerning for ovarian torsion.³ The combination of these two findings, enlargement and peripheral follicles, has been reported to have a positive predictive value of 87.5% for the diagnosis of torsion.² Because Doppler flow to the ovary is commonly reported, it is important to know that flow can be normal even in cases of ovarian torsion. This is due to the dual blood supply of the ovary.³

Most often, ovarian torsion is the result of a benign cystic lesion, although torsion can occur without a clear precipitant. Less than 0.5% are associated with a malignant neoplasm.¹ Although most often considered in the adolescent or adult patient, ovarian torsion can also occur in a premenarchal patient.²

Patients diagnosed with ovarian torsion should be evaluated by a surgeon immediately, and should be kept NPO and placed on intravenous fluids. With respect to treatment, many surgeons are moving away from oophorectomy in the pediatric patient and instead treat patients with detorsion and conservative measures. This is due in part to the rarity of malignancies as a cause of torsion in pediatric patients, and in part to increasing evidence of the rarity of complications and good clinical outcomes. Of note, multiple studies have indicated that the intraoperative appearance of the ovary does not predict permanent damage or long-term sequelae of torsion. In more advanced cases, salpingo-oophorectomy may be required, particularly if there is evidence of necrosis.³ Although rapid diagnosis and treatment is important, there are reports of ovarian salvage even in the setting of prolonged symptom duration.⁶

The patient underwent transabdominal ultrasound which showed normal blood flow to her ovaries and no evidence of torsion.

In this case, the team found that the result of their diagnostic test did not match their anticipated diagnosis. If the ultrasound had showed enlarged ovaries or peripheral follicles, it would have been important to involve a surgical or gynecological consultant despite the report of normal blood flow. However, in this case, the ultrasound was completely normal.

When the team reevaluated the patient after her ultrasound, the social history was noted to be incomplete.

For an adolescent, it is crucial to ask the social history in privacy. The social history should cover the home situation, school and other activities and the potentially sensitive domains of substance use, sexual activity, suicidality/depression, eating behaviors, and safety, including access to firearms.

When the physician interviewed the patient without her mother in the room, she disclosed a sexual assault that had occurred that day. She reported vaginal penetration, without anal or oral contact. She stated there was a single perpetrator who was an unknown adult, and noted that she had bled during the assault.

Although underreporting likely means that the true incidence is higher, 10.5% of female high school students report having been subjected to forced intercourse.⁷ One national study reported 10.7% of girls aged 14–17 experienced a sexual assault in the past year.⁸ These patients will frequently present to the emergency department as their first point of contact with the healthcare system. As resources and systems for the care of these patients vary widely, it is important for the pediatric emergency physician to be prepared to obtain the appropriate information, provide care and, in many cases, collect forensic evidence. In patients who have been acutely sexually assaulted, it is crucial to identify injuries and to collect forensic evidence as soon after the event as possible

Whenever possible, a team approach should be used for the assessment and treatment of patients who have experienced a sexual assault. This will limit the number of times a history is given and the number of times a patient is examined. For stable patients, the evaluation can begin with history taking, ideally with all relevant team members [physician, nurse, sexual assault examiner (if available), social worker (if available)] present. The medical provider does not need to obtain a detailed history of the event, as optimally an interview by

a trained forensic interviewer, a police detective and/or Child Protective Services will follow the initial medical evaluation, but the ED provider should obtain sufficient information to identify potential areas of injury, assist with interpreting physical exam findings, and determine the need for evidence collection. More specifically, helpful historical information (“minimal facts”) would include the timing of the assault; the circumstances of the assault (ie. known perpetrator, age and in the context of a dating relationship vs. unknown assailant); type of sexual contact; the location of the incident; whether there is reason for concern for drug facilitated sexual assault; and symptoms of traumatic injury. For sexually active teens, it is also important to determine the last consensual sexual contact if forensic evidence collection will be conducted. If the perpetrator is known, it is helpful to assess their risk factors for human immunodeficiency virus (HIV). In most cases, this should be done during a private interview with the adolescent.⁷ Because forensic interviewing requires specific training and is beyond the scope of skills of most professionals, avoiding in-depth interviewing can minimize the potential for inconsistent or confusing stories.

