

HISTORY

Anorexia and appendicitis

In general, as acute appendicitis produces progressive peritoneal irritation, appetite disappears. Cope's monograph on abdominal pain asserts that "So frequent is anorexia or nausea [in patients with appendicitis] that the presence of hunger should raise a question of the diagnosis of acute appendicitis. " Many surgeons, especially those still in training programs, may mistakenly elevate this cautionary note to the status of a *sine qua non* for the diagnosis of appendicitis.

However, if the inflammation is well localized, such as with a retrocecal appendicitis, appetite may remain intact. In fact, among all patients with proven acute appendicitis normal appetite can be anticipated in about 1/3 of cases (35%: Rothrock, J Emerg Med 13:1; 1995; 30%: Alvarado: Ann Emerg Med 15:557; 1986; 32%: Wagner, JAMA 276:1589; 1996)

Prior Episodes

Often the patient knows or strongly suspects the true etiology of his pain based on past experience, but hesitates to volunteer this information for fear of "biasing the jury". Surprisingly, even the direct question "Have you ever had this pain before?" may produce a negative response, since this episode is the most *severe* instance of a long string of similar prior attacks, and therefore unique to the patient. It has proven more informative to ask specifically: "Have you ever had similar pains in the past, *even mild ones?*"

Pain Duration

Pain of more than 6 hours duration, but less than 48 hours, is most characteristic of surgical etiologies. Outside of that window, non-surgical entities become more likely. (Brewer: Am J Surg 1331:219; 1976 and Staniland: Br Med J 3:393; 1972)

PHYSICAL EXAMINATION

Tests for Peritoneal Irritation

From the least to the most noxious evoking stimuli:

- History: enroute, hurts when auto hits a bump
- ask the patient to cough
- standard tests for local/generalized rebound tender. Watch patient's expression (especially children). Simple patient reporting of discomfort is not really a positive.
- pelvic shake
- Markle (heel drop) test: patient stands, feet together, rises on toes, forcibly drops with locked knees on heels. In patients with appendicitis, this is 74% sensitive (v. 37% to 64% with standard rebound test). -Markle: Arch Surg 120:243; 1985.

The Ticklish or Hypersensitive Patient

Children (and some adults) may present difficulties during the abdominal examination because they are ticklish or otherwise tense their abdominal muscles upon attempts by the examiner to palpate. A useful technique is to simply take the patient's hand and place it over the area of the abdomen to be palpated. The examiner then places his hand on top of the patient's and proceeds with the palpation. In

most cases (for some reason) the problem with hypersensitivity during the procedure is eliminated. True tenderness using this technique will be detected.

Abdominal Wall Pain

Strenuous and sustained abdominal muscle contractions during repeated vomiting may lead to both pain and objective tenderness on exam (ergo the dictum: vomiting before pain favors a non-surgical etiology). Other less common causes of abdominal wall pain include local subcutaneous infections, Herpes Zoster infection (which may cause pain prior to the appearance of the tell tale rash), and rectus sheath hematoma. Problems in the abdominal wall may be distinguished from an intra-abdominal process by the abdominal wall tenderness test (Thomson: Lancet 2:1053; 1977). Lying supine, patient tenses abdominal muscles (lift legs, partial sit-up, forceful valsalva). During this maneuver, abdomen is re-examined. If tenderness is markedly *decreased*, this favors an intra-abdominal etiology. If tenderness and pain are *increased*, this favors an abdominal wall etiology. Be wary of using this test in trauma patients, as the abdominal wall and intra-abdominal contents may *both* be involved.

