Chapter

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Acute Abdomen in Non-surgical Disorders

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The "Acute Abdomen" is medical slang for sudden abdominal symptom consisting for the most part of pain, vomiting, constipation and changes in genitourinary function. The correct interpretation of acute abdomen is challenging, which requires immediate attention and prompt action, as many of the conditions producing acute abdomen are potentially lethal. Few other conditions demand such precise judgment as diagnosis of acute abdomen. Very often the onset of a catastrophic event may be preceded only by subtlest of the symptom or sign, which requires meticulously executed detailed history and physical examination. The diagnosis of "Acute or Surgical Abdomen" may not be correct as the term is misleading and very often encountered error in judgment. The most obvious of "Acute Abdomens" may not require operative intervention; on the other hand, the mildest of abdominal pain and other symptoms may require an urgent intervention.

Diagnosis of acute abdomen is not easy. Studies in the past has clearly demonstrated that half of the patients, coming to the emergency room with complaints of acute abdominal pain turned out to be cases of non-specific pain, i.e. gastroenteritis, menstrual discomfort or other disorder[1, 2]. Half of admitted patients with such emergency, leave hospital with different diagnoses. The analysis is further difficult in women and patients of more than 50 years of age. There is considerable amount of overlap between cases that require surgery or case, which can be treated with medicines successfully. The most common condition, which is thought to require operation, is acute salpingitis and on the other hand, which is thought not to need surgery on initial evaluation is acute appendicitis and small bowel obstruction. Other features like fever, vomiting and leucocytosis are present in both the groups, however in patients with surgical problems, pain nearly always precedes vomiting and opposite order is commoner in non-surgical diseases. Diagnostic yield increases when pelvic and rectal examination is carried out regularly.

Unfortunately, there is no set of laboratory or X-ray findings, which can confirm the diagnosis. In the event of strong suspicion of surgical cases, laparotomies are routinely performed. Inevitably, certain explorations result only to exclude presence of any surgical disease (false positive). About 15% operations for acute appendicitis show only normal appendix and prove only non-surgical causes of symptoms or in some cases no abnormalities at all. However, such negative laparotomies should not be considered as unnecessary operations and blame to the operating team should be avoided as in the absence of any effective diagnostic maneuver, they may be useful in proving a non-surgical cause (false negatives at the expense of false positives). Recently diagnostic laparoscopes are being increasingly preferred by surgeons and have curtailed non-therapeutic laparotomies considerably.

Causes

Abdominal pain is the most constant symptom of acute abdomen whether of surgical or non-surgical origin. It is worthwhile classifying pain according to speed and character of the onset of pain. The onset may be sudden, rapid or gradual (Table 1).

Sudden severe pain will have an abrupt and noticeable beginning and some of the examples in this class require immediate surgery (i.e. perforation, passage of kidney stone, etc.) however, an abdominal vascular accident, i.e. mesenteric occlusion or leaking aneurysm may appear with catastrophic onset without much localizing sign. In fact, the combination of extremely severe pain and relatively unimpressive abdominal

Table 1: Causes of abdominal pain (non-surgical) according to rate of development

a.	Sudden onset (instantaneous)
	Infarction of an organ (spleen, gut)
	Rupture or dissecting aneurysm
	Spontaneous pneumothorax
b.	Rapid onset (minutes)
	Pancreatitis
	Embolism or thrombosis
	Vascular rupture
	Pneumonitis
	Peptic ulcer
	Diverticulitis
	Trauma or infection of muscles
c.	Gradual onset (hours)
i.	Inflammation of abdominal organs
	Pancreatitis, gastritis (peptic ulcer), mesenteric lymphadenitis, Crohn's disease, ulcerative colitis, cystitis or pyelitis, prostatitis.
ii.	Worm infestation
	Ascaris, strongyloids
iii.	Referred pain
	Pneumonia, coronary occlusion
	Radiculitis from arthritis, Herpes zoster
	Torsion of testis
iv.	Metabolic
	DKA, Lactic acidosis, porphyria
v.	Neurogenic cause
	Tabes dorsalis, H zoster, causalgia

findings is characteristic of acute abdominal vascular disease. Pain that has rapid onset develops over an hour and an increase in next several hours is characteristic of inflammatory process (appendicitis and pancreatitis) or obstruction of a hollow viscus (non-strangulated bowel obstruction or urinary tract obstruction). The patient's behavior on bed may sometimes offer a clue to the diagnosis, patient lying still on bed suggests parietal pain (peritonitis), if he is moving about restlessly to find a comfortable position, it may be visceral (colicky pain). Similarly location of pain, radiation, aggravating or alleviating factors and associated symptoms may all provide some clues.