Collection of forensic evidence should be considered up to 72 hours following assault. In some centers, evidence collection for pre-pubertal children is only performed within 24 hours of the assault,⁹ but new data suggests that collection beyond 24 hours may be useful.^{10,11} Importantly, the yield of forensic testing is not associated with physical findings¹⁰ and so evidence collection should be considered even in the setting of a normal physical exam. Furthermore, evidence collection should be guided by the disclosure history, with recognition that the history of the assault provided or recalled may change with time. A full and detailed physical exam with documentation of injuries should be performed whether or not forensic evidence is collected.

Adolescent victims of sexual assault should be screened for sexually transmitted infections (STIs). Determination of which sites to sample should be based on areas of possible contact with assailant’s bodily fluids and can include vaginal, urethral, anorectal, throat, and/or blood, with consideration of testing for STIs from multiple sources. If possible, STI testing prior to prophylactic treatment (described below) is recommended. Nucleic acid amplification tests (NAATs) for *Neisseria gonorrhoeae* (GC) and *Chlamydia trachomatis* (CT) are the preferred diagnostic test for adolescent sexual assault victims, regardless of the sites evaluated (genital and/or extragenital). Testing for *Trichomonas vaginalis* (TV) should be by rapid antigen testing or NAAT (preferred) or culture or wet mount of a vaginal swab specimen. The wet mount can also be used to evaluate for bacterial vaginosis (BV) and candidiasis, if vaginal discharge, malodor, or itching is evident; however, these infections are not generally due to the acute assault. Syphilis testing should be performed using the RPR test in settings with a high prevalence of the disease, and Hepatitis B testing should be performed if the patient has not been fully immunized against this infection. HIV testing should be performed after appropriate counseling and providing patients with the information that the test result will only provide evidence of infection acquired 6 months prior to testing, although the new 4th generation HIV immunoassays can detect more acute HIV-1 infection with a window of 3 months.

In addition, testing following acute sexual assault has been controversial in some settings due to concern that evidence of prior consensual sexual contact would negatively impact

future criminal proceedings. Although the identification of an STI may represent an infection acquired prior the assault, “shield” laws in all 50 states strictly limit the evidentiary use of a survivor’s previous sexual history, including evidence of previously acquired STIs, as part of an effort to undermine the credibility of the survivor’s testimony. It is critical to ensure appropriate follow-up for repeat testing and treatment, if needed. In all cases, pregnancy testing is of key importance both at the initial visit and in follow-up.⁷

Adolescent patients should be offered prophylaxis for STIs and pregnancy (Table 1). This consists of ceftriaxone for gonorrhea, azithromycin for Chlamydia and metronidazole for trichomonas and bacterial vaginosis. Patients without prior vaccination to hepatitis B should receive the vaccination.⁷ Emergency contraception should be provided if the patient presents within 120 hours of assault.⁷ HIV prophylaxis should be offered in the setting of a high-risk exposure and usually with the assistance of a specialist consultation. For those without access to an infectious disease or child protection specialist, The National Clinician’s Post-Exposure Prophylaxis Hotline (<http://nccc.ucsf.edu/clinician-consultation/post-exposure-prophylaxis-pep/>) is a resource for assistance with questions regarding post-exposure prophylaxis recommendations.

Arranging appropriate follow-up is of key importance to assist with further testing for sexually transmitted infections and continuation of HIV prophylaxis as necessary. Follow-up examinations by specialist physicians can also identify injuries that were not appreciated or have evolved since initial presentation to the ED.¹²

Finally, physicians and other healthcare professionals are mandated reporters under U.S. law, and are therefore required to report suspected as well as known cases of child abuse to the child protective services agency, and often to the police. Knowledge of local and state laws regarding reporting is critical for the ED provider.

On exam, patient’s labia majora and minora were normal, and she had no vaginal bleeding. Her hymen had no visible tears, bruising or lacerations, and her anal exam was unremarkable. Her exam was notable for black coarse hair in vaginal area and positive blue light (semen staining) on the thigh and nipples

It is important to note that a normal exam neither proves nor disproves sexual assault.⁷

At this point, L.M.’s urine pregnancy test resulted as positive.

Trauma sustained during assault could be the etiology of her vaginal bleeding, and the patient will need a speculum exam to look for lacerations and abrasions.

