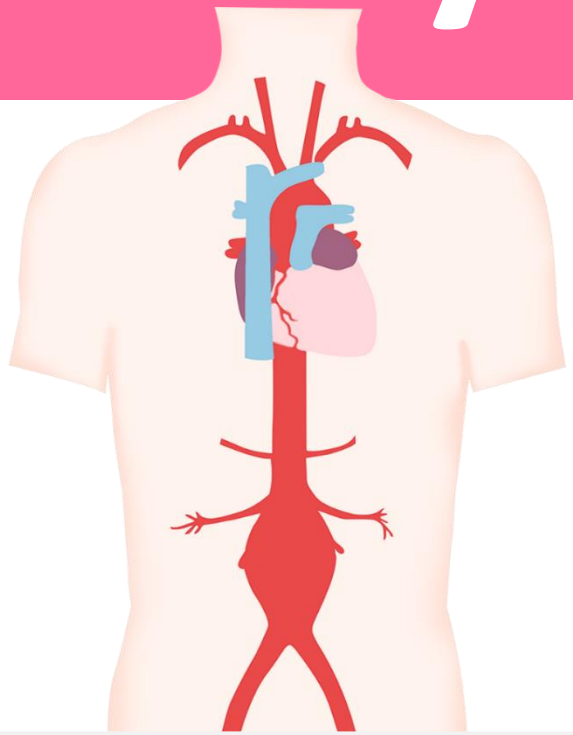
Abdominal Aortic Aneurysm



Definition

- An aneurysm is an abnormal localized dilatation of an artery.

Classification of Aneurysms

- **Wall**
  - True aneurysm
  - False aneurysm
- **Morphology**
  - Fusiform
  - Saccular
- **Aetiology**
  - Atheromatous
  - Mycotic
  - Collagen disease
  - Traumatic

True vs False Aneurysm

True aneurysm	False aneurysm
• Containing the three layers of the arterial wall in the aneurysm sac(intima, media, adventitia).	• Having a single layer of fibrous tissue as the wall of the sac.
• Underlying cause is usually atherosclerosis-related but may be associated with infective causes and collagen and elastin abnormalities.	• Usually secondary to penetrating trauma, including iatrogenic injury.

Aetiology

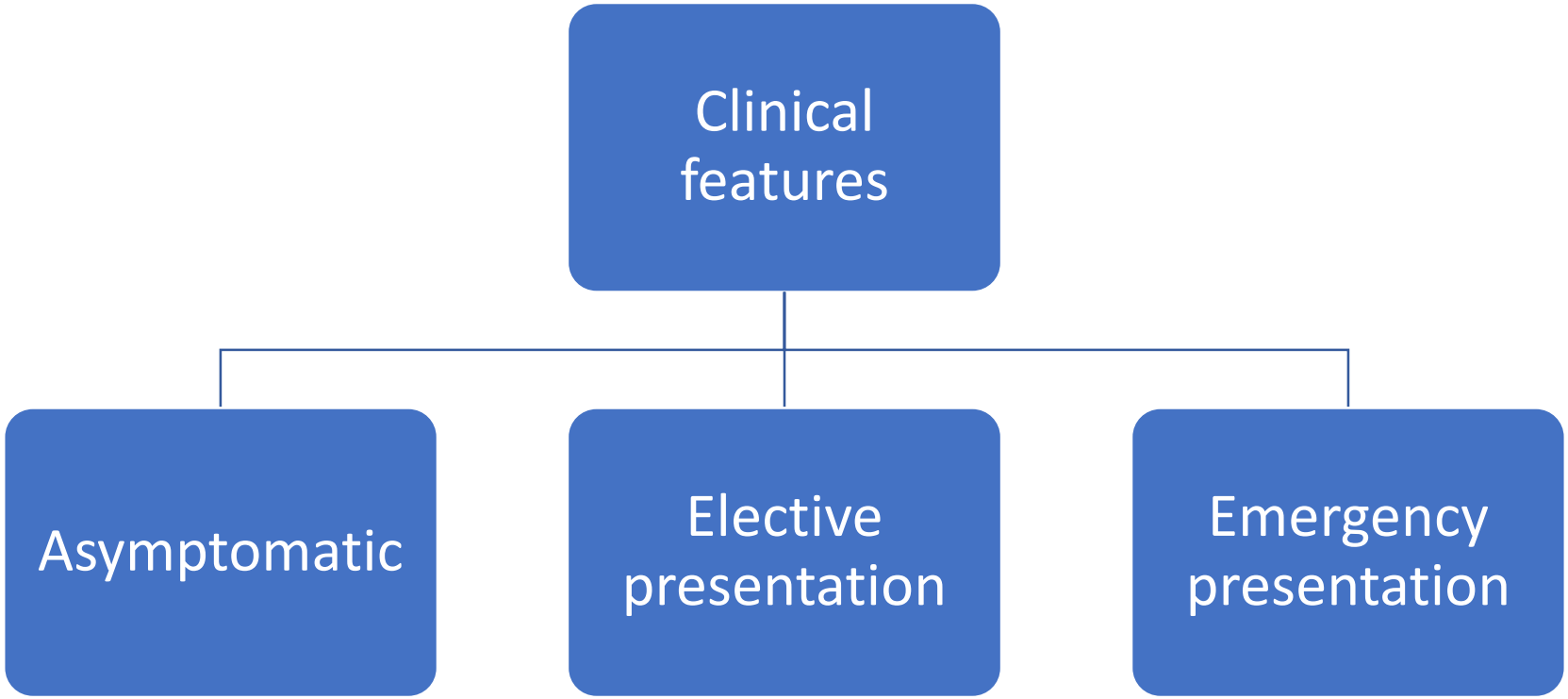
- Aneurysms are due to degeneration of the arterial media, particularly a reduction in elastin.
- The exact aetiology of aortic aneurysms is unknown but there are contributing factors.

