

# SURGICAL CAUSES OF ACUTE ABDOMEN

Prof. Dr. / Alaa El-Suity

# What will we discuss ?

## **1) Introduction**

## **2) discussion**

- \* Clinical features
- \* Pathophysiology of abdominal pain
- \* Classification of causes
- \* Common causes of acute abdomen :
- \* Investigation

## **3) Conclusion**

# Introduction

- \*Acute abdomen and acute abdominal pain are different terms<sup>(1)</sup>
- \*Many diseases, some of which aren't surgical can produce acute abdominal pain and tenderness.
- \*Non surgical causes of an acute abdomen can be divided into three categories: endocrine and metabolic, hematologic, and toxins or drugs.<sup>(2)</sup>
- \*Despite improvements in laboratory and imaging studies, history and physical examination remain the mainstays of determining the correct diagnosis and initiating proper and timely therapy

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(1) Siewert, J.R., Brauer, R.B. (2007). Basiswissen Chirurgie (Heidelberg: Springer)

(2) Steinheber FU: Medical conditions mimicking the acute surgical abdomen. *Med Clin North Am* 57:1559–1567, 1973.

# Clinical features

In the majority of patients, a proper diagnosis is reached by means of a careful history and complete physical examination supplemented by a few simple laboratory tests.

## Symptoms:

- (1) Acute pain is usually the most important symptom. It is to be noted that there are two types of abdominal pain, visceral or somatic.
- (2) Vomiting usually occurs once or twice after the onset of pain. Frequent and profuse vomiting is serious.
- (3) Bowels: Constipation is the rule in most cases of acute abdomen. Tenesmus may be present in pelvic appendicitis. Mesenteric thrombosis may be accompanied by bleeding per rectum.
- (4) Urinary problems and menstrual disturbances should be inquired about.

**Full general examination** should be performed checking the vital signs, respiratory rate and looking for pallor, jaundice and dehydration.(3)

# Classification of causes

## *According to the mode of presentation.*

- (1) Colics : Intestinal, appendicular and biliary.
- (2) Inflammations: Appendicitis, cholecystitis, pancreatitis, diverticulitis, and Meckel's diverticulitis.
- (3) Perforations: Perforated appendix, peptic ulcer, gall bladder diverticulum, and typhoid ulcer of the small bowel.
- (4) Intestinal obstruction: Simple, strangulation, and paralytic ileus.
- (5) Internal haemorrhage.
- (6) Urological causes. Calculi and inflammations.

## (7) Gynaecological causes :

- Mid menstrual pain.
- Twisted ovarian cyst.
- Dysmenorrhoea.
- Ruptured ectopic pregnancy.
- Ruptured ovarian cyst.
- Pelvic inflammatory disease.

## (8) Medical causes of acute abdomen:

- Severe gastroduodenitis.
- Mediterranean fever.
- Activity of a peptic ulcer.
- Intermittent porphyria.
- Enterocolitis.
- Basal pneumonia and pleurisy.
- Uraemia.
- Acute myocardial infarction.
- Diabetic ketoacidosis.
- Alcoholic hepatitis.

# According to site :

## Upper abdominal

- Perforated peptic ulcer.
- Leaking abdominal aortic aneurysm.
- Biliary colic and acute cholecystitis.
- Mesenteric vascular occlusion.
- Acute pancreatitis.
- Acute myocardial infarction.

## Mid-abdominal

- Mesenteric vascular occlusion
- Intestinal obstruction

## Right lower abdomen

- Acute appendicitis.
- Mesenteric adenitis
- Regional ileitis (Crohn's disease)
- Right ureteric colic
- Colitis
- Meckel's diverticulitis

Abdominal examination must be preceded by a detailed general examination of the patient as a whole. Physical examination

