

# Acute abdomen

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The term **acute abdomen** refers to a sudden, severe abdominal pain of unclear etiology that is less than 24 hours in duration

It is a condition that requires a fairly immediate judgment or decision as to management.

General causes of the acute abdomen may be divided into six large categories:

- Inflammatory
- Mechanical
- Neoplastic
- Vascular
- Congenital defects
- Traumatic

■ The **inflammatory** causes may be divided into two subgroups: 1) bacterial, and 2) chemical. Some common examples of the bacterial causes would include acute appendicitis, diverticulitis, and some cases of pelvic inflammatory disease. An example of a chemical cause would be a perforation of a peptic ulcer, where spillage of acid gastric contents causes an intense peritoneal reaction.

- **Mechanical** causes of an acute abdomen include such obstructive conditions as incarcerated hernia, post-operative adhesions, intussusceptions, malrotation of the gut with volvulus, congenital atresia or stenosis of the gut. The most common cause of large bowel mechanical obstruction is carcinoma of the colon.
- the impaction of one or more gall stones in the intestine, usually in the terminal ileum, but rarely in the duodenum or the colon is also mechanical

- Newplasia; The commonest cause is carcinoma, of which about 60% are situated in the sigmoid colon.
- **Vascular** entities producing an acute abdomen include mesenteric arterial thrombosis or embolism. When the blood supply is cut off, necrosis of tissue results, with gangrene of the bowel.

- ❑ **Congenital** defects can produce an acute abdominal surgical emergency any time from the minute of birth (with conditions such as duodenal atresia, omphalocele or diaphragmatic hernia) to years afterward in conditions such as chronic malrotation of the intestine.
- ❑ **Traumatic** causes of an acute abdomen range from stab and gunshot wounds to blunt abdominal injuries producing such conditions as splenic rupture. History or evidence of trauma should make this diagnosis fairly obvious.

# Clinical Characteristics of the Acute Abdomen

## *Three Types of Abdominal Pain*

- *Visceral Pain*
- *Somatic (Parietal) Pain*
- *Referred Pain*

## ■ Visceral Pain

- *Within the muscular walls of hollow organs and the capsules of solid organs.*
- *Stimulated primarily by stretching, distension, and excessive contractions.*
- *Characteristically deep, dull, aching or cramping, and **poorly localized**.*
- *Usually felt in the midline, **unaccompanied by tenderness**.*

## ■ Somatic (Parietal) Pain

- *Afferent fibers: from T6 to L1, more localized.*
- *Characteristically sharper, aggravated by stimulation of the parietal peritoneum with movement, coughing, or walking.*
- *True parietal pain                      surgical cause of abdominal pain.*

## ■ Referred Pain

- *Pain felt a site other than that of the primary noxious stimulus.*
- *Occurs in an area supplied by the same neurosegment as the involved organ.*
- *Most visceral pain is of this type.*
- *Usually intense and most often secondary to an **inflammatory lesion**.*
- *Subdiaphragm disorder~shoulder pain*
- *Biliary tract disorder~right shoulder pain*
- *Small bowel disorder~back pain*

# Locations of Referred Pain and its Causes

1. Right Shoulder
  - Liver
  - Gallbladder
  - Right Hemidiaphragm

## 2. Left Shoulder

- Heart
- Tail of pancreas
- Spleen
- Left hemidiaphragm

## 3. Scrotum and testicles

- Ureter

# History

Pain

When? Where? How?

Abrupt, gradual

Character

Sharp, burning, steady,  
intermittent

Referral?

Previous occurrence?

Vomiting

Relationship to pain

How often? How much?

Nausea? Anorexia?

Bowel movements

*Number*

*Character*

*Bloody?*

Past Medical and Surgical History

Travel History

Last meal

Systemic Review

# *History of Present Illness*

## ■ Type of onset

- sudden - rupture of viscus, mesenteric thrombosis
- gradual -
  - cholecystitis, appendicitis

## ■ Quality

- dull - initial epigastric pain of appendicitis
- sharp - renal or biliary colic or obstruction of gut
- aching - pelvic inflammatory disease
- pleuritic - intensified by breathing
- lancinating - acute pancreatitis
- tearing - dissecting aneurysm

## ■ Intensity

- severe - rupture of viscus or blood in the peritoneal cavity
- moderate - RLQ appendiceal
- mild peptic ulcer, without perforation

## ■ Temporal features

- continuous - acute pancreatitis
- pulsatile - abdominal aneurysm
- colicky - lumen obstruction, intermittent severe pain with pain-free intervals
- frequency & duration transient pain of short duration which does not recur is usually insignificant. The longer the duration the more likely a surgical condition.