Genetic	• 25% of first degree relatives will develop an aneurysm.
Atherosclerosis	• Not causally linked but often also present.
Smoking	• Associated with more rapid expansion.
Hypertension	• Involved in formation but also rate of expansion.
Collagen defects	• e.g. Marfan's disease and Ehlers Danlos syndrome
Flow dynamics	• The infrarenal aorta is a common site as pulse pressure here is maximal due to tapering calibre and reflected waves from the bifurcation.
Elastin degradation	• Due to increased levels of metalloproteinases.

Abdominal Aortic Aneurysm

- Enlargement of aorta at least 3 cm.
- Most common type of large vessel aneurysm.
- Common in male.
- 95% have associated atheromatous degeneration.
- Two types,
  - ❑Suprarenal
  - ❑Infrarenal - 95%

Clinical Features



Elective Presentation

- Pressure symptoms
  - ❑Nerve roots
    - ○ Back pain, thigh and groin pain
  - ❑IVC compression
    - ○ DVT
  - ❑Duodenum
    - ○ Vomiting
- Pulsatile abdominal mass (expansile pulse) just above the umbilicus.
- Bruit.
- Aortoenteric fistula.
- Ureteric obstruction.

Emergency presentation

- Rupture of Aneurysm
  - ❑Severe/sudden onset epigastric and/or back/loin pain.
  - ❑History of sudden ‘collapse’
  - ❑Transient hypotension.
  - ❑Shock
  - ❑Sweating
- Peripheral ischaemia due to emboli.

Investigations

- **USS**
  - ❑ Assess the maximum diameter of the aneurysm
  - ❑ Assess the relationship to renal arteries
  - ❑ Cannot diagnose rupture
- **CECT scan**
  - ❑ Morphology of the aneurysm is best assessed by CT

