Class Room

The Acute Abdomen

Prof. Dr. R. Ganesan,* S. Ramanujam**

Chettinad Health City Medical Journal 2012; 1(1): 36 - 39

"Prof.Dr. R. Ganesan is presently the Head of Department, General Surgery in Chettinad Hospital & Research Institute. He has vast experience in the surgical field and as a teacher in various government institutions spanning over three decades."

*Professor, ** Assistant Professor, Dept. of General Surgery, CHRI

Abstract

The acute abdomen may be defined as an intra- abdominal process causing severe pain and often requiring surgical intervention. It is the most common complaint by individuals attending the outpatient department or the emergency department. In most of the cases, a thorough history and physical examination will reveal the cause of the abdominal pain or at least sufficiently narrow down the possibilities to allow initial treatment decisions to be made. Therefore it is of prime importance that a thorough examination be done both in elective and emergency scenarios.

Causes of the Acute Abdomen

Any pathology in the organs in the abdomen, pelvis and retroperitoneum may cause acute abdominal pain. It may include the following:

Table 1. Causes of acute abdomen

Intra abdominal causes

Perforation

Gastro Intestinal (GI) tract

- Ulcer (Duodenal ulcer/ Gastric ulcer)
- Infection (small intestines in Enteric fever)
- Trauma
- Parasites
- Cancer

Genito Urinary (GU) tract

Inflammation

- Acute Gastritis
- Duodenitis
- Cholecystitis
- Pancreatitis
- Acute Appendicitis
- Acute Salphingitis, etc...

Obstruction

GI tract

- Adhesions
- Hernia
- Volvulus,
- Tumor
- Intussusception
- Parasites

GU tract

- Stone
- Tumor

Vascular System

- Thrombus
- Embolus (mesenteric ischemia)

Hemorrhage

- GI tract
- GU tract

Medical Causes of Acute Abdomen

One should not forget that there are occasions, during which symptoms of acute abdomen may occur in the following medical conditions.

Table 2. Medical causes of acute abdomen

Supradiaphragmatic

- Myocardial infarction
- Pericarditis
- Lower lobe pneumonia
- Pneumothorax
- Pulmonary infarction

Endocrine and metabolic

- Diabetic ketoacidosis
- Addisonian crisis

Hematologic

- Sickle cell disease
- Acute leukemia
- Porphyria

Drugs

Nervous System

- Herpes Zoster
- Tabes dorsalis
- Nerve root compression

The Pathophysiology of Abdominal Pain

It is important for us to know the mechanism behind the distribution of pain fibres within the abdomen and the retroperitoneum, so that the clinical symptoms and signs of acute abdomen can be deciphered. Pain may be mediated by somatic or visceral nerves. In addition patients might have referred pain.

Visceral pain vs somatic pain

During embroyological development, the gastrointestinal tract is divided into three regions based on blood supply and innervation; these relationships are maintained from embryonic to adult life. The foregut consists of oropharynx, esophagus, stomach, proximal duodenum, pancreas, liver, biliary tract, and spleen. The midgut includes distal duodenum (ligament of Treitz), the small intestine, appendix, cecum, ascending colon, and proximal two thirds of the transverse colon. Rest of the colon and rectum make up the hindgut.

The GI tract consists of both somatic as well as visceral peritoneum. Though both of them are continuous, the visceral peritoneum is supplied by the autonomic nerves whereas the somatic peritoneum is supplied by spinal nerves. Therefore visceral pain tends to be vague and poorly localized to the epigastrium, periumbilical region, or hypogastrium, depending on its origin from the primitive foregut, midgut, or hindgut. In contrast, parietal pain corresponds to the segmental nerve roots innervating the peritoneum and tends to be sharper and better localized.

The visceral peritoneum and its associated organs are insensitive to pain caused by touch, electrical stimulation, and cutting or burning; but the sensation of pain from these sites can be induced by stretching, distention of hollow viscus, or vigorous contraction against resistance. Visceral pain usually indicates the presence of significant intraabdominal disease. Extension of the underlying disease process to include the parietal peritoneum is implicated by the transition of visceral pain to somatic pain and often mandates the need for urgent operative intervention (e.g., intestinal obstruction with strangulation). However, somatic pain of intraabdominal origin can be caused by conditions that do not require an emergency surgery (e.g., acute diverticulitis). Therefore it is important to distinguish localized somatic pain from diffuse somatic pain. Although conditions associated with localized peritonitis may require operation, the degree of urgency is far less than in diffuse peritonitis, where an emergency surgery is usually required.