## ■ Factors which intensify or relieve pain

- relation to meals - peptic ulcer pain relieved by food, cholecystitis pain aggravated by fatty meal
- posture jack-knifing - leg drawn up to decrease peritoneal irritation in suppurative appendicitis
- motion - any movement causes intense pain in generalized peritonitis and the patient lies motionless

- Associated nausea and vomiting  
nausea & vomiting - reflex, or irritative non-specific vomiting occurs in many conditions. In surgical disease such as acute appendicitis, anorexia always occurs and vomiting, if it occurs, usually follows abdominal pain rather than preceding it, as in gastroenteritis. Repeated vomiting of large amounts occurs in gut obstruction, is often bile stained and may become fecal.

## ■ Protracted vomiting

- time - early in high GI obstruction;  
late in low GI obstruction
- character of vomitus - blood -  
bleeding ulcer bile stained -  
obstruction below ampulla of Vater  
fecal - intestinal obstruction,  
mechanical or with paralytic ileus;  
copious amount

- Diarrhea
- most common with acute gastroenteritis or food poisoning, but it may occur with appendicitis or other focal inflammatory lesions of the gut
- Constipation or obstipation
- With complete small bowel obstruction - unremitting constipation (obstipation) after fecal material below obstruction has been passed. Progressive constipation with carcinoma of the large bowel.

- The age and sex of the patient will provide helpful leads as to which conditions responsible for a "hot belly" are most likely, outlined below:
- Age - newborn - congenital anomalies, gut atresia, imperforate anus, malrotation, diaphragmatic hernia
- Neonatal - hypertrophic pyloric stenosis (males), megacolon, hernia
- Later infancy - intussusception

- Childhood and young adults - hernia, appendicitis - most common but can occur at any age
- Young adolescent females - "mittelschmerz" - rupture of graafian follicle with LLQ or RLQ abdominal pain occurring in the middle of the menstrual cycle.
- Females - gallbladder - female, fair, fat, forty ectopic pregnancy pelvic inflammatory disease

- Males - peptic ulcer
- Advancing age - mesenteric thrombosis or embolus often after myocardial infarction, large bowel neoplasms, diverticulitis

# *Historical Questions*

- *How old are you? (Advanced age mean increased risk)*
- *2. Describe the position, character, and migration of the pain*
- *sudden coupled with weakness or fainting, less acute but still abrupt onset ,or begin gradually and maximize slowly*

- ***Is the pain constant or intermittent?  
(Constant pain is worse)***
- ***Have you ever had this before? (No  
prior episodes is worse)***
- ***Did the pain start centrally and  
migrate to the right lower quadrant?  
(High specificity for appendicitis)***

- ***Have you noticed specific aggravating or relieving factors? (Eating, defecation or flatus)***
- ***4. Have you ever had abdominal surgery? (Consider obstruction in patients who report previous abdominal surgery)***

- ***5. Do you have nausea, vomiting, diarrhea or bowel habit change? (D/D true diarrhea, overflow incontinence or tenesmus)***
- ***6. Do you have HIV? (Consider occult and unusual infection, 30% mortality of surgical treatment)***
- ***7. How much alcohol do you drink per day? (Consider pancreatitis, hepatitis, or cirrhosis)***

- ***Are you pregnant? (Test for pregnancy-consider ectopic pregnancy, menstrual history, sexual exposure history)***
- ***9. Are you taking antibiotics or steroids? (These may mask infection)***
- ***10. Do you have a history of vascular or heart disease, hypertension, or atrial fibrillation? (Consider mesenteric ischemia and abdominal aneurysm)***

# Physical Examination

- Appearance and position of patient
- Vital signs
- Appearance of abdomen

## Distention

Hernia

Scars

- Tenderness

Rigidity

Masses

- Bowel sounds
- Rectal and Pelvic Examination

The abdomen must be exposed completely for examination.

The patient should be in a comfortable supine position with the knees slightly flexed to relax the abdominal musculature, and the examiners hand should be warm.

A calm sympathetic approach and gentleness in examination on the part of the practitioner are very helpful.

The patient is asked to point with one finger to the area of greatest pain, and the examiner should be especially gentle when studying these areas. Inspection of the abdomen may reveal significant surgical scars.

Auscultation of the abdomen is performed next. The intestine is quite sensitive to touch, and peristaltic bowel sounds can be best evaluated by listening to the abdomen before palpating it.

