LESSON 14

- APPENDICITIS
- PERITONITIS

Objectives

By the end of this lesson, you should be able to:

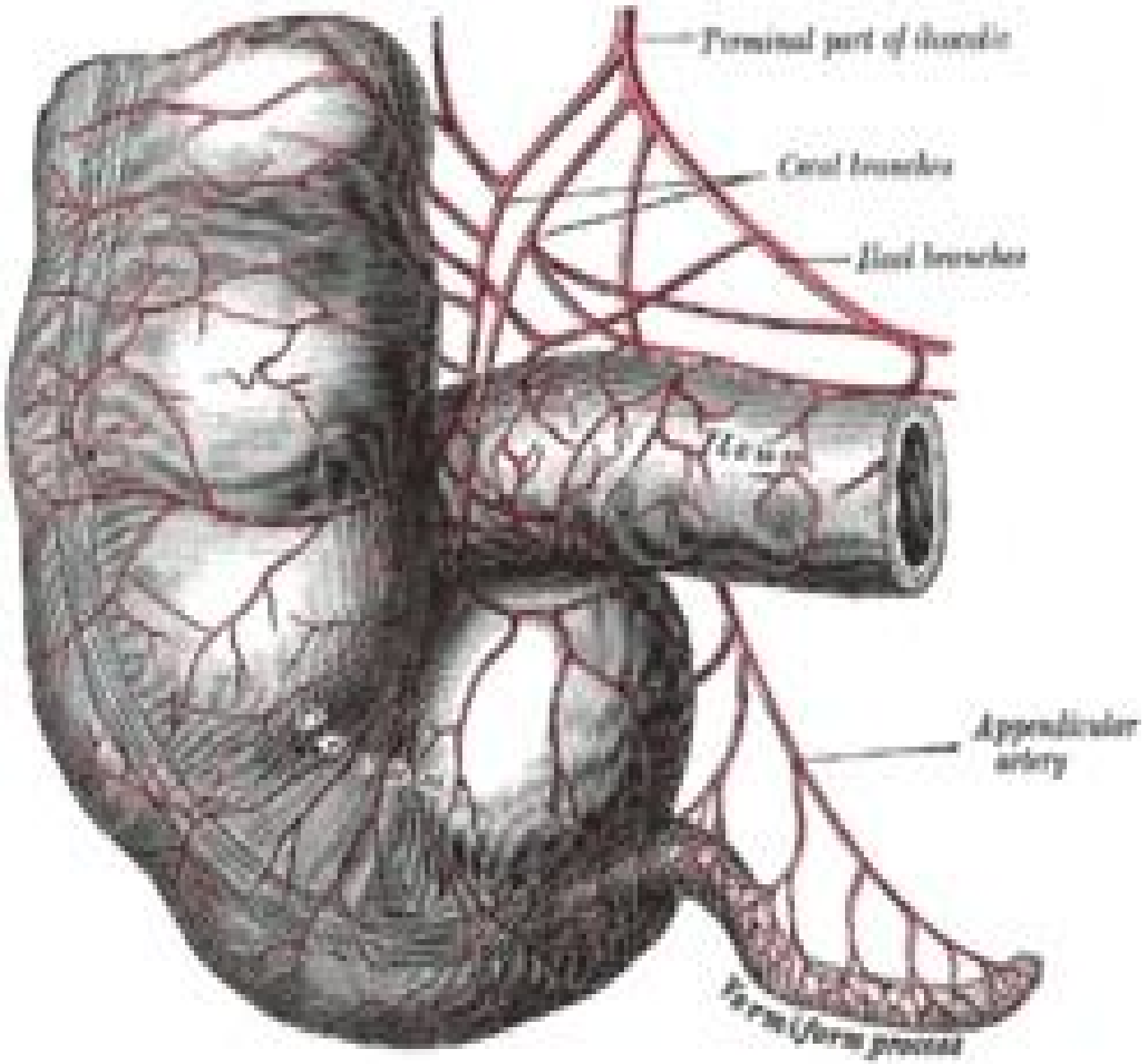
1. Classify appendicitis
2. List the etiology of appendicitis
3. Describe clinical presentation, treatment and complications of acute appendicitis
4. Classify peritonitis
5. List the etiology of peritonitis
6. Describe clinical presentation, treatment and complications of acute appendicitis

