Thinking like an emergency doctor

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Thinking like an emergency doctor

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THE PRESENTING PROBLEM
A previously healthy 14-year-old girl develops acute lower abdominal pain and vomiting. The pain comes in waves, and the girl is in obvious distress. Her parents have now brought her to the emergency room.

THE PATIENT’S STORY
The girl had been running and playing soccer with friends outside when she suddenly felt a sharp, radiating pain in her abdominal region. At first, she ignored it and continued playing, but eventually the pain became so intense that she couldn’t stand. Becoming concerned, her parents tried to get her to stand, but she was unable to walk. They carried her to the car and drove her straight to the emergency department. Since the onset of the pain, she began vomiting intermittently. She is now curled on a stretcher and guarding her stomach.

THE EMERGENCY ROOM
The parents are frantic. Repeatedly, they have demanded that their daughter be given some form of analgesia or narcotics to control the pain. The girl’s pain seems to be getting worse. The emergency doctor works quickly to first assess ABCDE: Airway, Breathing, Circulation, Disability, and Exposure. Outside of the girl’s pain, it appears that the girl is stable.

GENERAL APPROACH
The most important thing to determine in children with abdominal pain is whether this is a life-threatening condition that will require immediate intervention. If not life-threatening, more time can then be taken to identify the proper cause of the pain.\(^1\) There are three areas of examination that are important:

- **History** – Use the history to try and understand the cause of the abdominal pain. Ask about any trauma to the area, previous surgeries, fever, vomiting, the location of the pain and pattern of symptoms.\(^2\)
  - **Trauma:** Abdominal trauma can be life-threatening, especially if organs are damaged. Remember that for some abdominal injuries, symptoms may not appear immediately, such as left shoulder pain from a slowly developing splenic hematoma, or a duodenal hematoma from a lap seatbelt injury.\(^3\)
  - **Characteristic of Pain:** Obtain information about the onset, frequency, duration, characterization, and location of the pain. Specific diagnoses have particular characteristic patterns of presentation.\(^4\)
  - **Associated Symptoms:** Signs of fever and abdominal pain are often correlated with infectious etiologies such as gastroenteritis, viral syndromes, or pharyngitis. Vomiting in connection with abdominal pain, especially without diarrhea can be indicative of life-threatening bowel obstruction or appendicitis. Volvulus and intussusception should also be included on the differential and ruled out, although the latter is less likely in this age group. A history of a cough should also be elicited because children with pneumonia frequently complain of abdominal pain. Lower urinary symptoms should be elicited since abdominal pain may be a presenting symptom of urinary tract infection (UTI).\(^5\) An often missed etiology is a gynecologic emergency such as ovarian torsion, ectopic pregnancy, etc., necessitating a complete gynecological history.\(^6\)
  - **Past Medical History:** Previous abdominal surgeries, UTIs and pre-existing conditions such as Sickle Cell Disease should be taken into consideration.\(^7\)

- **Physical examination** – Vital signs and detailed abdominal examination are essential.\(^8\)
  - **Appearance:** Look at the patient
    - Hypovolemia can be indicative of abdominal injury, volvulus, or intussusceptions
    - Jaundice can indicate hepatitis or hemolysis
  - **Vital Signs:** Key features to keep in mind are fever, which would suggest an infection, tachypnea, which may indicate respiratory illness or metabolic acidosis, and hypotension, which can develop from intravascular volume loss or peritonitis.
  - **Abdominal Examination:** Look for distention, listen for bowel sounds, localize quadrant pain, and percuss for tenderness, rebound, or involuntary guarding. Rectal exam may be indicated, and stools should be observed for softness and blood.
  - **General Examination:** Extra-abdominal findings can help determine the cause of abdominal pain, such as respiratory symptoms suggestive of pneumonia, altered heart sounds indicating either pericarditis or myocarditis, flank tenderness suggestive of pyelonephritis or urolithiasis, or rashes/bruises indicative of Henoch-Schonlein purpura.\(^9\) For sexually active females with lower abdominal pain, bimanual pelvic examinations should be done to look for pelvic inflammatory disease, adnexal masses or cysts, uterine pathologies, etc.\(^10\) The costovertebral angle should also be percussed.