Auscultation is most helpful in determining functional activity of the bowel

- The next step is systematic palpation of the abdomen with light pressure (to a depth of about 1 cm) beginning at a distance from the area of maximal tenderness and alternately testing and comparing each side with the opposite side, while observing the patient closely for wincing or other evidence of pain. The entire abdomen is palpated systematically for areas of tenderness, muscle spasm, or presence of masses

Any specific areas which may appear abnormal should be retested and re-evaluated. Deep palpation, again done gently, gives more information about deep tenderness or the nature, size, and consistency of any lesion or mass

Persistent localized tenderness, **point tenderness** , is the most important sign of peritoneal inflammation. In acute appendicitis, when point tenderness is definite, it is an indication for surgery. Rebound tenderness may be demonstrated when pain is experienced on sudden release of deep pressure.

Percussion of the abdomen is helpful in demonstrating gas or fluid in hollow organs or in the free peritoneal cavity. When the abdomen is enlarged and hyperresonant, intestinal distention or pneumo-peritoneum should be considered. Free fluid within the peritoneal spaces is demonstrated by testing for a fluid wave and shifting dullness. In ascites, bulging in the flanks may be observed. Dullness to percussion can be helpful in determining the size of an enlarged spleen or liver or a solid tumor mass.

The physical examination must include rectal palpation in the male and pelvic and rectal examination in the female. Fecal impaction, pelvic abscess, and neoplasms may produce signs of intestinal obstruction. When an inflamed appendix lies low in the pelvis, there may be rectal tenderness or a palpable pelvic mass in the absence of abdominal signs. Disease of the female pelvic organs may produce acute abdominal conditions. Bimanual pelvic examination may reveal a tubal or ovarian mass, exquisite tenderness on movement of the cervix, or bloody or purulent cervical discharge, suggestive of acute pelvic complications.

# Diagnosis

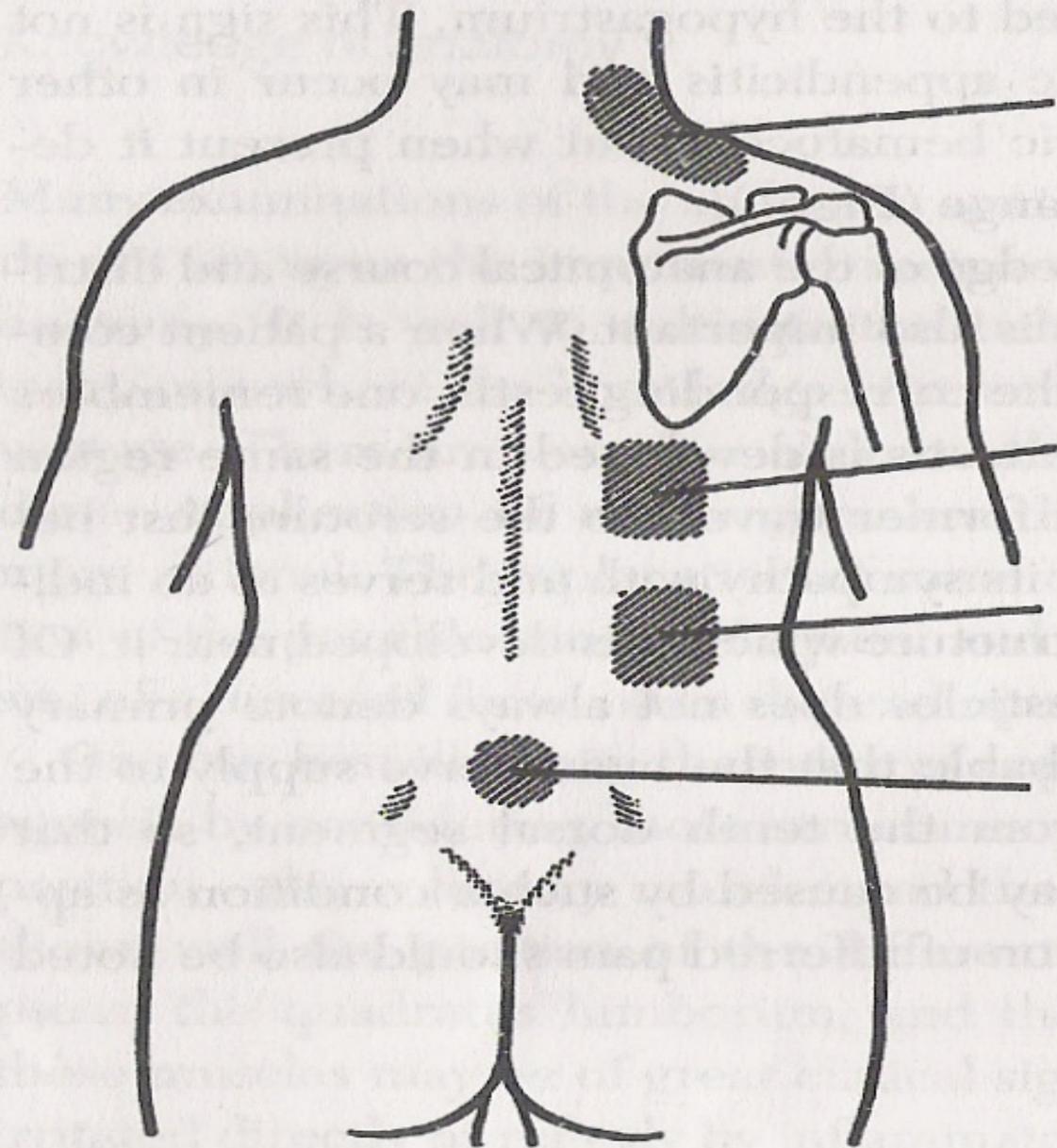
- Diagnose early
- No narcotics until diagnosis is made
- Examination ,reexamination ,testing by inexperienced hands leads to delay in diagnosis and early pain relief
- Early diagnosis improves recovery
- Decreases mortality
- Reduces hospital stay due to infections
- Reduces long term complications

