Acute abdomen is considered an emergency characterized by sudden and severely tender abdominal pain. It is usually associated with life-threatening medical conditions that prompt urgent diagnosis and management. Differential diagnoses should be ruled out with physical examination, laboratory tests, and different imaging modalities. Management is based on the underlying etiology through either medical treatment or surgical intervention.

Definition of Acute Abdomen

Acute abdomen as a symptom complex

An acute abdomen is not a single disease entity, but a blanket term for a symptom complex that constitutes a life-threatening abdominal condition that needs urgent medical attention. The symptoms can have both abdominal and extra-abdominal etiology.

The term ‘acute abdomen’ is used to describe a patient’s condition until a final etiological explanation can be given and a diagnosis can be made, and it always describes an emergency situation. The phrase acute abdomen should, therefore, be carefully selected in a clinical context.
Key symptoms of acute abdomen

Abdominal pain is the most important and the most frequent complaint in patients presenting with an acute abdomen in emergency settings. The pain is of acute onset, often very severe, and non-traumatic; although, in some patients, pain may be mild or even absent.

The following complaints are also part of an acute abdomen symptom complex and are considered to be key symptoms:

- Nausea, vomiting
- Constipation
- Symptoms of shock (dyspnea, oliguria, anuria, dizziness, palpitations)
- Poor general health
- Bleeding (hematemesis, melena, etc)

In very young and elderly patients, as well as in pregnant women, acute abdomen may present in a more diffuse manner and with atypical symptoms that are less specific for the underlying pathology such as abdominal bloating, heartburn, abdominal discomfort, drowsiness, and general ill-health, which may lead to a delay in the proper diagnosis and treatment. This results in increased complications and higher morbidity and mortality.

Etiology of Acute Abdomen

Causes of acute abdomen

The causes of the acute abdomen are broadly categorized into:

1. Localized abdominal pain.
2. Diffuse clinical conditions, such as inflammation, infection, mechanical obstruction, and circulatory disturbances.

Note: The most important causes of the acute abdomen are inflammations or perforations of the intraperitoneal organs (e.g. appendix, bile ducts, and stomach); intestinal obstruction (ileus) and visceral circulatory problems.

These most common causes of the acute abdomen should always be ruled out first. Some of the extra-abdominal entities may mimic an acute abdomen, such as myocardial
infarction, lower lobe pneumonia, and testicular/ovarian torsion. It makes sense to conduct a targeted observation and examination by organ system to reach the accurate diagnosis.

Diagnosis of Acute Abdomen

Clinical diagnosis of acute abdomen

Acute abdomen represents an emergency situation and needs urgent evaluation. Several of the possible disease complexes which could lie at the heart of the diagnosis requires a prompt causal therapy for the patient. Weighing up how thorough an initial diagnosis is required before proceeding with the first steps of treatment is different from case to case and depends on the following factors:

- **Hemodynamic stability of the patient:** Hemodynamic instability, such as unexplained decreases in blood pressure, can be indicative of bleeding. Indications of internal bleeding would suggest immediate surgical treatment.
- **Extent of peritonism:** Local or diffuse as a measure of the progression of the symptoms.
- **Clinical stability of the patient** or is their condition rapidly deteriorating?

History

A proper history is indispensable and can give clues to the underlying etiology of the acute abdomen. It is important to ask:

**Where the pain began and the current location of it** in order to gain clues to the primarily affected organ. For example, the pain of acute appendicitis starts in the periumbilical region and then shifts to the McBurney’s point.

**Type of pain:** Description of the intensity and nature of the symptoms.

- **Visceral pain:** Relatively hard to pinpoint, dull, pressing pain that often radiates to other regions of the body, as well as non-specific symptoms such as vomiting, sweating, and hypotension e.g. stomach ulcer perforation or inflammation.
- **Colic pain:** Belongs to the visceral pain category, increasing and decreasing intensity, extremely unsettled patients e.g. gallstones, kidney stones or ileus.
- **Somatic pain:** Relatively easy to locate, although becomes increasingly diffuse in advanced peritoneal irritation, pricking to stabbing pain, often only mild or no vegetative attendant symptoms at all e.g. appendicitis.

**Age of patient:** Probable diagnoses of certain disease complexes can be evaluated based on the age of the patient. While invagination and testicular torsion are relatively common amongst younger patients, perforations of the GI tract or tumors are more common diseases amongst adults. This knowledge also allows for more targeted clinical diagnosis.

**Patient medication history:** The medication history of the patient is very important. If surgical symptoms present, then we have to determine the use of anticoagulants such as warfarin.
Physical examination

In order to clinically examine a patient with an acute abdomen, it is necessary to:

Inspection for injuries or hematomas, hernias, other abdominal wall defects or skin discoloration (pancreatitis).