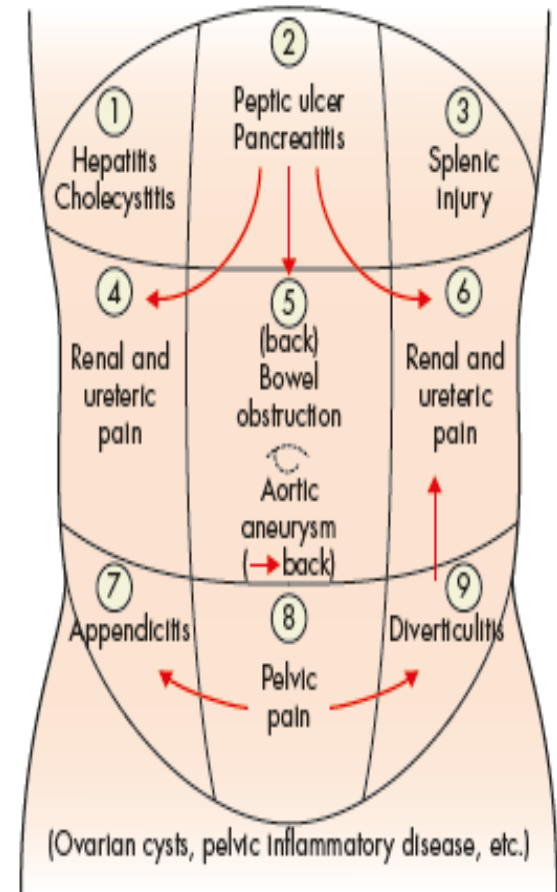


Figure 59.4 Nine sites of abdominal pain: 1, right subcostal; 2, epigastric; 3, left subcostal; 4, right flank; 5, periumbilical; 6, left flank loin; 7, right iliac fossa; 8, suprapubic/hypogastrium; 9, left iliac fossa. (From 25th Edition of Bailey and Love, courtesy of Mr Simon Paterson-Brown, Consultant Surgeon, Royal Infirmary of Edinburgh.)

## **Left lower abdomen**

- Colonic diverticulitis
- Left ureteric colic
- Colitis

## **Pelvic**

- Mid menstrual pain
- Pelvic inflammatory disease
- Proctitis
- Cystitis and prostatitis
- Complicated ovarian cyst
- Ectopic pregnancy
- Pelvic appendicitis

## **Abdominal and back pain**

- Biliary colic and acute cholecystitis
- Acute pancreatitis
- Renal and ureteric colic
- Leaking abdominal aortic aneurysm
- Posterior duodenal ulcer penetrating pancreas.
- Spine diseases with radicular pain that radiates forwards (3)



# Some common causes of acute abdomen



# Acute appendicitis

In adult patients younger than age 60, acute appendicitis accounts for 25% of admissions to the hospital from the emergency department for abdominal pain <sup>(4)</sup>

it begins with prodromal symptoms of anorexia, nausea, and vague periumbilical pain. Within 6 to 8 hours, the pain migrates to the right lower quadrant.

In uncomplicated appendicitis, a low-grade fever to 38°C and mild leukocytosis are usually present. A higher temperature and white blood cell count are associated with perforation and abscess formation.

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(4) Irvin TT: Abdominal pain: A surgical audit of 1190 emergency admissions. Br J Surg 1989; 76: pp. 1121-1125

(5) Alvarado A: A practical score for the early diagnosis of acute appendicitis. Ann Emerg Med 1986; 15: pp. 557-564

Common findings of in the history, physical examination, and white blood cell count in appendicitis have been combined into a predictive tool known as the **Alvarado score**<sup>(5)</sup>

**TABLE 11-3** The Alvarado Score for Predicting Acute Appendicitis

| Feature                            | Score |
|------------------------------------|-------|
| Migration of pain                  | 1     |
| Anorexia                           | 1     |
| Nausea                             | 1     |
| Tenderness in right lower quadrant | 2     |
| Rebound tenderness                 | 1     |
| Elevated temperature               | 1     |
| Leukocytosis                       | 2     |
| Left WBC shift                     | 1     |
| Sum                                | 10    |

A score of 5-6 is suggestive of appendicitis; a score of 7-8 indicates probable appendicitis; and a score of 9-10 indicates that appendicitis is likely. Patients with scores >5 should be evaluated by a surgeon or undergo an imaging study to look for appendicitis.

WBC, white blood cell count.

From Alvarado A. A practical score for the early diagnosis of acute appendicitis. *Ann Emerg Med* 1986; 15:557-64.