# Anatomy

- Apply your knowledge of anatomy in diagnosing abdominal conditions
- Cultivate habit of thinking anatomically
- Diaphragmatic spasm – decreased movt of lower chest and upper abdomen
- Rectus and lateral abd muscle rigidity – in subjacent inflammation
- Psoas spasm – flexion of thigh and internal rotation

- Obturator internus spasm – pain on rotation of the flexed thigh inwards and this pain is referred to hypogastrium - in pelvic appendicitis and haematocele
- Knowledge of course and distribution of segmental nerves
- Note both the ventral and dorsal distribution of referred pain.

Radiating pain to testis does not always denote genitourinary disease and can also occur with appendicitis



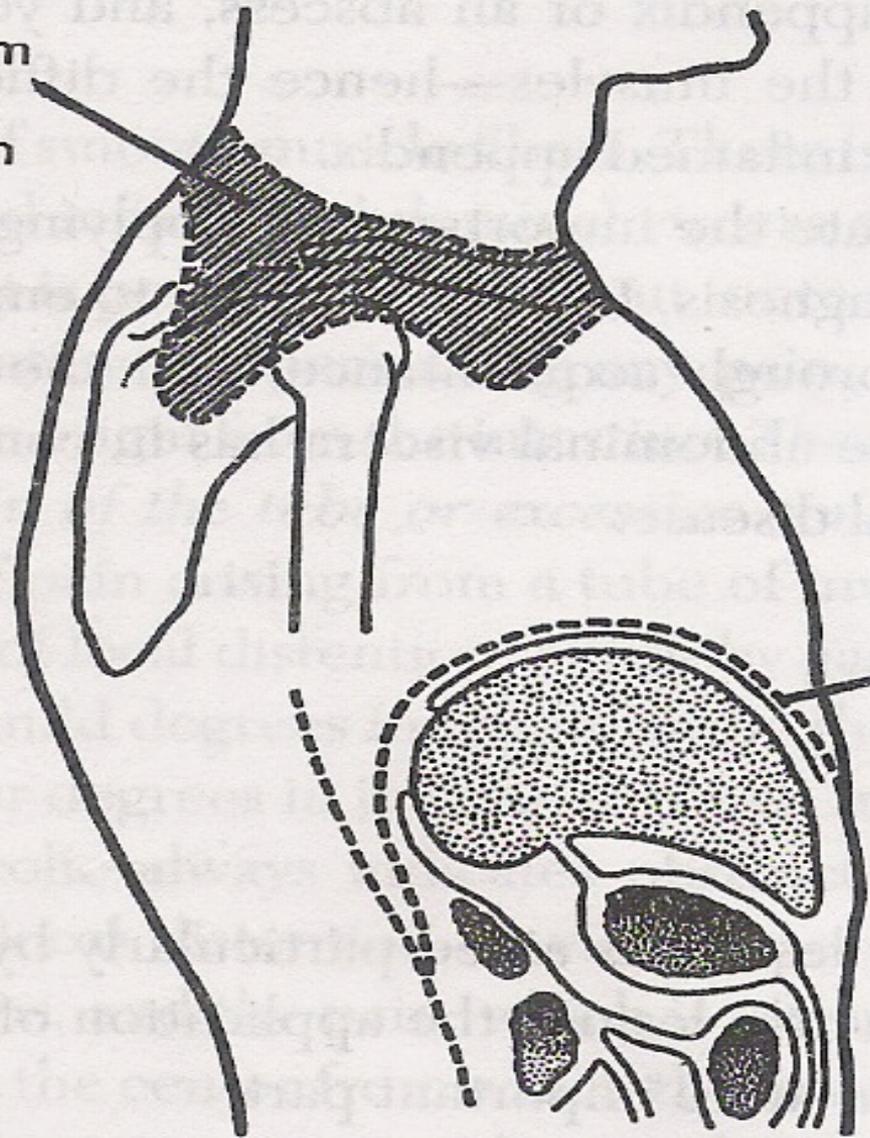
**Perforated  
duodenal ulcer  
or ruptured spleen**