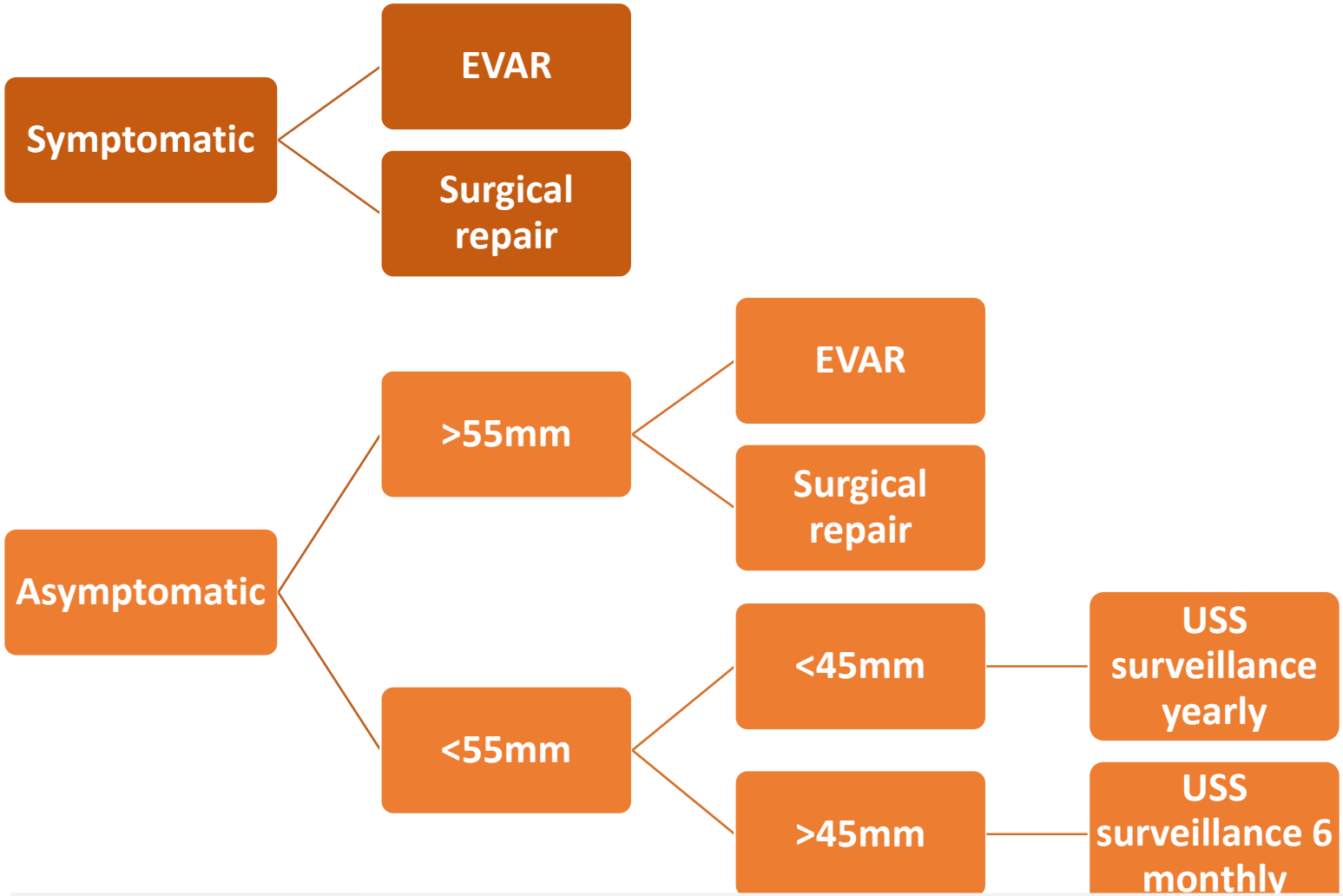
CECT – Coronal view
Infrarenal AAA.

CECT – Sagittal view
Infrarenal AAA.

