

Acute Abdomen — Symptoms and Differential Diagnoses

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Acute abdomen is an emergency characterized by sudden and severe abdominal pain. It is usually associated with life-threatening medical conditions warranting urgent diagnosis and management. Differential diagnosis should be based on physical examination, laboratory tests, and imaging modalities. Management via medical or surgical intervention depends on the underlying etiology.



Definition of Acute Abdomen

Acute abdomen is a symptom complex

Acute abdomen is not a single disease entity, but a **blanket term for a number of often vague symptoms constituting a life-threatening abdominal condition** warranting 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 mechanism and diagnosis can be established, and it is always an emergency event. 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.

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

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

In very young and elderly patients, as well as in pregnant women, acute abdomen may present with diffuse abdominal pain. Atypical symptoms that are less specific for the underlying pathology such as **abdominal bloating, heartburn, abdominal discomfort, drowsiness, and general ill-health** may delay the diagnosis and treatment. This delay may result in increased complications and higher morbidity and mortality.

Etiology of Acute Abdomen

Causes of acute abdomen

The causes of acute abdomen are broadly categorized into:

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

Note: The most important causes of acute abdomen include inflammation or perforation of intraperitoneal organs (e.g., appendix, bile ducts, and stomach), intestinal obstruction (ileus), and abnormal visceral circulation.

The most common causes of an 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 is sensible to conduct a targeted observation and examination of different organ systems to establish an accurate diagnosis.

Diagnosis of Acute Abdomen

Clinical diagnosis

Acute abdomen **is an emergency warranting urgent evaluation**. Several possible disease complexes, which may be key to the diagnosis, require prompt causal therapy for the patient. Evaluation of the quality of initial diagnosis is essential before proceeding with the first steps of treatment, and it differs from case to case and depends on multiple factors.

- **Hemodynamic instability**, such as unexplained decreases in blood pressure, is indicative of bleeding complications warranting immediate surgical intervention.
- **Local or diffuse peritoneal signs** are a measure of symptom progression.
- **Clinical stability** or rapid deterioration

History

Patient history is indispensable and key to the underlying etiology of the acute abdomen. It is important to ascertain the **origin of pain and its current location** in order to analyze the effects on the primary organ. For example, the pain in acute appendicitis starts in the periumbilical region and is then usually transferred.

Type of pain

- **Visceral pain** is relatively hard to pinpoint. It is a dull and pressing pain that often radiates to other regions of the body. Non-specific symptoms may include vomiting, sweating, and hypotension, e.g., due to gastric ulcer perforation or inflammation.
- **Colic pain** is visceral pain with increasing and decreasing intensity, especially in extremely unsettled patients, e.g., those with gallstones, kidney stones or ileus.
- **Somatic pain** is relatively easy to locate, although it is increasingly diffuse in advanced peritoneal irritation. The pain may be described as pricking to the stabbing, often associated with only mild or no vegetative symptoms, e.g., appendicitis.

Patient's age: The diagnosis of certain disease complexes may 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 amongst adults. This knowledge also enables more targeted clinical diagnosis.

Patient's medication history: The patient's history of medications is very important. The presence of surgical indications may indicate the need for anticoagulants such as warfarin.

Physical examination

Clinical examination of a patient with acute abdomen requires:



- [Image](#): Palpation of the Abdomen. By Pöllö, License: [CC BY 3.0](#)

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

- **Auscultation** before manual examination to prevent intestinal noise: Auscultation of intestinal sounds should be used to determine any intestinal noises present, along with the noise grade and the absence of noises may indicate paralytic ileus.
- **Palpation** for the detection of muscle rigidity, muscle guarding, peritoneal signs (rebound tenderness), tenderness, and ascites
- **Percussion** for the detection of ascites, and abdominal fluid.
- **Digital rectal examination** for conditions such as palpable tumors, and [blood](#)

Note: A digital rectal examination is always employed for the evaluation of acute abdomen.

Laboratory testing

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, and platelets)
- **Inflammatory parameters** (e.g., C-reactive protein (CRP), creatine kinase)
- **Blood group type and cross-matching**
- **Serum amylase and/or lipase** (increases in pancreatitis)
- **Liver function tests** (elevation in gallbladder inflammation)
- **Lactate** (increase in mesenteric ischemia, shock)
- **Electrolytes**
- **Glucose**
- **Urine sediment** (leukocytes/blood suggesting possible [kidney](#) stones or ureteral calculi)
- **Urine pregnancy test** in all women of child-bearing age

Imaging

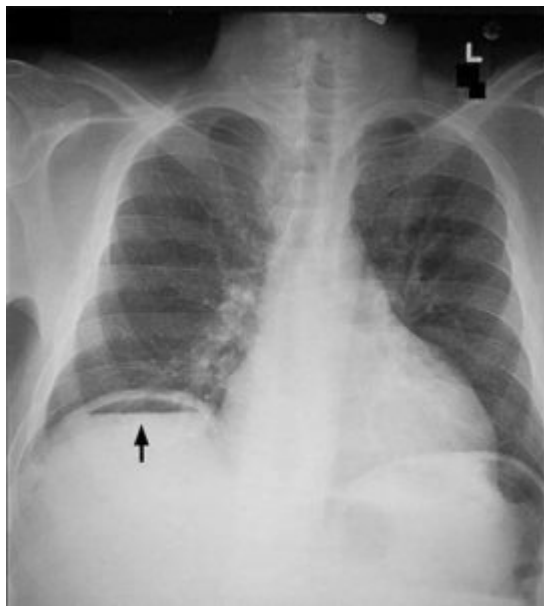
A diagnostic imaging technique should be based on history and physical examination.