**Biliary  
colic**

**Acute  
pancreatitis,  
renal colic**

**Uterine and  
rectal pain**

Pain from  
phrenic  
irritation



Diaphragm

- ❑ Irritation to the diaphragm will cause pain in the shoulder as the diaphragm has its origin from the 4th cervical segment and is supplied by the cervical segment via phrenic nerve
- Pain may be felt in the shoulders in cases of subphrenic abscess, diaphragmatic pleurisy, a/c pancreatitis, ruptured spleen etc.

- The pain is felt in supraspinatous fossa, over the acromion, clavicle or in subclavicular fossa
- The shoulder pain is often overlooked as it is attributed to arthritis.

# Methods of diagnosis

- History and physical examination is the most important part.
- Record history in the chronological order of symptoms
- Age- intussusception in infants (<2)
  - Cancerous stricture rare below 30
  - A/c pancreatitis rare below 20
  - Perforated GU rare below 15

# Exact time and onset

- Many conditions are precipitated by exertion . It is important to know what the patient was doing at the time of onset.
- Fainting occurs with ectopic gestation, perforated GU/DU, a/c pancreatitis, ruptured aortic aneurysm.
- Intestinal obstruction gradual in onset and culminates in crisis

# Shifting or localisation of pain

- When peritoneal cavity is filled with pus, blood or fluid pain is felt all over the abdomen and later shifts to site of perforation.
- Pain of small intestine is always felt first in epigastric or umbilical region (T9 to T11 nerves)
- Remember appendicular nerves are also derived from the T9 to T11 so pain may be initially felt in the epigastric region

# Vomiting

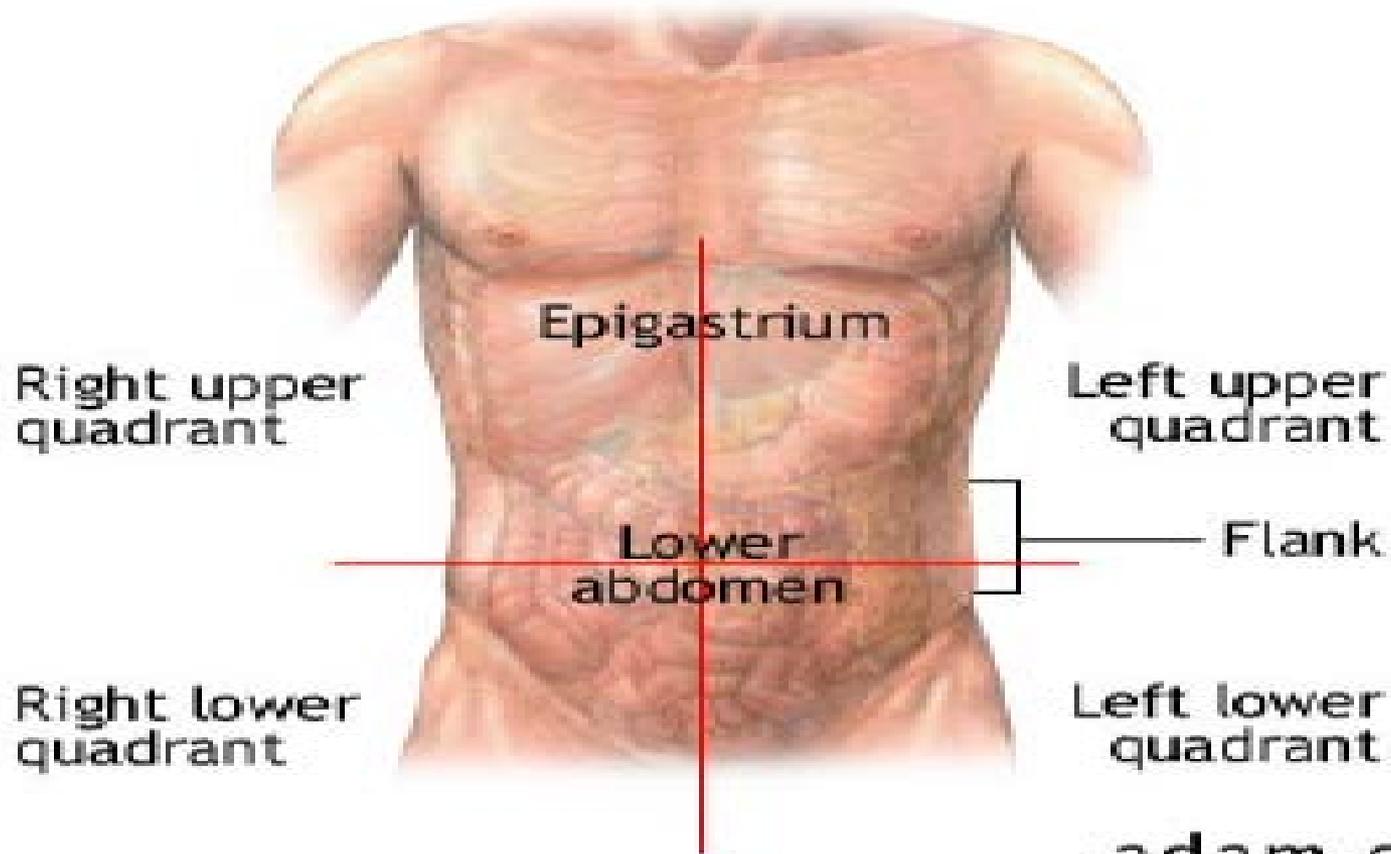
- Vomiting is early, sudden and violent in ureteric colic
- Early and copious in upper intestinal obstruction
- No vomiting until late in large bowel obstruction
- Frequent scanty in *A/c* pancreatitis
- Vomiting precedes pain in gastroenteritis