Associated symptoms, vomiting occurs in most cases with pain of rapid onset but the persistence and severity of vomiting are much greater with intestinal obstruction than any primary inflammatory disorder. An important point to remember here is that pain nearly always precedes vomiting with surgical problems, however, opposite sequence is common with non-specific abdominal disorder (e.g. gastroenteritis). Moderate temperature elevation is characteristic of most of the diseases in this category. However, higher temperature ($>39^0$ C) with chills are characteristic of UTI or cholangitis while fever developing late in the course suggests other diagnosis, i.e. cholecystitis, appendicitis, diverticulitis. In females, menstrual history or history of any vaginal discharge is significant if diagnosis of ectopic pregnancy or pelvic inflammatory disease is suspected. Ovarian cysts can cause sudden pain by enlarging or rupturing. In a ruptured follicular cyst pain occurs at the midcycle (mittelschmerz) whereas pain of a ruptured corpus luteam cyst develops around the time of menstruation.

DIAGNOSTIC IMAGING

A plain X-ray abdomen in supine and erect position and/or lateral decubitus films may be ordered. Plain radiographs of chest may be obtained in most cases. Ultrasonography of the abdomen may be very helpful in acute abdominal conditions related to hepatobiliary tract, solid visceral tumor and pelvic pathologies.

Recent advances in computed tomography (CT) helped include thinner slices, faster scan time and higher spatial resolution allowing for more accurate evaluation. Spiral CT eliminates respiratory motion artifacts and decreases the required amount of IV contrast. The newest generation spiral CT scanner has multiple detectors and can scan the entire abdomen and pelvis in very short time. CT scan in patients with acute abdominal pain has considerable diagnostic and therapeutic impact. A study was conducted in Beth Israel Hospital US, in 2004, to demonstrate the value of CT in emergency hospital for patients with non-traumatic abdominal pain[3]. In 536 consecutive patients, the physicians were asked to complete a questionnaire where they were asked to declare most likely diagnosis, prior conjecture of normal or abnormal CT results, their treatment plan, and the role in deciding to order CT. When the post-CT diagnosis and subsequent management was matched with the earlier information, results were really interesting. Pre- and Post-CT diagnosis were similar in only 200 of 536 (37%) patients. The physicians' certainty in the accuracy of their pre-CT scan diagnosis was less than high (88% of patients). Prior to CT, the management plan include hospital admission for 402 patients while after CT scan, 312 patients were actually admitted (17% less admission). Prior to CT scan 67 of 536 (13%) of patients would have undergone immediate surgery. However, after CT scan only 25 (5%) actually required surgery. Among patients with the four most

common pre-CT scan diagnosis (appendicitis, abscess, diverticulitis, and urinary tract stones). CT scan had the greatest impact on hospital admission and surgical management. For patients with suspected appendicitis CT scan reduced the hospital admission rate in 28% (26 of 91) of patients and changed the surgical management in 40% (39 of 91) of patients. In another study, [4] CT scan in patients with abdominopelvic pain showed considerable diagnostic and therapeutic impact, altering management in 58% patients, studied. Here, the major impact was to avert intended laparotomy.

PITFALLS

The following is the list of important points for a diagnostician confronting the problem of a patient who has acute abdominal pain.

1. Acute disease of the chest may closely mimic primary diseases of abdomen. Pneumonia, pulmonary infarction, myocardial infarction, congestive heart failure should always be considered. Most patients of emetogenic rupture of the esophagus have abdominal and not chest pain.
2. In the initial twelve hours, the exact etiology whether surgical or medical cannot be decided, i.e. appendicitis can almost never be excluded short of laparotomy or laparoscopy during this interval. So, reevaluation of patients at frequent intervals is always necessary. If the patient unexpectedly worsens, previous judgment should be suspended and exploration is carried out.
3. Acute pancreatitis is a diagnosis of exclusion (except exceptionally high serum amylase, >1000 unit). Even after the diagnosis of presumed pancreatitis deteriorates, operation should be seriously considered without any fear of any detrimental effects on the course of pancreatitis[5].
4. Acute pyelonephritis occasionally produces abdominal pain out of proportion to dysuria and can sometimes mimic acute appendicitis, cholecystitis or intestinal obstruction. Urinalysis will reveal the real cause of the symptoms.
5. Nearly 25% cases of perforated peptic ulcer are atypical in the sense that onset is not abrupt or free intraperitoneal air is absent. On the other hand, presence of pneumoperitoneum may not indicate intra-abdominal perforation (non-surgical pneumoperitoneum) always. A study from Turkey reported six such cases where no intraabdominal pathology was found.
6. Vascular causes include infarction of various intra-abdominal organs, which present in different manner and often deceptively. Acute mesenteric infarction is difficult to diagnose early. Paucity of abdominal findings, lack of systemic signs and inconclusive X-ray picture, all contribute to missed diagnosis. Stools containing blood is a late finding. Infarction of other abdominal organs, i.e. greater omentum may present as acute abdomen and mimic acute appendicitis[6]. In another patient, already on anticoagulants, small bowel infarction complicated by large rectus sheath hematoma, was diagnosed by CT scan, presented as acute abdomen[7]. Rectus sheath hematoma should be considered in the differential diagnosis of acute abdominal pain in the elderly, especially in the absence of underlying conditions[8]. Some diseases involving small and medium sized vessels (i.e. SLE) may produce acute abdomen like picture . In one case report colonic and especially rectal involvement from vasculitis presented with profound and life-threatening manifestations of acute abdomen, i.e. rectal perforation[9].
7. Surgical conditions, that present with visceral pain and no sign of intestinal obstruction and no abdominal mass or localized tenderness are difficult to diagnose early and very often confused with gastroenteritis or any other nonspecific causes of pain. The common conditions in this group are mesenteric vascular occlusion, Richter's hernia, caecal volvulus and some cases of gallstone ileus. On the other hand, idiopathic pseudoobstruction (Ogilvie's syndrome) may present with progressive abdominal distension and abdominal pain like acute abdomen[10].
8. One of the most important, though rare causes of acute abdominal pain is acute porphyria. Because of its wide range of unspecific symptoms and signs, acute porphyria is rarely considered as a differential diagnosis of acute abdomen. Some patients have undergone unnecessary surgery. In a study from Taiwan, thirty-two patients of porphyria-visited emergency room in thirteen years, ten were diagnosed first time in the emergency department itself[11]. All these patients presented with abdominal pain but without fever, dermatological or neurological symptoms. On an average most of them attended emergency room repeatedly (at least four times) before being diagnosed properly and were treated with different kind of analgesics including narcotic analgesia. This study leads one to believe that when a patient attends emergency room repeatedly with severe abdominal pain, acute porphyria should be taken into consideration.