Ultrasonography of the abdomen

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

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

X-rays of the chest and abdomen

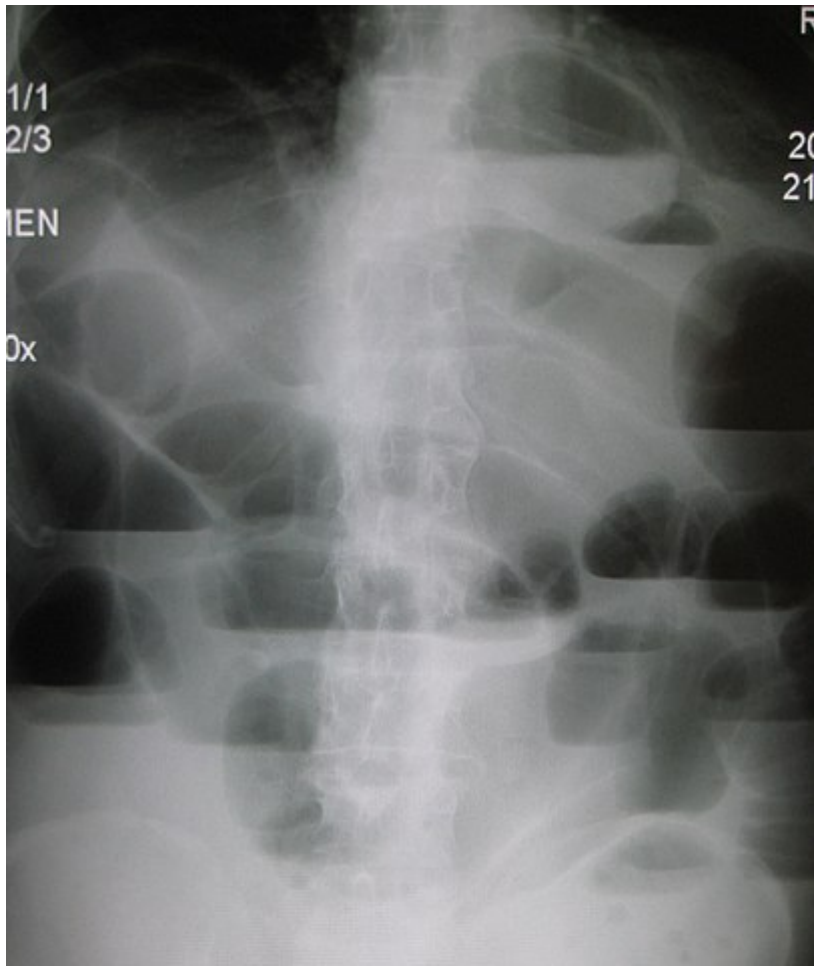


[Image:](#)
Pneumoperitoneum on chest X-ray. By Clinical_Cases,
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An upright **chest X-ray** can be used to identify free air in the abdomen as a result of the perforation of the hollow organs and is visible as a **sub-diaphragmatic crescent of air (pneumoperitoneum)**. It is also used to detect abnormal chest findings such as pneumonia, which sometimes presents as an acute abdomen.

Plain abdominal radiography in the **left lateral position** can reveal air inclusion between the [liver](#) and flank in cases of pneumoperitoneum.

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



[Image](#): An upright X-ray demonstrating a small bowel obstruction (note multiple air-fluid levels). By James Heilman, MD, License: [CC BY-SA 3.0](#)

CT scan of the abdomen

A CT scan is the gold standard for the diagnosis of acute abdomen if there is a justifiable suspicion of acute inflammation of intra-abdominal structures (e.g., **pancreatitis**, and **diverticulitis**). It is also indicated in cases where sonography results are less meaningful, e.g., in obese patients, in the presence of superimposed air signals or large injuries. The advantages of a CT scan include shorter investigation time and satisfactory image resolution.

Diagnostic Laparoscopy

In select patients, diagnostic laparoscopy is occasionally considered when the diagnosis cannot be established by history, examination, or relevant diagnostic tests.

Differential Diagnosis

Differential diagnosis of acute abdomen is often carried out depending on the location of pain in abdominal quadrants and further characteristics of pain. Abdominal organs produce symptoms based on their location, e.g., liver and gallbladder diseases often trigger 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 evaluate diseases of organs based on the pattern of complaints. The most important differential diagnoses are listed below.