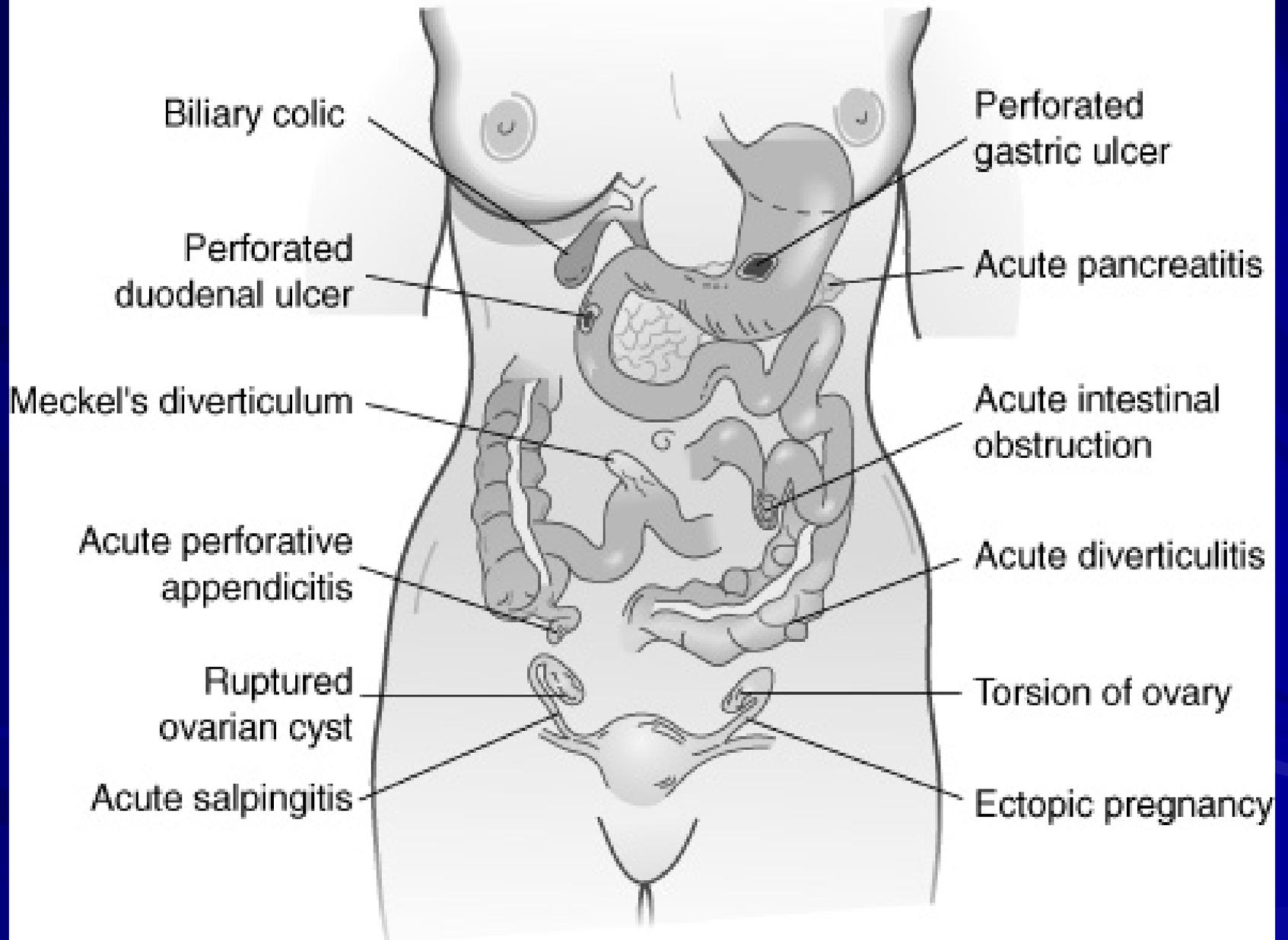
# Character of Vomitus

- In gastritis vomitus contains food particle and some bile
- In CHPS and duodenal atresia differentiated by presence of bile in the latter
- In intestinal obstruction content varies from gastric , bilious greenish yellow to orange and brown indicating feculent vomitus.
- Hypogastric pain and diarrhoea when followed by hypogastric tenderness and constipation suspect pelvic abscess.

Partial small bowel obstruction may produce profuse watery diarrhoea without passage of flatus

## ■ Differential Diagnosis





# Epigastrium

Acid/Peptic Disease

Ulcer, GERD, Gastritis

ACS (Angina, MI)

Aortic Aneurism

Cholelithiasis, Choledocholithiasis

Diaphragmatic Defect Related

Paraesophageal Hernia, Gastric Volvulus, Congenital

Diaphragmatic

Hernias

Gastroenteritis

Pancreatitis

Gastric Cancer, Pancreatic Cancer, etc.

# Right Upper Quadrant

- Appendicitis (Retrocecal or Malrotated)
- Cholelithiasis, Choledocholithiasis
- Liver Related
  - Hepatitis, Abscess, Malignancy
- Renal Related
  - Pyelonephritis,  
Nephrolithiasis/Ureterolithiasis
- Subdiaphragmatic Process
- Abscess

# Left Upper Quadrant

- Colonic Ischemia
- Pancreatic
  - Pancreatitis, Tumor
- Renal
  - Pyelonephritis,  
Nephrolithiasis/Ureterolithiasis
- Splenic
  - Infarct, Abscess
- Subdiaphragmatic Process
  - Abscess.

# Mid-Abdomen/ Periumbilical

- Aortic Aneurism