Complications

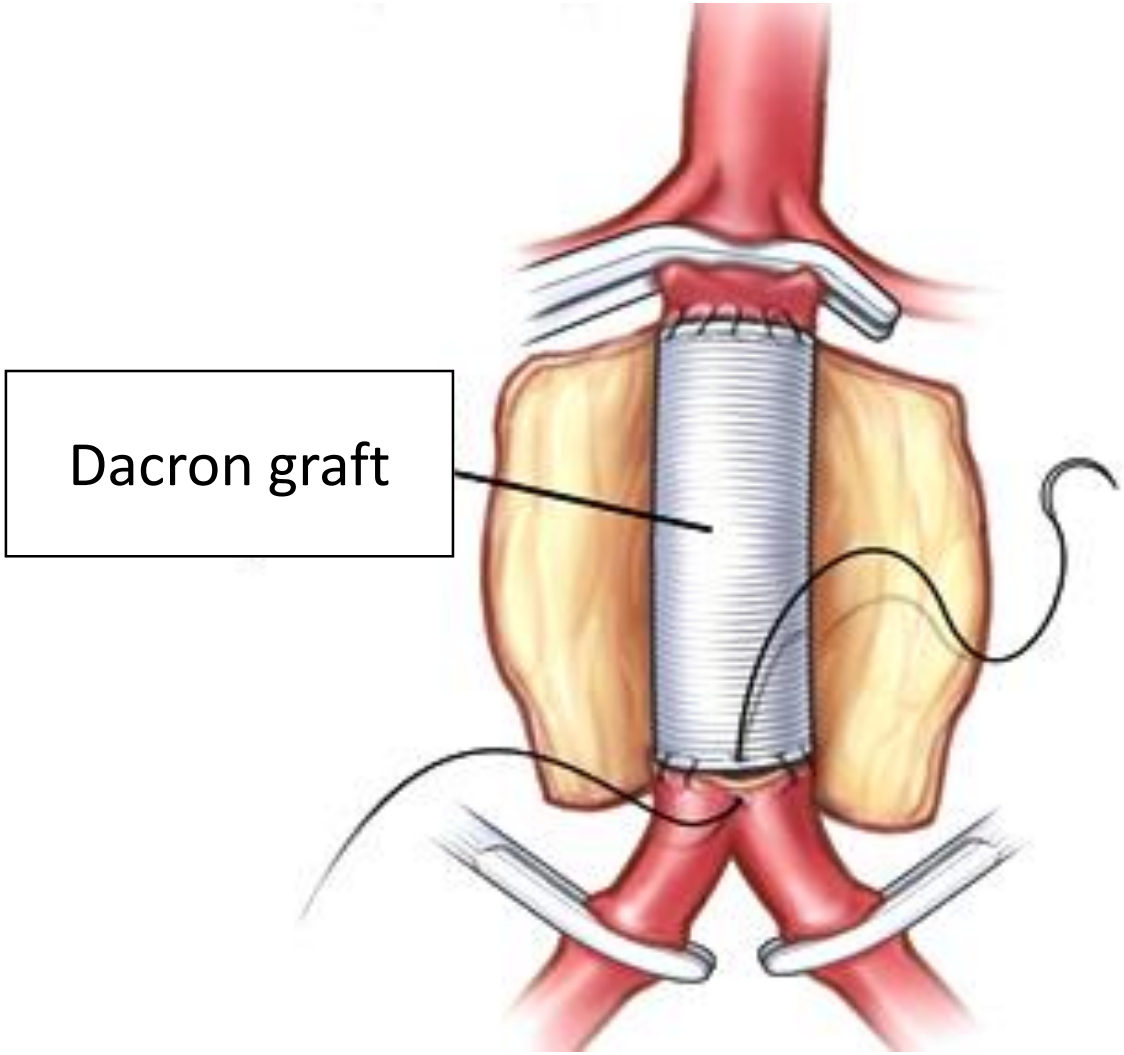
- Rupture with retroperitoneal haemorrhage or intraperitoneal haemorrhage, or into the IVC (AV fistula).
- Distal emboli.
- Severe back pain due to erosion of the lumbar vertebral bodies.
- Thrombosis with distal ischaemia.

Management


Symptomatic
EVAR
Surgical repair
Asymptomatic
>55mm
EVAR
Surgical repair
<55mm
<45mm
USS surveillance yearly
>45mm
USS surveillance 6 monthly