Introduction

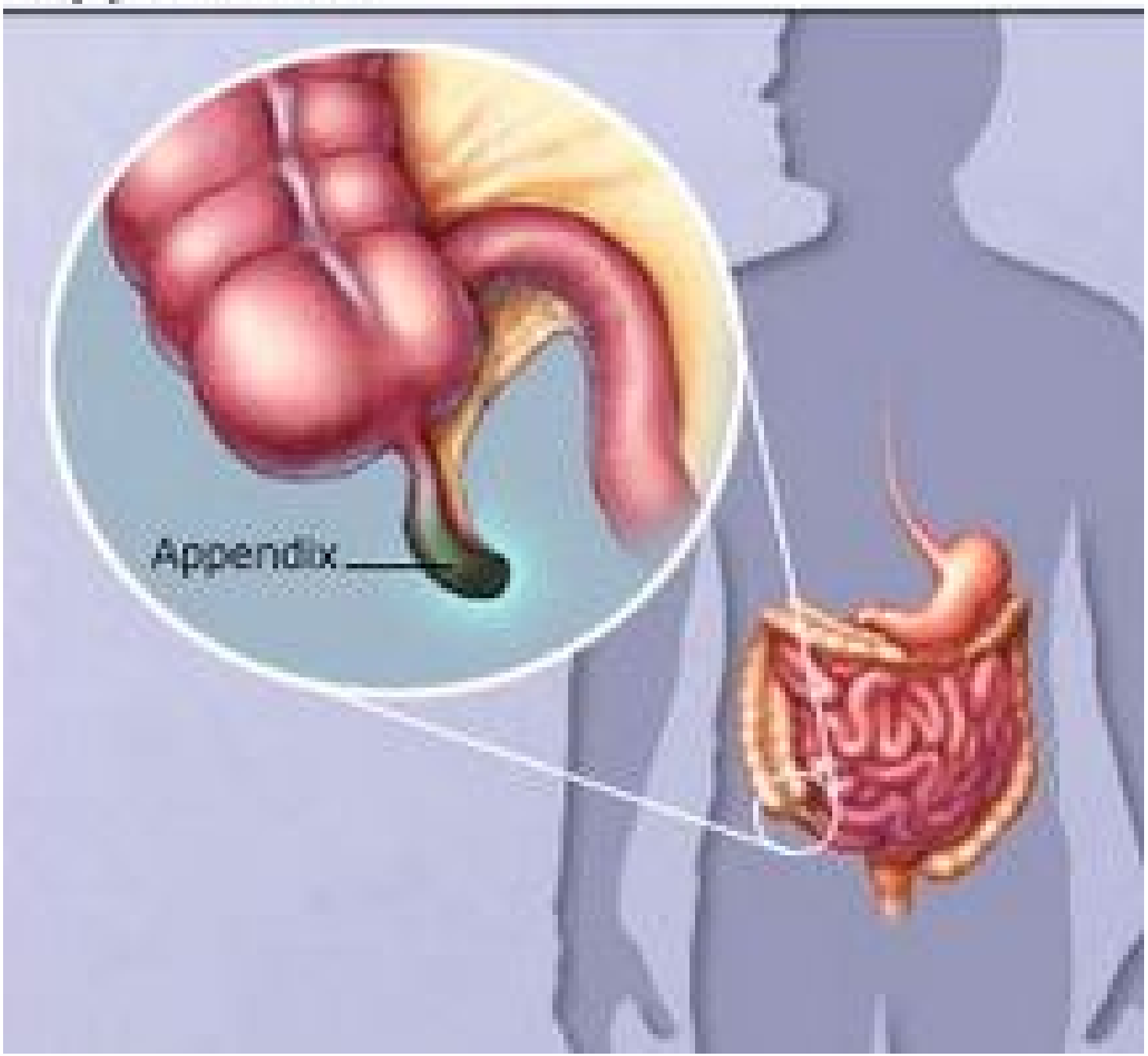
- Vermiform appendix is considered a vestigeal organ
- Its importance in surgery is only due to its propensity for inflammation resulting into appendicitis
- Acute appendicitis is the commonest cause of acute abdomen in children and young adults
- Appendicitis is a condition characterized by inflammation of the appendix. It is a medical emergency and mostly requires surgical removal
- Can occur at any age but it is commonest in the young (10 -30 yrs)
- Untreated, mortality is high due to peritonitis and shock

SURGICAL ANATOMY

- The appendix averages 10cm in length (2 to 20cm)
- The diameter is usually between 7-8mm.
- The appendix is located in the right lower quadrant of the abdomen, or, more specifically, the right iliac fossa.
- Its position within the abdomen corresponds to a point on the surface known as McBurney's point
- While the base of the appendix is at a fairly constant location, 2cm below the ileocaecal valve, the location of its tip can vary from being retrocaecal (74%), in the pelvis or extraperitoneal.
- In rare individuals with situs inversus, the appendix may be located in the lower left side.