9. Lactic acidosis is another cause of abdominal pain in accident and emergency department. Metformin, an important drug in type 2 diabetes mellitus management, is rarely a cause of lactic acidosis with a mortality rate of 50%. The chief presenting complaints are non-specific and patient may present as acute abdominal pain with reduced consciousness. In a case report from Germany, a 79-years-old lady was misdiagnosed as a case of acute intestinal ischemia and an exploratory laparotomy was carried out without much success. Post-operatively, the diagnosis of metformin associated lactic acidosis with acute renal failure was made and the woman was successfully treated with bicarbonate dialysis[12].
10. Certain infections can also present as acute abdominal pain. In a study from China, fourteen patients of Dengue Hemorrhagic Fever / Dengue Shock Syndrome (out of 382 patients) presented as acute abdomen. Presumptive diagnosis of acute cholelithiasis (10 patients), non-surgical peritonitis (3 patients), and acute appendicitis (1 patient) were made. Patients who underwent invasive procedures had prolonged time in the hospital (11 days vs. 7 days, p= 0.015)[13].
11. Worm infestation is an endemic disease in tropical region. Ascariasis is a helminthic infection very commonly seen in this region especially in communities of low socioeconomic status. Rarely it may present as acute abdomen where most of the modern and sophisticated means of investigative techniques (Ultrasound, CT scan, Radionuclide study or MRI / MRA) would fail. In a case report from New Jersey, USA, after the unsuccessful attempt to diagnose a case of acute abdomen with all the possible investigative measures, a small bowel series was suggested. The diagnosis of Ascariasis leading to obstruction was confirmed and was treated medically successfully[14]. Such diagnosis is more important and should be legitimately thought amongst immigrant communities in developed countries. Other infections, i.e. strongyloides, amebiasis and, giardiasis may also present as acute abdomen and especially looked for, when patients present with history of diarrhea[15]. Eosinophilic jejunitis / eosinophilic gastroenteritis, though a rare disorders, may be a cause of acute abdomen[16,17].
12. Neurogenic causes of acute abdominal pain, i.e. tabes dorsalis, Herpes zoster infection, causalgia, etc. should also be thought. Diabetic neuropathy, radiculopathy may be a cause of acute abdominal pain which should be suspected with history of diabetes and previous such episodes.
13. The presence of intraperitoneal air signifies perforation of a hollow viscus in most of the patients. Rarely, pnemoperitoneum may be present in absence of a surgical cause. In a study where six children of such non-surgical, spontaneous or idiopathic pneumaoperitoneum were analyzed, two of such children underwent exploratory laparotomy and no surgical cause was detected. One child showed malrotation and rest of the children were managed conservatively. An understanding of this situation should possibly reduce the need to perform emergency laparotomy in an otherwise well patient with an unexplained pneumoperitoneum[18].

Many patients presenting in emergency room have a symptom model (a friend or relative with a similar complaint), multiple other complaints with somatization, a history of physical abuse at the hand of parent or relative and sign of guilt or penance may be carefully sought. However, the presence of these features does not exclude the possibility of an organic source of the pain. Their management should always be planned in the background of their previous history and more reliance on signs rather than symptoms should be given. Consultation with psychiatrist should benefit these patients.

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