- Appendicitis
- Small Bowel Obstruction
- Ischemia (“Intestinal Angina”)
- Gangrene

# Right lower quadrant

- Appendicitis
- Colon Related
- Colitis (Especially Pseudo membranous),  
Right- or Left-Sided
- Diverticulitis, Cancer
- Crohn's Disease
- Gynaecological

- Tubal Pregnancy, Ovarian Torsion, Cyst, PID, Tuboovarian
- Abscess, Tumor, Endometriosis, etc.
- Hernia
- Inguinal, Femoral
- Meckel's Diverticulitis
- Renal
- Pyelonephritis, Nephrolithiasis/Ureterolithiasis
- Typhlitis
- Rectus/Retroperitoneal Hematoma

# Left Lower Quadrant

- Colon Related
- Colitis (Especially Pseudomembranous), Diverticulitis, Cancer, Colonic
- Ischemia
- Diverticulitis+ Same as RLQ-Appendicitis

# Suprapubic

- Colon Cancer
- Diverticulitis
- Gynecological
- Endometritis, Endometriosis, PID
- Prostatitis ,UTI

# Surgical Cause of Acute Abdomen

1. Hemorrhage
  - Solid Organ Trauma
  - Leaking or ruptured Arterial Aneurysm
  - Ruptured Ectopic pregnancy
  - Bleeding Gastrointestinal Diverticulum
  - Intestinal Ulceration
  - Mallory Weiss syndrome

## 2. Infection

- Appendicitis
- Cholecystitis
- Hepatic Abscesses
- psoas Abscesses
- Meckel's Diverticulitis

### 3. Perforation

- Perforated Gastrointestinal Ulcer
- Perforated Gastrointestinal Cancer

### 4. Obstruction

- Adhesion Related small and large bower obstruction
- Sigmoid Volvulus
- intussusceptions