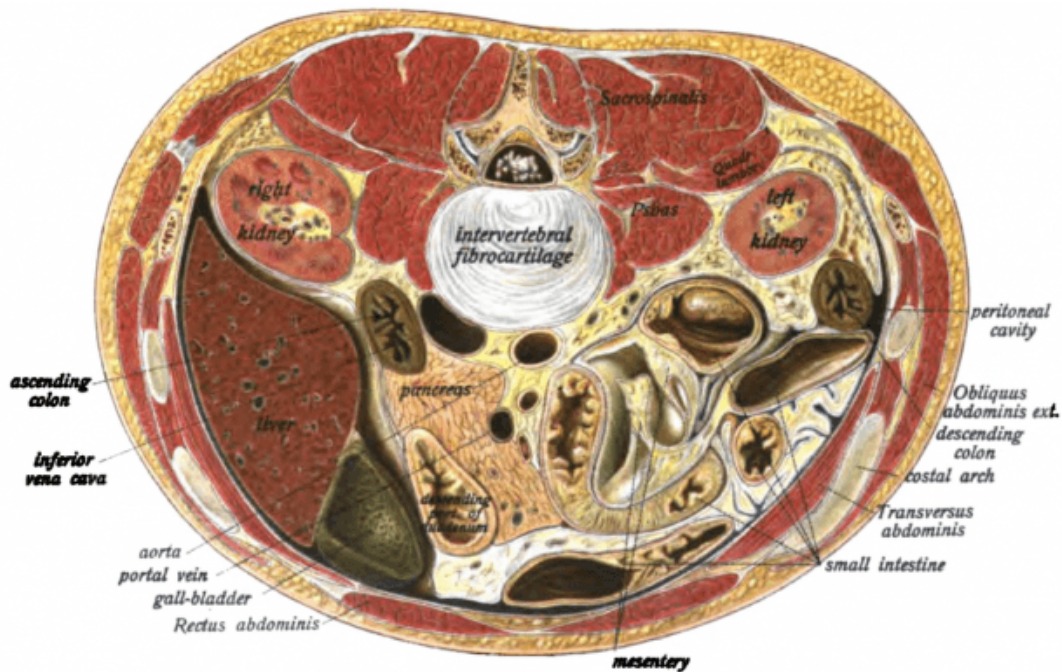


Image: Axial cross-section through the level of the kidneys showing detailed anatomic structures and relationships.

Organ System	Organ with the clinical picture
Upper abdomen (both sides possible)	<ul style="list-style-type: none"> Lungs/Pleura: pleurisy, pneumonia, pneumothorax, pulmonary embolism Heart: acute myocardial infarction, pericarditis Kidneys: renal pelvis calculi, nephritic abscess, pyelonephritis
Right upper abdomen	<ul style="list-style-type: none"> Bile ducts: cholecystitis, cholangitis Pancreas: pancreatitis Duodenum: duodenal ulcer Liver: hepatitis, liver abscess, ruptured liver, congested liver
Epigastrium	<ul style="list-style-type: none"> Stomach: peptic ulcers, gastritis Small intestine: Ileus
Left upper abdomen	<ul style="list-style-type: none"> Spleen: splenic infarction, ruptured spleen Pancreas: pancreatitis, pancreatic cancer
Lower abdomen (both sides possible)	<ul style="list-style-type: none"> Intestines: diverticulitis Urinary system: acute urinary retention, kidney or ureter stones, testicular torsion Reproductive system: ovarian cysts, extrauterine pregnancy, duct rupture, adnexitis
Right lower abdomen	<ul style="list-style-type: none"> Intestines: appendicitis
Central abdomen, Navel	<ul style="list-style-type: none"> Intestines: ileus (mechanical), mesenteric ischemia, volvulus, invagination, toxic megacolon, intestinal infection, Crohn's disease, ulcerative colitis
Left lower abdomen	<ul style="list-style-type: none"> 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 followed by immediate transfusion unless contraindicated.
- Patients are initially administered nothing orally (NPO).
- Intravenous acetaminophen is the first choice. Other non-steroidal anti-inflammatory drugs (NSAIDs) and narcotic analgesics may be given according to pain severity.

Conservative or operative measures

The definite treatment of acute abdomen is based on the 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, treatment with antibiotics is necessary. It is important not to primarily prescribe cephalosporin in this case. Cephalosporins are not effective against enterococci, and are therefore not recommended against a number of common bacteria that cause acute abdomen.

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

Disease Progress and Prognosis of Acute Abdomen

The course and prognosis of acute abdomen strongly depend on the causal factors as acute abdomen is only a working diagnosis until a final diagnosis is established.

References

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Bailey, H., Love, R. J., Mann, C. V. & Russell, R. C., 1992. Bailey and Love's short practice of surgery. London: Chapman and Hall medical.

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