# APPENDICITIS

- Peak incidence 10-12 years
- Begins as dull, steady pain in periumbilical area...

Progresses over 4-6 hours & localizes to right lower quadrant

- Low grade fever
- Nausea
- Anorexia

- Sudden pain relief may indicate rupture of appendix (Leads to peritonitis)



## \*Diagnosis\*

- Clinical signs and symptoms
- ↑ WBC
- Abdominal Sonogram
- Exploratory Lap

- Rebound Pain or Tenderness (RLQ) at McBurney's Point

# Acute cholecystitis

Biliary disease accounts for some 5% to 7% of visits to an emergency department for abdominal pain.<sup>(6)</sup>

The initial pain of acute cholecystitis is diffuse and colicky in the upper abdomen.

Later it localizes in the right hypochondrium.

It is difficult to palpate the gall bladder due to the overlying tenderness and rigidity.

Patients who present with right upper quadrant pain with jaundice and signs of sepsis should be suspected of having obstruction of the bile duct by a gallstone. Right upper quadrant pain, fever and chills, and jaundice (Charcot's triad) are suggestive of ascending cholangitis <sup>(7)</sup>

**\*Ultrasound is diagnostic**

**\*HIDA scan is very helpful .**

(6)Bohner H, Yang Q, Franke C, et al: Simple data from history and physical examination help to exclude bowel obstruction and to avoid radiographic studies in patients with acute abdominal pain. *Eur J Surg* 1998; 164: pp. 777-784

(7)Wada K, Takada T, Kawarada Y, et al: Diagnostic criteria and severity assessment of acute cholangitis: Tokyo Guidelines. *J Hepatobiliary Pancreat Surg* 2007; 14: p



# Acute pancreatitis

Acute pancreatitis typically begins as acute pain in the epigastrium that is constant and frequently described as boring through to the back or left scapular region.

Fever, anorexia, nausea, and profuse vomiting are typical

**Physical examination** reveals an acutely ill patient in considerable distress. Patients are usually *tachycardic* and *tachypneic*. Abdominal examination reveals hypoactive bowel sounds and ***marked tenderness to percussion and palpation in the epigastrium***. Abdominal rigidity is a variable finding.

In rare patients, flank or periumbilical ecchymoses (Grey-Turner's or Cullen's sign, respectively)

## Investigation

\*White blood cell counts of 12,000 to 20,000/mm<sup>3</sup> are common.

\*Elevated serum and urine amylase levels are usually present within the first few hours of pain. returns to normal within 2-3 days. It has no predictive value. Many other conditions raise the serum amylase.

∴

\*Abdominal US is useful for identifying gallstones as a potential cause of pancreatitis. CT may reveal enlargement of the pancreas, peripancreatic fluid collection, or pancreatic necrosis , usually it is reserved for patients with severe or complicated pancreatitis.

Although most cases of acute pancreatitis are self-limited, as many as 20% of patients have severe disease with local or systemic complications, including hypovolemia and shock, renal failure, liver failure, and hypocalcemia.<sup>(3) (8)</sup>

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(3) Kasr El-Aini introduction to surgery : seventh edition ; volume 2 ; chapter 40

(8) Frossard J, Steer M, and Pastor C: Acute pancreatitis. Lancet 2008; 371: pp. 143-152

# ACUTE PANCREATITIS

CT Scan





# Acute diverticulitis

Acute diverticulitis is a common disease. Approximately 80% of affected patients are older than 50 years of age.

dull, left lower quadrant pain and fever.