## 5. Ischamia

- ischemic Colitis
- Testicular torsion
- Strangulated hernia

# Non Surgical Cause

## 1. Endocrine and metabolic cause

- Uremia
- DKA

## 2. Hematologic causes

- Acute Leukemia

## 3. Toxic And drugs

- Lead poisoning

# Investigations

- Patients with an acute abdomen comprise the largest group of people presenting as a general surgical emergency.
- In most acute abdominal conditions, following the history and clinical examination, plain film radiographs have traditionally been the first & most useful methods of further investigation.
- A supine abdomen and an erect chest is regarded as the basic standard radiographs.

# *Chest X-ray*

This is an essential examination in any patient with acute abdomen because:

- 1- It is the best radiograph to show the presence of a small pneumoperitoneum.
- 2- A number of chest conditions may present as an acute abdominal pain : pneumonia (particularly lower lobe), MI, ...

3- Acute abdominal conditions may be complicated by chest pathology: pleural effusion frequently complicate acute pancreatitis.

4- Even when the chest radiograph is normal it acts as a valuable baseline.

# ***Abdominal radiographs***

***In most acute abdominal conditions the radiological diagnosis depends on gas patterns .***

- The supine abdominal radiograph is probably the single most useful film. It allows the distribution of gas and the caliber of bowel to be determined and may show displacement of bowel by soft tissue masses.***

***An erect abdominal radiograph is usually taken to show the air fluid levels; three or more small bowel fluid levels longer than 2.5 cm are abnormal, and indicate dilated small bowel loops with stasis.***

***Plain X-Ray can interpret many condition like perforated DU, intestinal obstruction, stones etc***

# ***Laboratory Examination***

- ***CBC & differential***
- ***Serum electrolyte ( K, Bicarbonate )***
- ***Urinalysis***
- ***$\beta$ -HCG – woman of childbearing age***
- ***Bilirubin, Alk-p, ALT, AST, G-GT – RUQ pain, jaundice***
- ***Amylase, lipase – epigastralgia***
- ***PT, APTT***
- ***EKG, CK – epigastralgia with aged patient***

➤ Measurement of serum electrolytes blood urea nitrogen and creatinine assists the effect of such factors as vomiting or third-space fluid losses

➤ Serum amylase and lipase determinations may suggest pancreatitis as the cause of abdominal pain but can also be elevated in other disorders such as small bowel infarction or duodenal ulcer perforation

➤ Liver function tests, including total and direct bilirubin serum aminotransferase , and alkaline phosphates are helpful in evaluating potential biliary tract cause of acute abdominal pain

# *Ultrasound*

- *Rapid, safe, low cost*
  - *Operator dependent*
- *Fluid, inflammation, air in walls, masses*
- *Liver, GB, Spleen, Pancreas, Appendix, Kidney, Ovaries, Uterus*

# *Emergency Department Management of Acute Abdomen*

- *IV volume replacement and NG decompression*
- *Antibiotics: indicated if infection is suspected.*
- *Narcotic analgesia (?) Timing (?)*
  - **Pro:** *Permit a more accurate history and PE.*  
*Morphine (2-5 mg IV)*
  - **Con:** *Surgeon is hostile to this approach,*  
*consultation immediately.*

# *When to Operate ?*

- *Peritonitis*
  - *Excluding primary peritonitis*
- *Abdominal pain/tenderness + sepsis*
- *Acute intestinal ischemia*
- *Pneumoperitoneum*
- *Make sure pancreatitis is excluded*

# When **NOT** to Operate

- *Appendiceal abscess*
- *Acute diverticulitis + abscess*
- *Acute pancreatitis or hepatitis*
- *Ruptured ovarian cysts*
- *Long standing perforated ulcers?*

# Acute abdomen in pregnant women

- Ectopic gestation
- Retroverted gravid uterus
- Threatened abortion
- Sepsis following abortion
- Torsion ovarian cyst/ fibroid
- Red degeneration fibroid
- Rupture uterus
- Appendicitis

# Acute abdomen in tropics

- Amebiasis
- Malaria
- Worm infestation
- Sickle cell anemia
- Pyomyositis (in HIV)
- Enteric fever

# Diseases that simulate acute abdomen

- Diabetic ketoacidosis
- Typhoid
- Malaria
- TB peritonitis
- Food poisoning
- Lead colic
- Porphyria
- Pleurisy/pneumonia
- Cardiac disease (eg. MI)
- Disease of spine affecting nerve roots
- Renal disease

**Thankyou**