High Controversy over the Lowly Rectal (digital) Examination

PRO:

In a report out of the U.K., only 1/2 of patients with anorectal symptoms had a rectal examination by a GP before being referred to a specialist, yet between 25% and 35% of colorectal cancers are palpable rectally. 35% of patients with prostatic cancer do not have a rectal exam before being referred to a urologist. Reasons for GPs deciding not to do a rectal: reluctance of the patient, expectation that the exam would be repeated, lack of time, or GP felt the technique had been poorly taught in medical school. (Henningan: BMJ 301:78; 1990)

Digital exam useful for identifying anal and rectal lesions and fecal impaction in elderly patients. (Smith, Age Ageing 19:142; 1990)

Another U.K. study done in a GI referral clinic: Rectal examination would have facilitated the diagnosis in 47% of patients referred and therefore should be performed on all patients where symptoms are referable to the lower GI tract. (Ng, Post Grad Med J 67:904; 1991)

Study in U.S. among children referred to specialty GI clinic for chronic constipation, 77% never had a digital rectal exam performed by the primary care physician prior to referral. 70% of referrals were ultimately diagnosed as fecal impaction and treated definitively with enemas. (Gold, Arch Pediatr Adolesc Med 153: 377; 1999)

Appendicitis is initially misdiagnosed in almost 100% of children under age two, and in almost 60% of children under age six. In a retrospective study out of the U.S., of 181 cases of appendicitis in children under 13 yo: among those under 6 yo, up to 25% had palpable masses rectally. Performance of rectal examinations was documented less common in patients with missed appendicitis. Conclusion: "Physicians may diagnose a case of appendicitis that they might have otherwise missed by performing a rectal examination." (Rothrock, Ann Emerg Med 20:45; 1991)

CON:

From the U.K.: 1,028 patients undergoing rectal for RLQ pain. Found only 3 masses on rectal not suspected on abdominal exam. Conclusion: rectal exam does not give further diagnostic information over the rest of exam. Also: "rectal examination...should not be part of the examination performed by a general practitioner before referral to hospital" (Dixon: BMJ 302:386; 1991)

Rectal exams in pediatric patients by GPs are indicated on "rare occasions"; otherwise the exam should be deferred to "experienced clinicians". (Jesudason, Br J Surgery 86:376; 376)

Small study of children with suspected appendicitis found that in groups with and without rectal exams, there was similar diagnostic success. (Dunning, Ann R Coll Surg Engl 73:233: 1991)

Among children with acute abdominal pain, rectal exam was done by general pediatricians in only 5% of cases. Among those receiving rectals, the procedure yielded clinically contributory findings in 21% (12/56). (Scholer, Clin Pediatr (Phila). 37:311; 1998)

Study of 477 patients in Germany with appendicitis, concluded the rectal digital examination is superfluous, and adds little over the abdominal exam. (Langenbecks, Arch Chir Suppl Kongressbd. 115:1120; 1998)

A meta-analysis concluded that the digital rectal was useful in assessing men with suspected prostate problems or rectal problems, but not in diagnosing acute appendicitis. (Muris, Fam Pract 10:34; 1993)

A literature review found overall sensitivity of rectal tenderness for appendicitis was 41% and specificity was 77%. Conclusion: presence of rectal tenderness is helpful, its absence is not. (Wagner, JAMA 276:1589; 1996)

Nelson Textbook of Pediatrics (16th Ed): “The value of rectal examination in the diagnosis of appendicitis has been questioned. If the history and abdominal examination are convincing for appendicitis, the rectal examination adds little information. However, if the diagnosis is in doubt, particularly in the very young (younger than 4 years) or in the female adolescent, rectal examination often yields important information.” (Gary Hartman, Chairman Dept Pediatric Surgery, Geo Washington University SOM).

INVESTIGATION AND INITIAL MANAGEMENT

Which Plain Films

Study reviewing 252 ED patients presenting with abdominal pain who had an “abdominal series” (2 views of the abdomen + CXR). Radiologic pathologic findings were present in 20% of the abdominal films and in 13% of the chest radiographs. The author found that both the upright CXR and the supine abdomen were useful in providing information that impacted therapy. However, the upright abdomen contributed no information not apparent from the other two films. Conclusion: the abdominal series should consist of two films: the supine abdomen and the erect CXR. (Mirvis, Am J Radiol 147:501; 1986)