They may complain of constipation and usually are found to have a leukocytosis

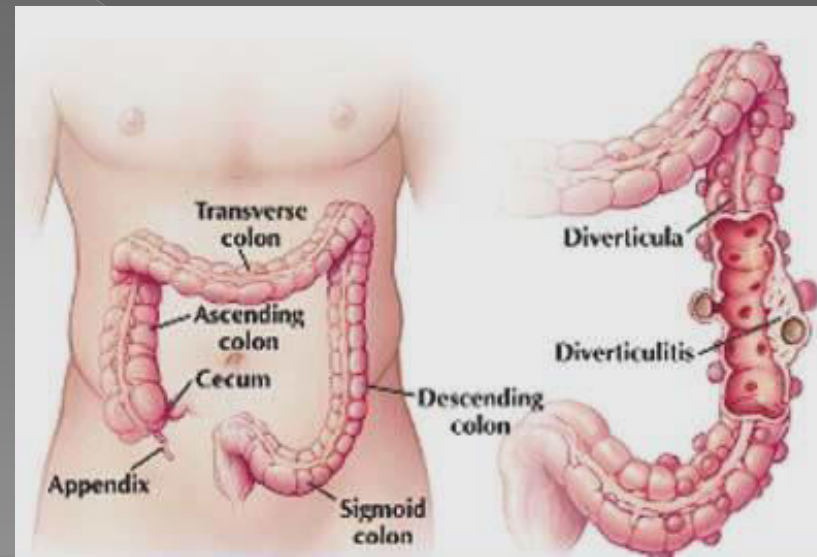
Physical examination demonstrates left lower quadrant tenderness and, in some cases, a left lower quadrant mass.

CT is reliable in confirming the diagnosis, with a sensitivity of 97%, and should be performed routinely in the emergency evaluation of patients with diverticulitis

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(9) Jacobs D: Diverticulitis. N Engl J Med 2007; 357: pp. 2057-2066

(10) Ambrosetti P, Grossholz M, Becker C, et al: Computed tomography in acute left colonic diverticulitis. Br J Surg 1997; 84: pp. 532-534



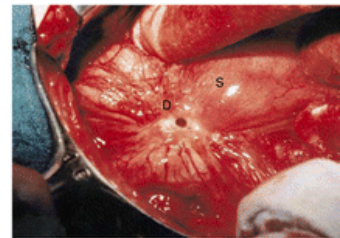
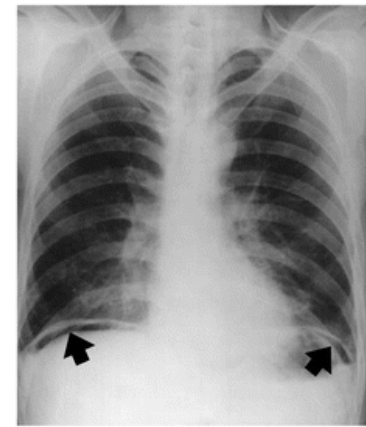
# Perforated peptic ulcer

Patients with a perforated peptic ulcer typically present with the sudden onset of severe diffuse abdominal pain. These patients may be able to specify the moment of the onset of symptoms.

Abdominal examination reveals peritonitis, with rebound tenderness, guarding, or abdominal muscular rigidity

A perforated peptic ulcer should be suspected in any patient with sudden onset of severe abdominal pain who presents with abdominal rigidity and free intraperitoneal air.

Pneumoperitoneum is detected on an abdominal film in 75% of patients. If plain X-ray does not show free gas, gastrografin meal will reveal leakage of



# Intestinal obstruction

\*It is characterized by colicky abdominal pains, vomiting, abdominal distension and absolute constipation.

\*Examination reveals an acutely ill, restless patient. Fever, tachycardia, and orthostatic hypotension are common. Abdominal distention is common.

\*Auscultation characteristically demonstrates hyperactive bowel sounds and audible rushes

## **\*Plain films of the abdomen are diagnostic.**

\*Small bowel enema (enteroclysis) in cases of doubtful small bowel obstruction may be indicated

\*Barium enema in large bowel obstruction is diagnostic. (3)



# Mesenteric ischaemia

This is actually a type of strangulation intestinal obstruction.

Suspect the diagnosis in patients over 50 years with valvular or atherosclerotic heart disease, arrhythmias, hypotension, hypovolaemia, myocardial infarction, or polycythaemia.

The hallmark of the diagnosis of acute mesenteric ischemia is abrupt onset of intense cramping epigastric and periumbilical pain out of proportion to the findings on abdominal examination.