Appendicitis



Etiology

- Obstruction of the appendiceal lumen causes appendicitis.
- Mucus backs up in the appendiceal lumen, causing bacteria that normally live inside the appendix to multiply. As a result, the appendix swells and becomes infected.
- Sources of obstruction include
  1. Fecolith
  2. Parasites
  3. Neoplasms that block the appendiceal lumen
  4. Enlarged lymph tissue in the wall of the appendix, caused by infection in the gastrointestinal tract or elsewhere in the body
  5. Inflammatory bowel disease, including Crohn's disease and ulcerative colitis
  6. Trauma to the abdomen

Classical Symptoms

1. Abdominal pain is the main presenting complaint
   - usually occurs suddenly, often causing a person to wake up at night
   - occurs before other symptoms
   - begins near the umbilicus and then localizes in the right iliac fossa
   - is new and unlike any pain felt before
   - gets worse in a matter of hours
   - Aggravated by movement, deep breaths, coughing, or sneezing

Associated symptoms

1. Loss of appetite
2. Nausea
3. Vomiting
4. Constipation or diarrhea
5. Inability to pass gas
6. Low-grade fever that follows other symptoms
7. Abdominal swelling
8. the feeling that passing stool will relieve discomfort

Differential diagnosis

- Gynaecological – Salphingitis, twisted TOM or abscess, ectopic pregnancy
- Urinary & male reproductive system – Renal or ureteric stones, infections, testicular torsion
- Perforated peptic ulcer
- Mesenteric adenitis
- Meckels diverticulitis
- Perforated caecum
- Psoas abscess
- Incarcerated hernia
- Inflammatory bowel disease eg crohns disease
- Other causes of acute abdomen

Signs

- **Tenderness in the right iliac fossa maximum at McBurneys point**
- **Guarding.** Subconsciously tensing of the abdominal muscles during an examination. Can be voluntary or involuntary
- **Rebound tenderness.** Applying hand pressure to a patient's abdomen and then letting go. Pain felt upon the release of the pressure indicates rebound tenderness.
- **Rovsing's sign.** Applying hand pressure to the lower left side of the abdomen. Pain felt on the right iliac fossa upon the release of pressure on the left side indicates the presence of Rovsing's sign.
- **Psoas sign.** Applying resistance to the right knee as the patient tries to lift the right thigh while lying down. Pain in the right iliac fossa indicates a positive Psoas sign
- **Obturator sign.** Asking the patient to lie down with the right leg bent at the knee. Moving the bent knee left and right will cause abdominal pain if the appendix is inflamed.

- Digital rectal examination - Tenderness
- Pelvic examination for female patients in the child bearing age – PID, Ectopic pregnancy

Investigations

Laboratory Tests

1. Haemogram – FBC – leucocytosis with neutrophilia
2. Biochemistry – UEC – electrolyte imbalances
3. Unrinalysis – pus cells, Pregnancy
4. Microscopy – Stool for o/c – infection, infestation

Imaging Tests

1. U/S scan of the abdomen
2. CT scan of the abdomen - more sensitive than U/S scan
3. Plan abdominal X-ray

Complications of appendicitis

- Appendicular mass – conservative management via Ochsner-Sherren regime
- Gangrene
- Perforation
- Peritonitis
- Intra-abdominal abscess

Surgical treatment

- Typically, appendicitis is treated by appendicectomy.
- If appendicitis is suspected, surgery is suggested without conducting extensive diagnostic testing.
- Prompt surgery decreases t chances for complications
- Appendicectomy can be done either by laparotomy or laparoscopy
- Surgery may reveal a normal appendix which is still removed to prevent future appendicitis or other pathologies which can be treated surgically
- Full recovery from surgery takes about 4 to 6 weeks. Limiting physical activity during this time allows tissues to heal.

Nonsurgical treatment

- Nonsurgical treatment may be used if surgery is not available, if a person is not well enough to undergo surgery, or if the diagnosis is unclear.
- Nonsurgical treatment includes antibiotics to treat infection and a liquid or soft diet until the infection subsides.
- A soft diet is low in fiber and easily breaks down in the gastrointestinal tract.