Air Fluid Levels

These don't always mean paralytic ileus or mechanical obstruction. Often, they can be normal. The average normal patient may have up to four or more air-fluid levels on an upright film. Most will be small, however (under 2.5 cm in length) and located in the large bowel. Larger air-fluid levels located in the small bowel are abnormal. (Gammill, Surgery 71:771; 1972)

Pain Control in the ED

The dictum of withholding narcotics for fear of masking vital symptoms or physical findings, dates back at least to Sir Zachary Cope's monograph on acute abdominal pain first published in 1921. Conventional surgical wisdom proscribes the use of narcotics until a firm diagnosis is established.

Over the last two decades authors have reported that pain meds, including narcotics, may be given without adversely affecting pre-operative diagnostic accuracy:

- Podgorny: Ann Emerg Med 10:547; 1981
- Zoltie: An R Coll Surg 68:209; 1986
- Attard: BMJ 305:1020; 1992
- Pace: Acad Emerg Med 3:1086; 1996
- Lovecchio: J Emerg Med 15:775; 1997
- Vermeulen: Radiology 210:639; 1999
- Mahadevan: Am J Emerg Med 18:753; 2000
- McHale: Eur J Emerg Med 8:131; 2001

Similarly, narcotic analgesia in children with acute abdominal pain does not appear to adversely affect the ability to identify surgical conditions (Kim: Acad Emerg Med 9:281; 2002)

Recent editions of Cope's classic work now condemn the withholding of analgesia as a "cruel practice" and advocate that "a responsible surgeon should evaluate the patient as early as possible, formulate a plan, and give analgesia."

For the emergency physician, it's a good idea to at least let your surgeon know of your preferred approach to this problem. Temporarily delaying analgesia until immediately after surgical consultation, but prior to definitive diagnosis is a compromise most surgical colleagues will accept.

Fluids for both Management and Diagnosis

Most summaries on the subject include the administration of IV crystalloid as part of the initial management of patients with acute abdominal pain, especially those with obvious signs of hypovolemia. The administration of crystalloids to these patients also may have significant diagnostic value. As a routine in our ED, patients presenting with signs and symptoms of an acute abdomen all receive aggressive IV hydration during the course of their evaluation (assuming no cardiovascular co-morbidity). By the time labs and x-rays are ready for review (which may take several hours in our facility), the patient typically has received 1-2 liters of fluid or more. As a policy, all these patients undergo a repeat clinical assessment prior to obtaining a surgery consultation and, surprisingly, many are found to have complete resolution of all symptoms and signs. Few of such patients prove to have surgical lesions.

A review of the literature turned up very few well designed studies specifically examining this phenomenon. Graff looked at patients being observed in the ED for 10 hours for possible appendicitis. As would be expected, those who had appendicitis had a worsening of symptoms during the observation period. Importantly, those with no surgical lesion actually *improved* during the observation period, with the only intervention (presumably) being hydration and time. (Graff, Ann Emerg Med 20:503; 1991)

DKA and Acute Abdominal Pain

Patients with DKA may present with co-existent abdominal pain and generalized tenderness which may progress to board-like rigidity and even rebound tenderness. Most often a result of the DKA itself, the mechanism of this pain may be related to hypovolemia, hypotension and a relative bowel ischemia together with a total body deficit of potassium. Conversely, an acute surgical lesion may precipitate DKA. How, then, should one proceed?

Abdominal symptoms and signs caused by DKA typically resolve with fluid resuscitation and, in any event, treatment of the DKA must precede any surgical intervention because operative mortality is high otherwise. On the other hand, if symptoms and signs persist despite having achieved reasonable homeostasis, surgical pathology must be assumed.

Similarly, patients with alcoholic ketoacidosis frequently present with GI complaints, including abdominal pain. Initial treatment proceeds along the same lines (correction of hypovolemia and electrolyte abnormalities) with consideration of such entities as pancreatitis, hepatitis, gastritis and pneumonia if pain persists. (Wrenn: Am J Med 91:119; 1991)