- **Auscultation** should always be performed prior to manual examination in order to avoid provoking intestinal noises. Intestinal sounds should be auscultated in 4 sections. Are there intestinal noises present? What grade are they? If no noises are heard, this could indicate a paralytic ileus.
- **Palpation** to detect muscle rigidity, muscle guarding, peritonism (rebound tenderness), tenderness, and ascites.
- **Percussion** helps in the detection of ascites, and abdominal fluid.
- **Digital rectal examination** for conditions such as palpable tumors, an empty bowel (caused by an obstacle such as ileus or tumor) and blood.

Note: A digital rectal examination is always employed by acute abdomen – a fact which is commonly asked in examinations!

Laboratory testing

The laboratory testing depends upon the suspected diagnosis according to the patient’s medical history, physical examination, and clinical status. The following laboratory parameters are commonly tested in emergency settings:

- **Complete blood counts** (leukocytes, hemoglobin, hematocrit, platelets)
- **Inflammatory parameters** [e.g. C-reactive protein (CRP), creatine kinase]
- **Blood group typing and cross matching**
- **Amylase** and/or **lipase** in the serum (rises in pancreatitis)
- **Liver function tests** (rise in gallbladder inflammation)
- **Lactate** (rises in mesenteric ischemia, shock)
- **Electrolytes**
- Blood sugar
- **Urine sediment** (leukocytes/blood on suspicion of kidney stones or ureteral calculi)
- **Urine pregnancy test** in all women of child-bearing age

**Imaging**

Based on the observations from the history and the physical examination, a targeted diagnostic investigation should take place.

**Ultrasonography of the abdomen**

Sonography of the abdomen is the most cost-effective and fastest procedure to carry out. It can be used as a first line, orientating investigation, used principally to identify gallbladder pathology, abdominal aortic aneurysm, and free fluids such as blood, ascites and the contents of ruptured hollow organs in the abdomen.

Injuries to the parenchymatous organs, widening or perforations of vessels (abdominal aorta, ureter or bile ducts) can also be noticed. In paralytic ileus, a sonogram often has a poor resolution due to the superimposition of air.

**X-rays of the chest and abdomen**

An upright chest X-ray serves to identify free air in the abdomen which can occur as a result of perforation of the hollow organs and is visible as a sub-diaphragmatic crescent of air (pneumoperitoneum). It also detects abnormal chest findings such as pneumonia, which sometimes presents as an acute abdomen.

Plain abdominal radiography in a **left lateral position** can depict an air inclusion between the liver and flank in cases of pneumoperitoneum.

Further, an intestinal obstruction (ileus) can be visualized by **increased fluid levels** in the small and large intestines, or dilated intestinal loops in cases of volvulus, on upright and flat views.
CT scan of the abdomen

A CT scan is the gold standard in the diagnostics for acute abdomen if there is a justifiable suspicion of acute inflammation of intra-abdominal structures (e.g. pancreatitis, and diverticulitis). It is also of use in cases where sonography results are less meaningful e.g. in obese patients, if there is air superimposition or if there are large injuries. Advantages of a CT scan include a shorter investigation time and good picture resolution.

Diagnostic Laparoscopy

In selected patients, the diagnostic laparoscopy is sometimes considered when a diagnosis is not established by history, examination, and relevant diagnostic testings.

Differential Diagnosis

Differential diagnosis of acute abdomen is often made in relation to the location of pain in abdominal quadrants and on further characteristics of the pain. The abdominal organs produce symptoms in relation to their location e.g. liver and gallbladder diseases often cause pain in the right upper quadrant, while kidney diseases cause pain in the lumbar regions and spleen diseases in the left upper quadrant.

The next step is to consider which diseases of those organs identified could be responsible for the particular pattern of complaints. The most important differential


Diagnoses are illustrated below.