Other symptoms may include diarrhea, vomiting, bloating, and melena

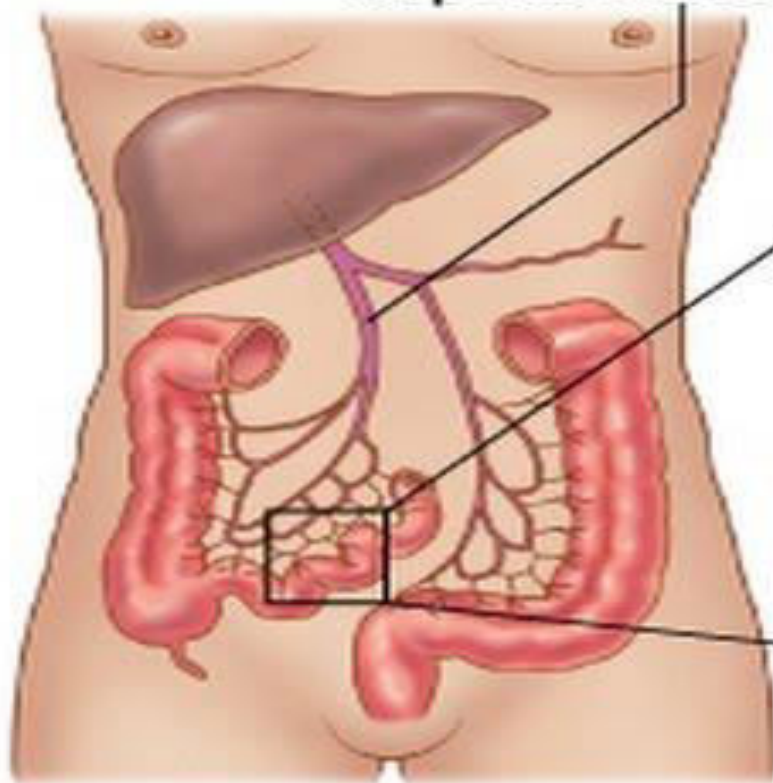
CT is the best initial diagnostic test .

**Aortogram.** A sure diagnosis is obtained by a retrograde transfemoral aortogram with the catheter tip just above the origin of the superior mesenteric artery.

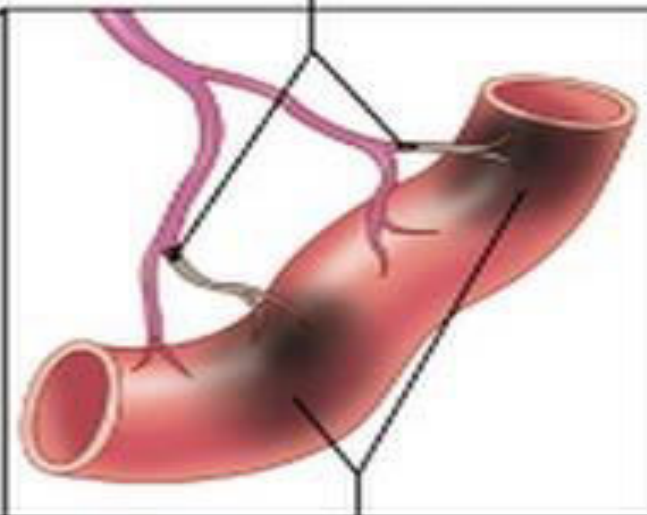
(11) Chang R, Chang J, and Longo W: Update in management of mesenteric ischemia. World J Gastroenterol 2006; 12: pp. 3243-3247

(12) Hirsch A, Haskal Z, Hertzler N, et al: ACC/AHA 2005 practice guidelines for the management of patients with peripheral arterial disease. Circulation 2006; 113: pp. e463-e465

**Superior mesenteric vein**



**Blood clots**



**Necrotic areas  
of small intestine**

# Pseudo-obstruction

This term includes a group of disorders which give the clinical picture of intestinal obstruction, but without a demonstrable organic lesion. Pseudo-obstruction is caused by the following disorders:

- \*Elderly patients with cerebrovascular accidents.
- \*Endocrine disorders, e.g., 'myxoedema.
- \*Neurologic disorder, e.g., Parkinsonism.
- \*Drugs, e.g., atropine like and tranquilizers.
- \*Electrolyte disturbances, e.g., hypokalaemia.
- \*Metabolic disturbances as in uraemia and diabetic ketoacidosis.
- \*Shock, e.g., from burns and septicaemia.
- \*Retroperitoneal irritation by collection of blood or urine, or by acute pancreatitis. <sup>(3)</sup>

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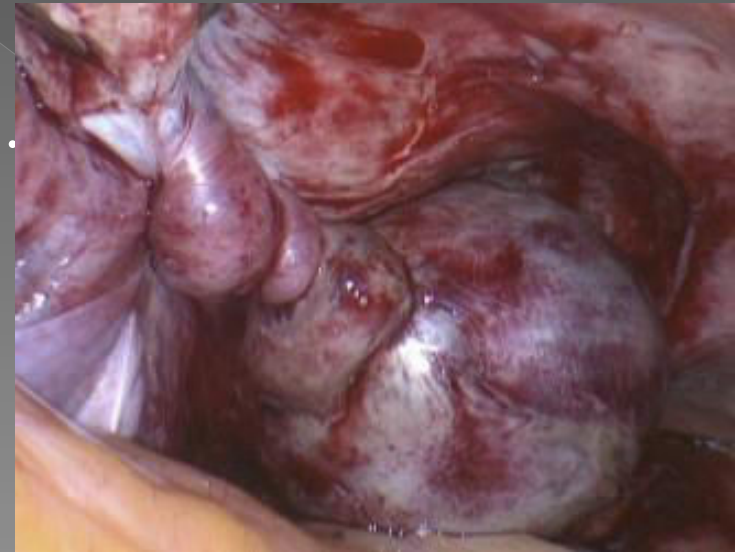
(3)kasr El-Aini introduction to surgery : seventh edition ; volume 2

# Ruptured ovarian cyst

- \*There is lower abdominal pain, tenderness and guarding.
- \*No toxaemia.
- \*Abdominal and pelvic ultrasound examinations are diagnostic<sup>(3)</sup>

# Torsion of an ovarian cyst

- \*Severe lower lateral abdominal pain.
- \*Adnexal mass may be palpable.
- \*Ultrasound is diagnostic.
- \*Laparoscopy is diagnostic and therapeutic.<sup>(3)</sup>



# *Pelvic inflammatory disease (PID)*

Suspect the disease in females in the reproductive period.

UD increases the possibility.

Inflammation is usually bilateral, but may be severer on one side.

Streptococci, E. coli and anaerobes are the usual causative organisms.

There is lower abdominal tenderness and guarding with high pyrexia.

Peritoneal signs in the upper abdomen suggest leakage or rupture.

Per vaginal examination and movement of the cervix are tender.

High vaginal swab for culture and sensitivity.

Ultrasound.<sup>(3)</sup>



# *Ruptured ectopic pregnancy*

Risk factors for ectopic pregnancy include prior salpingitis, tubal ligation, tubal repair, IUD and prior ectopic pregnancy.

History of menstrual abnormalities may be present.

Severe lower abdominal pain.

Pallor is usually a striking feature.

Abdominal examination reveals tenderness and guarding.

Per vaginal examination reveals tender cervix.

Chorionic gonadotropin testing is positive.

Ultrasound. The presence of a gestational sac in the uterus is against the diagnosis.

Free blood is present in the pelvis.

Laparoscopy is very helpful.

# Investigations of acute abdomen

## 1) Laboratory :

1. Full blood picture.
2. Urea and electrolytes.
3. Blood sugar.
4. Serum amylase.
5. Urine analysis

## 2) Radiological :

- 1-Plain X-ray of the chest in the erect position
- 2- Plain X-ray of the abdomen
3. Abdominal ultrasound
4. CT scan of the abdomen
- 5-Diagnostic laparoscopy:

# Conclusion

There are many causes of acute abdomen . Evaluation and management of the patient with acute abdominal pain remain a challenging part of a surgeon's practice. Whereas advances in imaging techniques, use of algorithms, and computer assistance have improved the diagnostic accuracy for the conditions causing the acute abdomen, a careful history and physical examination remain the most important part of the evaluation

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