However, with the positive pregnancy test and reported vaginal bleeding, ectopic pregnancy is now the most important item on the differential diagnosis.

Ectopic pregnancy occurs in 1.5–2% of pregnancies and accounts for 6% of maternal deaths¹³ The ectopic pregnancy rate in women aged 15–19 has been estimated to be 0.3%¹⁴ Although mortality has been decreasing, racial disparities persist, with higher incidence¹⁵ and mortality rates for African-American women.¹⁶

The patient underwent transfer to the general emergency department. She had a trans-vaginal ultrasound which revealed no evidence of an intrauterine gestational

sac, but a left adnexal mass which measured $2.2 \times 2.0 \times 2.2$ cm. This mass appeared separate from the left adnexa and demonstrated hypervascularity on color Doppler. There was also a small amount of free, simple appearing fluid in the cul-de-sac.

A ruptured ectopic pregnancy presents with severe abdominal pain and hemodynamic instability including tachycardia and hypotension.¹³ Prior to rupture, however, the symptoms of ectopic pregnancy can be mild and easily mistaken for normal pregnancy or confused with other etiologies of pelvic pain. The most common presenting symptoms of ectopic pregnancy are abdominal pain, amenorrhea and irregular vaginal bleeding.¹⁷ Any pregnant patient with a complaint of vaginal bleeding or abdominal pain, who has not yet had a documented intrauterine pregnancy, should be evaluated for ectopic pregnancy.¹⁸

Diagnosis of ectopic pregnancy relies on the combination of quantitative serum human chorionic gonadotropin (hCG) testing and transvaginal ultrasound.¹⁸ With an hCG value above 1500 to 3000 mIU, transvaginal ultrasound should be able to detect an intrauterine pregnancy with close to 100% sensitivity.¹³ Patients with an hCG >1500 and no intrauterine pregnancy visualized on ultrasound, should be considered at high risk for ectopic pregnancy.¹⁷ For patients with an initial hCG below that value, ultrasound should be performed to look for an ectopic pregnancy.¹⁹ If no ectopic or intrauterine pregnancy is visualized, patients should be followed closely for repeat testing (usually every 48 hours) and ultrasound. Detailed return precautions must be provided to these patients as they remain at risk for ectopic rupture.¹³ Visualization of an intrauterine pregnancy on ultrasound is generally sufficient to rule out ectopic pregnancy.²⁰ Heterotopic pregnancy, intrauterine pregnancy, and concurrent ectopic are quite rare in the absence of fertility treatment.

Ectopic pregnancy can be managed surgically or medically. Surgical options include removal of the fallopian tube, or removal of the pregnancy with preservation of the tube. In appropriately selected populations, the use of methotrexate for treatment of ectopic pregnancy is safe and effective.¹³ Ectopic pregnancies can resolve spontaneously without therapy, although women choosing to be managed expectantly must be well counseled on the risk of rupture of the fallopian tube.¹³

After extensive discussion, the decision was made to follow the patient closely for two more days in hopes of spontaneous resolution due to very low beta hCG.

Modified only slightly from a presentation to our emergency department, this case illustrates some of the complex decision making and diagnostic uncertainties in the care of adolescent females with abdominal pain, as well as the workup of ovarian torsion, sexual assault and ectopic pregnancy. Other potential etiologies of acute pelvic pain that could present in a similar fashion include ovarian cyst rupture, infection, trauma and abnormal uterine bleeding. This case illustrates the importance of taking a private and complete social history in an adolescent patient, understanding the available resources for the care of patients following sexual assault, and testing for pregnancy in the adolescent complaining of acute pelvic pain.

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Table 1

Prophylaxis for infection and pregnancy for female patients following sexual assault.

	All post-pubertal patients*	Within 120 hours of assault	If unimmunized
Gonorrhea	Ceftriaxone 250 mg IM or IV		
Chlamydia	Azithromycin 1g PO		
Trichomonas, bacterial vaginosis	Metronidazole 2g PO or IV		
Hepatitis B			First dose of Hepatitis B vaccine; If perpetrator is known HBsAg positive, HBIG should also be given
Pregnancy		Plan B (1.5mg levonorgestrel) Give both pills together in the ED or one dose with second dose 12 hrs later (Efficacy of both regimens is equivalent)	

* All patients require an anti-emetic