<table>
<thead>
<tr>
<th>Organ System</th>
<th>Organ with the clinical picture</th>
</tr>
</thead>
</table>
| Upper abdomen (both sides possible) | • Lungs/Pleura: Pleurisy, [Pneumonia](https://en.wikipedia.org/wiki/Pneumonia), [Pneumothorax](https://en.wikipedia.org/wiki/Pneumothorax), [Pulmonary embolism](https://en.wikipedia.org/wiki/Pulmonary_embolism)  
  • Heart: [Acute Myocardial infarction](https://en.wikipedia.org/wiki/Acute_myocardial_infarction), [Pericarditis](https://en.wikipedia.org/wiki/Pericarditis)  
  • Kidneys: Renal pelvis calculi, nephritic abscess, [Pyelonephritis](https://en.wikipedia.org/wiki/Pyelonephritis)  |
| Right upper abdomen           | • Bile ducts: cholecystitis, cholangitis  
  • Pancreas: [Pancreatitis](https://en.wikipedia.org/wiki/Pancreatitis)  
  • Duodenum: duodenal ulcer  
  • Liver: [Hepatitis](https://en.wikipedia.org/wiki/Hepatitis), liver abscess, ruptured liver, congested liver |
| Epigastrium                   | • Stomach: [Peptic ulcers](https://en.wikipedia.org/wiki/Peptic_ulcers), [Gastritis](https://en.wikipedia.org/wiki/Gastritis)  
  • Small intestine: Ileus |
| Left upper abdomen            | • Spleen: splenic infarction, [ruptured spleen](https://en.wikipedia.org/wiki/Ruptured_spleen)  
  • Pancreas: [Pancreatitis](https://en.wikipedia.org/wiki/Pancreatitis), [pancreatic cancer](https://en.wikipedia.org/wiki/Pancreatic_cancer) |
| Lower abdomen (both sides possible) | • Intestines: [Diverticulitis](https://en.wikipedia.org/wiki/Diverticulitis)  
  • Urinary: acute urinary retention, [kidney or ureter stones](https://en.wikipedia.org/wiki/Ureteral_stones), [testicular torsion](https://en.wikipedia.org/wiki/Testicular_torsion)  
  • Gynecological.: ovarian cysts, [extrauterine pregnancy](https://en.wikipedia.org/wiki/Extrauterine_pregnancy), duct rupture, inflammation of the ovaries (adenexitis) |
| Right lower abdomen           | • Intestines: [Appendicitis](https://en.wikipedia.org/wiki/Appendicitis) |
| Central abdomen, Navel        | • Intestines: Ileus (mechanical), [Mesenteric ischemia](https://en.wikipedia.org/wiki/Mesenteric_ischemia), volvulus, invagination, toxic megacolon, intestinal infection, [Crohn’s disease](https://en.wikipedia.org/wiki/Crohn%27s_disease), ulcerating colitis |
| Left lower abdomen            | • Intestines: sigmoid diverticulitis |
Treatment of Acute Abdomen

- Since acute abdomen is a medical emergency, the patient’s vital signs and airway (A), breathing (B), and circulation (C) should be initially assessed and managed accordingly.
- An intravenous line should be established and transfusions should be administered immediately unless contraindicated.
- Patients are initially given nothing by mouth (NPO).
- Early analgesic use is recommended, even before a definitive diagnosis is established.
- Intravenous acetaminophen is the first choice. Other non-steroidal anti-inflammatory drugs (NSAIDs) and narcotic analgesics may be given according to the pain severity.

Conservative or operative measures

The definite treatment of acute abdomen is based upon its underlying etiology and is either conservative or operative depending on the diagnosis (e.g. appendectomy and cholecystectomy for appendicitis and cholecystitis, respectively). If abdominal pathology indicates secondary peritonitis, then this has to be treated with antibiotics. It is important not to primarily prescribe cephalosporin in this case. This class of antibiotic has a loophole for enterococci and would therefore not be effective against a number of common bacteria that cause acute abdomen – a point which is commonly asked about in written medical exams.

**Note:** Cephalosporins are not to be used as an initial treatment for peritonitis due to their reduced effectiveness against enterococci.

Disease Progress and Prognosis of Acute Abdomen

The course and prognosis for acute abdomen are highly dependent on the causal factors as acute abdomen is only a working diagnosis until a final diagnosis is established.

Review Questions

Solutions can be found below the references.

1. **Which procedure is obligatory during the examination of patients with symptoms of the acute abdomen?**
   - A. Digital rectal examination
   - B. MRT scan
   - C. Abdominal CT
   - D. Cranial nerve status
   - E. Neurological examinations using major reflexes

2. **Which antibiotics should not be prescribed as the first choice when there is a suspicion of secondary peritonitis?**
   - A. Ampicillin
   - B. Linezolid
   - C. Vancomycin
   - D. Mezlocillin
3. Which of these is amongst the most common causes of the acute abdomen?

A. Appendicitis, cholecystitis, ileus, visceral circulatory disorders
B. Appendicitis, adnexitis, cholecystitis, ileus
C. Appendicitis, myocardial infarction, ileus, visceral circulatory disorders
D. Appendicitis, testicular torsion, cholecystitis, adnexitis
E. Appendicitis, aortic aneurysm, ileus, cholecystitis

References


Correct answers: 1A, 2E, 3A

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