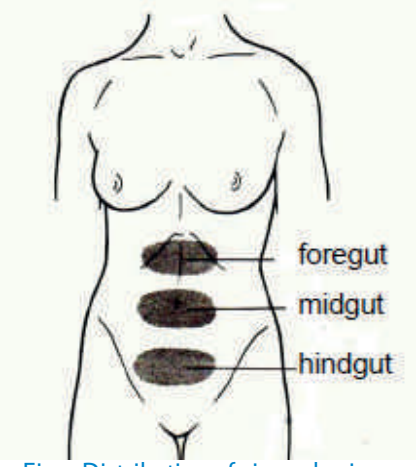

Fig 1. Distribution of visceral pain

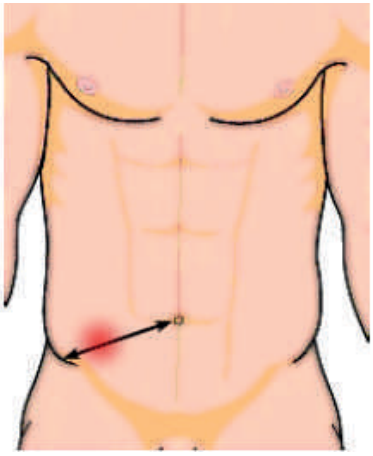
Fig 2. Localised somatic pain

Referred Pain

Apart from somatic and visceral pain, there is another form of pain related to acute abdominal disorders- referred pain. Referred pain is perceived at a site distant from the original location of the pathology but in a region that shares a common embryonic origin. One common example is the radiation of pain from hepatic abscess to the right subscapular region or right shoulder. This is because phrenic nerve is derived from the fourth cervical nerve. Therefore irritation of the undersurface of the right hemidiaphragm, caused by the hepatic abscess may induce pain in the skin distribution of the fourth cervical nerve.

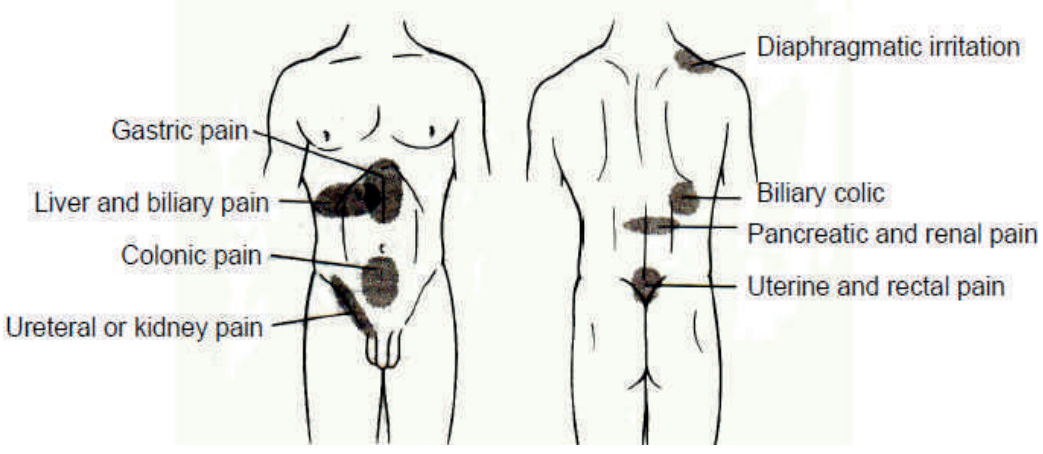

Fig. 3. Referred pain

Clinical Signs and Symptoms

SYMPTOMS reflect a subjective change from normal function which includes pain, anorexia, nausea, vomiting, dysphagia, weight loss, bloating, diarrhea, constipation, flatulence. Duration, intensity, character, radiation and activities that exacerbate or relieve pain should be enquired. Sudden onset of excruciating pain suggests conditions like intestinal perforation or bowel ischemia, though other conditions like biliary colic, can also present as sudden pain. Pain that develops and worsens over several hours usually denotes conditions of progressive inflammation or infection like cholecystitis, colitis, or bowel obstruction. The history of progressive worsening, in contrast to intermittent episodes of pain, can help to differentiate infectious processes from obstruction or colic where spasmodic pain is experienced. Eating generally worsens the pain due to bowel obstruction, pancreatitis, diverticulitis, biliary colic or bowel perforation. Food can relieve pain due to nonperforated peptic ulcer disease or gastritis. Patients with peritonitis avoid any activity that causes sudden body movement or stretch of the abdomen.

Associated symptoms are also important clues to the diagnosis. Vomiting is more likely to precede the onset of significant abdominal pain in most medical conditions whereas the pain of an acute surgical abdomen presents first and stimulates vomiting. Constipation or obstipation results from mechanical obstruction or decreased peristalsis. Diarrhea usually associated with blood can be seen in colonic ischemia.
Taking a careful clinical history and examination will help in planning for investigation and management, like history of alcoholism for pancreatitis, past history of surgery and renal stones and history of missed periods for ruptured ectopic pregnancy.