Elective surgery

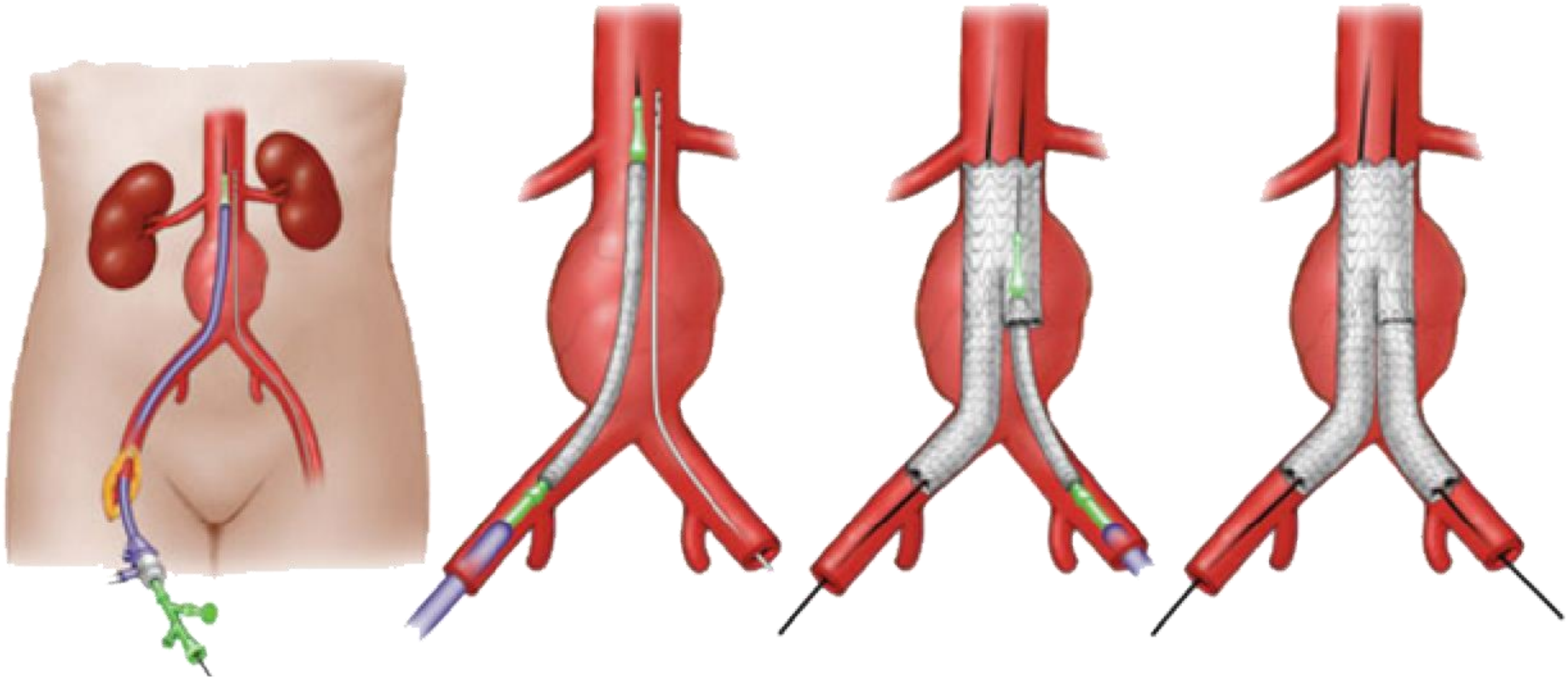
- Open repair involves an in-lay Dacron graft or a Dacron Y graft to the iliac arteries or femoral arteries.
- Laparoscopic repair may offer earlier return to normal function and reduced hospital stay.
- Postoperative complications
  - ❑Cardiac - Ischaemia and infarction.
  - ❑Respiratory - Atelectasis and lower lobe consolidation.
  - ❑Neurological - Sexual dysfunction and spinal cord ischaemia.
  - ❑Colonic ischaemia.
  - ❑Renal failure.



Open repair

Endovascular repairs

- Endovascular aneurysm repair (EVAR) with a stent graft.
- Percutaneous insertion of covered stent to exclude the aneurysmal segment from arterial pressure.
- Advantages-
  - Percutaneous technique.
  - Reduced early mortality.
- Disadvantages-
  - High early re-intervention rate.
  - Requires lifelong surveillance.



Endovascular aneurysm repair (EVAR)

Ruptured Abdominal Aortic Aneurysm

- Risk of rupture relates to maximum AP diameter.
  - ❑Less than 0.5% per year, <4.0cm diameter.
  - ❑One per cent per year, 4–5.5cm.
  - ❑Over 3% per year, >5.5cm.
- Less than 50% of patients with a ruptured AAA reach hospital alive and the overall mortality of the condition may be as high as 75–95%.

Clinical features

- Symptoms
  - ❑Severe abdominal pain radiating to the back or iliac fossa and is associated with collapse.
- Signs
  - ❑Unexplained rapid onset hypotension
  - ❑Tenderness
  - ❑A pulsatile abdominal mass (Not always easy to feel due to pain and abdominal wall rigidity).

Investigations

- CT scan
  - ❑If the diagnosis is in doubt and time allows.
  - ❑USS will show an aneurysm but not a rupture.

Management

Emergency management

- Immediate resuscitation (oxygen, intravenous replacement therapy, central line).
- Maintain systolic pressure, but not >100 mmHg, consider permissive hypotension.
- Urinary catheter.
- Cross-match six units of blood.
- Rapid transfer to the operating theatre.

Surgery for rupture

- Emergency repair should be undertaken once blood is available.
- Open repair is with an in-lay Dacron graft or a Dacron Y graft.
- Emergency EVAR also provides good results.