Post-operative complications

1. Wound infections
2. Intra-abdominal abscess
3. Paralytic ileus
4. Pneumonia
5. DVT and embolism
6. Portal pyemia
7. Fecal fistula
8. Adhesive intestinal obstruction
9. Right inguinal hernia – due to injury of iliohypogastric nerve

Recurrent appendicitis

- Appendicitis is notoriously recurrent
- It may occur every few months and its symptoms may be attributed to dyspepsia
- Chronic appendicitis does not per se exist
- Many patient with acute appendicitis have history of recurrent milder symptoms
- Treatment is elective appendicectomy

Less common conditions of the appendix

1. Mucocele of the appendix
2. Diverticulae of the appendix
3. Intussusception of the appendix
4. Neoplasms – carcinoid, adenocarcinoma (extremely rare)

PERITONITIS

- Peritonitis is defined as inflammation of the membrane that lines the abdominal cavity and the organs contained therein.
- The peritoneum, which is an otherwise sterile environment, reacts to a variety of pathologic stimuli with a fairly uniform inflammatory response.
- Depending on the underlying pathology, the resultant peritonitis may be infectious or sterile

Relevant Anatomy

- The peritoneum is the largest and most complex serous membrane in the body.
- It forms a closed sac by lining the interior surfaces of the abdominal wall, by forming the boundary to the retroperitoneum, by covering the extraperitoneal structures in the pelvis, and by covering the undersurface of the diaphragm.
- This parietal layer of the peritoneum reflects onto the abdominal visceral organs to form the visceral peritoneum.
- It thereby creates a potential space between the 2 layers (i.e, the peritoneal cavity).

Classification

Peritonitis is classified as:

1. Primary - from heamatogenous dissemination, usually in the setting of immunocompromised patients
2. Secondary - related to a pathologic process in a visceral organ, such as perforation, trauma, or postoperative – commonest type
3. Tertially - persistent or recurrent infection after adequate initial therapy

Peritonitis is further divided into

1. Generalized
2. Localized e.g. intra-abdominal abscess

Etiology

- Introduction of an infection into the otherwise sterile peritoneal environment through organ perforation,
- Irritants
  - Foreign bodies
  - Bile from a perforated gall bladder
  - Lacerated liver
  - Gastric acid from a perforated ulcer
  - Infected fallopian tube or a ruptured ovarian cyst in women

Clinical presentation

The main manifestations of peritonitis are acute

- abdominal pain
- Nausea and vomiting
- Abdominal distension
- abdominal tenderness
- abdominal guarding
- Rebound tenderness – Blumerg's sign
- Abdominal rigidity (washboard abdomen)
- Fever
- Tachycardia
- Paralytic ileus

Complications

1. Electrolyte imbalance
2. Shock
3. Acute renal failure
4. Peritoneal abscess (above or below the liver, or in the lesser omentum)
5. Septicaemia
6. Breathing difficulties.

Diagnosis

- A diagnosis of peritonitis is based primarily on the clinical manifestations described above.
- If peritonitis is strongly suspected, then surgery is performed without further delay for other investigations.
- Laboratory
  - Haemogram – FBC (leukocytosis)
  - Biochemistry – UEC (hypokalemia, hypernatremia, acidosis)

Diagnosis cont...

- Imaging
  - Plain abd X-ray (dilated, oedematous intestines, free air in the peritoneum indicating perforated gut)
  - U/S of abdomen
  - CT scan
- Paracentesis
- Laparoscopy
- Diagnostic laparotomy

Treatment

Depending on the severity of the patient's state, the management of peritonitis may include:

- **General supportive measures** –
  - vigorous intravenous fluids and
  - correction of electrolyte disturbances
  - Nil by mouth and nasogastric tube drainage
- **Appropriate antibiotics** – intravenously
- **Surgery** (laparotomy)
- The exception is primary peritonitis, which does not always benefit from surgery and may be treated with antibiotics in the first instance.

Prognosis

- If properly treated, typical cases of surgically correctable peritonitis (e.g. perforated peptic ulcer, appendicitis, and diverticulitis) have a mortality rate of about <10% in otherwise healthy patients,
- Mortality rises to about 40% in the elderly, and/or in those with significant underlying illness, as well as in cases that present late (after 48h).
- If untreated, generalized peritonitis is almost always fatal

Conclusion

1. Classification of appendicitis
2. Etiology of appendicitis
3. Clinical presentation, treatment and complications of acute appendicitis
4. Classification of peritonitis
5. Etiology of peritonitis
6. Clinical presentation, treatment and complications of acute appendicitis

Questions?