Ancillary studies – Laboratory and radiographic testing should only be done if there are focal concerns that suggest a particular diagnosis that can be confirmed with imaging/lab testing.

- **Laboratory Test:** WBC, hematocrit, serum chemistries, urine dipstick, urine pregnancy test, rapid Streptococcal antigen testing, etc.
- **Imaging:** Plain radiography, ultrasound, CT scan
  - **FAST:** Focused abdominal sonography for trauma – performed in the emergency room to quickly determine free fluid in the abdo-
THINKING ON YOUR FEET

• **ECG:** Can assess voltage, ST changes and T wave abnormalities that can suggest pericardial disease

**ANALGESIC USE**

Children with acute abdominal pain should receive an effective analgesic based on their level of discomfort. While there have been concerns about the use of analgesics altering the accuracy of clinical findings, clinical trials have shown that morphine analgesic use in children with acute abdominal pain is able to provide pain relief without significantly changing clinical examinations or determination of surgical conditions. NSAIDs are also acceptable for pain control. Despite the presence of this data, current observational studies indicate that children often do not receive adequate pain control in these acute circumstances.

**THE SPECIALIST EXAM**

In a debriefing by the parents, the emergency doctor conducted a quick test to rule out potential life-threatening causes of the girl’s pain. When making a secondary survey, think AMPLE: allergies, medications, past illnesses, last meal, and events preceding the injury.

**History** – The parents did not report any significant trauma incurred during the soccer game. Other than the lower abdominal pain, the girl is not complaining of discomfort anywhere else. She is localizing the pain to her right lower abdominal quadrant and radiating to her back. She describes the pain to be sharp and stabbing. She also reports other recent “stomach pains” that resolved spontaneously, believing these pains may have been due to menstrual cramping. She has no previous medical conditions. She is currently experiencing some nausea, and has vomited twice in the last few hours.

**Physical examination** – The patient does not appear to be hypovolemic or jaundiced. She has a unilateral, tender adnexal mass with some tenderness to palpation. There are no other remarkable findings. Stool samples have been normal.

**Ancillary studies** – Blood is drawn and a CBC shows normal levels of WBC and hematocrit. β-HCG levels are ordered, and the results are not suggestive of an ectopic pregnancy. Since she has lower abdominal pain, it was decided that a pelvic ultrasound would be carried out. Results showed an enlarged ovary to one side, with multiple small immature follicles along the periphery. Concerned about cysts, cancer, or other pathologies, a color Doppler U/S and CT scan were performed to show morphological and physiological changes in the ovary, and to assess blood flow. Very little intraovarian venous flow was present.

**SOLVING THE MYSTERY**

After taking a detailed history and imaging, the diagnosis of ovarian torsion was made with the help of a gynecologic consult. The presence of an enlarged ovary with a decrease in intraovarian venous flow alerted physicians this diagnosis. Laparoscopic surgery was quickly booked. In the meantime, morphine was used to control the girl’s pain until she was able to go to the OR.

**CONCLUDING REMARKS**

Ovarian torsion can easily mimic other GI causes of acute abdominal pain such as constipation, bowel obstruction, appendicitis, intussusceptions, gastroenteritis, renal colic, ans mesenteric adenitis. Despite its rarity in presentation, ovarian torsion should still be on the differential diagnosis when females present with severe, acute, lower abdominal pain. Due to its variable presentation and often non-specific findings, the diagnosis of ovarian torsion is often missed and ramifications for the delay can result in a necrotic ovary. Laparoscopy is used for confirmation of diagnosis and treatment, usually on an in-patient basis. Prompt diagnosis and timely management help save the adnexal structures from infarction and facilitate a speedy recovery.

**REFERENCES**