SIGNS are objective and reproducible findings.Physical examination should begin with general examination including pallor, cyanosis, diaphoresis and vital signs, inspection of patients attitude in bed, and facial expression. Unwillingness to change position indicates underlying peritonitis; these patients lie very still in the bed during the evaluation often maintaining flexion of their knees and hips to reduce tension on the anterior abdominal wall. A patient with acute pancreatitis usually prefers to lean forward.

Auscultation provides us with information about the gastrointestinal tract and the vascular system. A quiet abdomen is found in ileus, whereas hyperactive bowel sounds are heard in enteritis and early ischemic intestine. Bruits reflect turbulent blood flow within the vascular system and indicate stenosis.

Percussion of the abdomen distinguishes gaseous distention from ascites; Tenderness to percussion, either localized or across the abdomen, suggests focal or diffuse peritonitis.

Palpation reveals the presence of warmth, tenderness, guarding, rigidity and the presence of any abdominal mass. Palpation should always be gentle. The patient is informed prior to palpation, and palpation should always start from an area where the patient does not have pain.

Common Diagnosis based on region of abdominal pain

Epigastric	
	Gastritis
	Gastric ulcer
	Pancreatitis
Right hypochondrium	
	Duodenitis
	Acute cholecystitis/cholelithiasis
	Acute hepatitis
	Pneumonia right lower lobe
	Fracture ribs
Left hypochondrium	
	Splenic injury
	Pancretitis (tail)
	Pneumonia left lower lobe
	Fracture ribs
Umbilical	
	Appendicitis (early stage)
	Small intestinal obstruction
	Regional enteritis
Right iliac fossa	
	Acute appendicitis
	Ruptured ectopic
	Pelvic inflammatory disease
	Torsion of testes/ovary cyst
	Ureteric calculus
Left iliac fossa	
	Diverticulitis
	Ruptured ectopic
	Pelvic inflammatory disease
	Torsion of testes/ovary cyst
	Ureteric calculus
Suprapubic	
	Cystitis
	Vesicle calculus
Right and left lumbar	
	Renal calculus
	Nephritis

Investigations

Initial haematologic investigations include haemogram, electrolytes and blood urea. Serum amylase and liver function tests can be done in patients with upper abdominal pain.

A guiding principle in ordering radiologic tests is that the result should substantially influence plans for further testing or therapy. Redundant tests should be avoided1. Plain X ray abomen and X- ray chest in the erect posture to look for free air under diaphragm in case of perforation. Upright chest radiographs can detect as little as 1 mL of air injected into the peritoneal cavity.

Clinical Signs and Symptoms

Abdominal ultrasonography is extremely useful in detecting gallstones, assessing gallbladder wall thickness, diameter of the extrahepatic and intrahepatic bile ducts, more importantly the presence of intraperitoneal fluid. Transvaginal ultrasound aids in the detection of abnormalities of the ovaries, adnexa, and uterus.

Most of the common causes of acute abdomen and their complications are readily identified by CT scanning. CT is also excellent in differentiating mechanical small bowel obstruction from paralytic ileus. Some of the most difficult diagnostic dilemmas can often be identified by CT scans.

Immediate Treatment of Acute Abdomen

Most of the causes of acute abdomen are associated with third space losses. This leads to rapid dehydration with worsening of vitals, especially if the patient has associated vomiting and diarrhea. Therefore intravascular volume resuscitation is of prime importance. Large bore intravenous cannulas should be obtained and fluid resuscitation with isotonic crystalloids should begin. To help assessment of volume status a foley's catheter has to be inserted. Nasogastric tube is mandatory if concern regarding obstruction is present.

Pain and anxiety worsen the tachycardia in most of the patients. Adequate intravenous analgesia is a must. Antibiotics are started if inflammation is suspected. Definitive therapy or procedure will vary with the diagnosis, like emergency laparotomy for perforation, obstruction or inflammation and gangrene. Never should we forget to reassess the patient on a regular basis.

Further reading

1. Sabiston Text book of Surgery, 18th edition.
2. Greenfield's Surgery, Scientific Principles and Practice, 4th edition.

SIT LONGER, DIE YOUNGER!!

Almost all accept that sedentary life style predisposes to a variety of ailments and to prevent that one must lead an active life with regular exercise. But according to a recent study published in the Archives of Internal Medicine, the lead investigator Dr. Hidde Van Der Ploeg from Sydney University claims that sitting for more than four hours in a day can increase risk of early death by 15% even if one leads an active life with regular exercise. Sitting for too long is detrimental because of the absence of muscle contraction that is necessary to clear the glucose and lipids from the blood. Besides, prolonged inactivity reduces the activity of one of the important enzymes involved in the breakdown of lipids in the blood. So, if one wants to live long, one must take every opportunity to stand, take a walk and refuse to sit particularly in front of a television.

- Dr. K. Ramesh Rao