

ANEURYSMS OF THE AORTA AND MAJOR ARTERIES

ANEURYSM DEFINED AS DILATION OF VESSEL ABOVE 1.5 TIMES NORMAL

TRUE ANEURYSM CONTAINS ALL LAYERS OF THE VESSEL WALL → RISK FACTORS INCLUDE CONNECTIVE TISSUE DISORDERS, FAMILIAL HISTORY, ATHEROSCLEROTIC RISK FACTORS

PSEUDOANEURYSM → CONSISTS PARTLY OF THE VESSEL WALL AND PARTLY OF FIBROUS OR OTHER SURROUNDING TISSUE

MYCOTIC ANEURYSM → RESULT OF INFECTION IN THE VESSEL WALL, MORE COMMON IN THE IMMUNOSUPPRESSED

PERIPHERAL AND VISCERAL ANEURYSMS REPRESENT A SMALL BUT IMPORTANT SUBSET → POPLITEAL, RENAL, SPLENIC AND HEPATIC ARTERIES → ALL BUT SPLENIC ARE MORE COMMON IN ELDERLY MEN.

COMPLICATIONS OF ANEURYSM INCLUDE RUPTURE AND THROMBOSIS WITH RESULTANT EMBOLISM TO DISTANT SITES

REMEMBER LAPLACE'S LAW → WALL TENSION = PRESSURE X RADIUS → HENCE AS ANEURYSM'S INCREASE IN SIZE, THEY HAVE MORE WALL TENSION AND ARE MORE LIKELY THEREFORE TO RUPTURE

CLINICAL FEATURES DEPEND ON TYPE OF ANEURYSM AND ITS ANATOMICAL LOCATION (COMPRESSION OF ADJACENT STRUCTURES) → ONCE RUPTURED, HAEMORRHAGIC SHOCK ENSUES AND DEATH IS INEVITABLE WITHOUT SURGICAL INTERVENTION

ABDOMINAL AORTIC ANEURYSM:

- Defined as aneurysmal once above 3cm diameter, repair considered for AAA above 5cm
- Most patients are >60, male predominance, associated with other aneurysms and peripheral vascular disease

CLINICAL FEATURES:

- **VARIETY OF SIGNS AND SYMPTOMS THAT MIMIC OTHER DISORDERS:**
 - Syncope
 - Flank pain
 - Back or abdominal pain
 - GI bleeding from aortoenteric fistula
 - Extremity ischaemia from embolisation of thrombus in the aneurysm

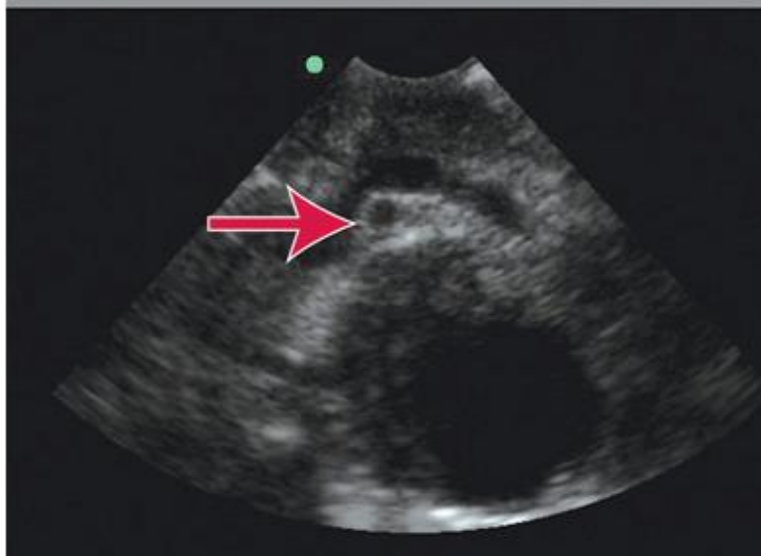
- SHOCK or SUDDEN DEATH
- Syncope without warning followed by severe back or abdominal pain suggests AAA rupture → syncope caused by blood loss and loss of cerebral perfusion
- Back or abdominal pain is the most common presenting symptom, severe and abrupt in onset
 - Atypical sites → flank, groin, isolated quadrants, hip
- PHYSICAL EXAM HAS ONLY MODERATE ABILITY TO DETECT A.A.A.
- SIGNS OF ACUTE RUPTURE:
 - Periumbilical ecchymosis (Cullen sign) or flank ecchymosis (Grey Turner sign)
 - Psoas sign from retroperitoneal blood irritating the psoas muscle
- AORTOENTERIC FISTULA:
 - Considered in patients with unexplained UGI/LGI bleeding
 - More common in those with graft repair of AAA
 - Duodenum is most commonly involved → manifests as haematemesis, melaena or (if rapid transit) → haemochezia
 - Often massive bleeds, but can have warning “sentinel” bleeds
- ALL ASYMPTOMATIC ANEURYSMS NEED TO BE REFERRED, REPAIR CONSIDERED ABOVE 5CM due to increased risk of rupture

DIAGNOSIS:

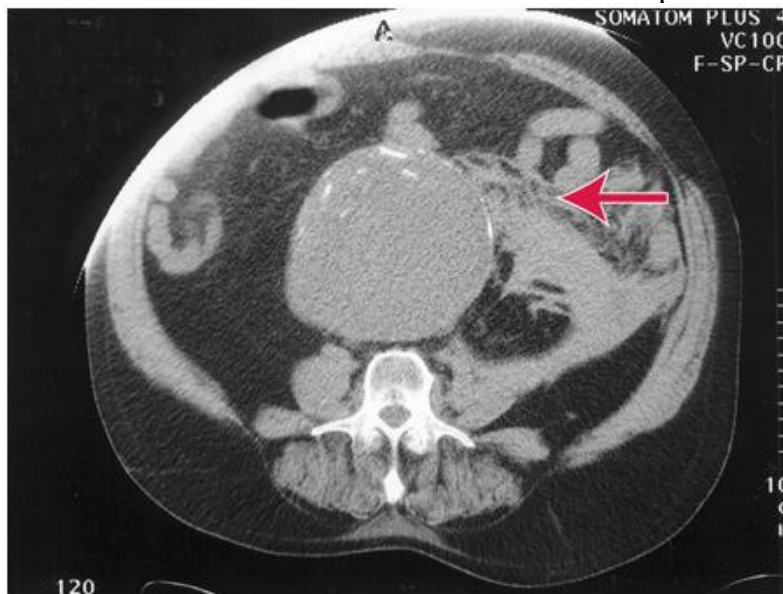
- RAPID BEDSIDE ULTRASOUND:
 - Ideal for patients who are unstable and cannot undergo CT
 - Measure from outer wall to outer wall



- Technically adequate US study has >90% sensitivity for demonstrating aneurysm and measuring its diameter → obesity, bowel gas and abdominal tenderness make it more difficult
- Identification of aorta aided by other structures such as the SMA, vertebral body



- CT SCANNING:
 - Performed in stable patients
 - Need IV contrast
 - Demonstrate anatomic details and associated retroperitoneal haemorrhage



- Arrow above denotes haemorrhage and surrounding inflammation

TREATMENT:

- All symptomatic AAA require emergency surgical consult or transfer to surgical facility capable of repair
- CLINICAL TRIAD OF ABDOMINAL/BACK PAIN, PULSATILE ABDOMINAL MASS AND HYPOTENSION ONLY OCCURS IN ONE THIRD PATIENTS

- Any suspected rupture needs immediate surgical repair → ONE HALF OF PATIENTS WITH RUPTURED AAA WHO MAKE IT TO OPERATING THEATRE ALIVE DIE!
- While in ED (hopefully brief period!):
 - Large bore access
 - Resuscitation (not overly vigorous, as this may be harmful)
 - Pain relief
- Asymptomatic/incidental aneurysms need outpatient follow up

THORACIC AORTIC ANEURYSMS:

- Become symptomatic by compressing or eroding into adjacent structures → can present with oesophageal, tracheal/bronchial or even neurologic disorders → if it has eroded into an adjacent structure, this is generally immediately fatal!

EXTREMITY AND VISCERAL ANEURYSMS:

CAUSE SYMPTOMS BY EXPANSION OR RUPTURE

Table 63-2 Nonaortic Large-Artery Aneurysms			
Artery	Risk Factors	Clinical Presentation	Management
Popliteal (>2 cm or >150% of normal caliber)	Advanced age, male gender, trauma, congenital disorders	Most common peripheral aneurysm; discomfort behind knee with swelling with or without deep venous thrombosis	Thrombolysis, ligation, arterial bypass, endovascular repair
Subclavian	Arteriosclerosis, thoracic outlet obstruction	Pulsatile mass above or below clavicle, dysphagia, stridor, chest pain, hoarseness, upper extremity fatigue or numbness and tingling, limb ischemic symptoms	Surgical repair
Femoral	Advanced age, male gender, trauma, congenital disorders	Pulsatile mass with or without pain, limb ischemic symptoms, peripheral embolic symptoms	Thrombolysis, ligation, arterial bypass, endovascular repair
Femoral pseudoaneurysm	Prior femoral artery catheterization, trauma, infection	Pulsatile mass with or without pain	Surgical repair
Iliac		Pain in groin, scrotum, or lower abdomen; sciatica; vulvar or groin hematoma with rupture	Surgical repair
Renal	Age 40–60 y, no gender preference, HTN, fibrodysplasia, arteriosclerosis	Flank pain, hematuria, collecting system obstruction, shock if ruptured	Surgical repair, nephrectomy
Splenic	Advanced age, female gender, HTN, congenital, arteriosclerosis, liver disease, multiparous, rupture increased in pregnancy	Rapid symptom onset; epigastric or left upper quadrant pain first, then diffuse abdominal pain with rupture, shock	Surgical repair, splenectomy, embolization if unruptured
Hepatic	Infection, arteriosclerosis, trauma, vasculitis	Obstructive jaundice, hemobilia from rupture into common bile duct, right upper quadrant pain, peritonitis, upper GI bleed	Surgical ligation, embolization

- Peripheral artery aneurysms (subclavian, popliteal, femoral) are often asymptomatic until a complication occurs → rupture, thrombosis, embolisation

- Visceral artery aneurysms remain silent until a complication → renovascular HT, renal artery thrombosis, organ infarction, AV fistula formation, rupture
 - Rupture should be considered in a patient with sudden onset abdominal pain and shock
- POPLITEAL ANEURYSMS:
 - Localised dilation to >2cm
 - Rupture rare, but often lead to acute limb ischaemia caused by thrombosis or embolisation
- FEMORAL OR ILIAC ANEURYSM:
 - Pulsatile mass in groin or upper thigh, scrotal haematoma or acute limb ischaemia
 - Iliac aneurysm notoriously difficult to diagnose due to confusion with other visceral cause of pain
- HEPATIC ARTERY ANEURYSM:
 - QUINCKE TRIAD → jaundice, biliary colic and upper GI bleeding → may be present as a result of haemobilia from leaking aneurysm
 - Often manifests with rupture with abdominal pain and shock
- SPLENIC ARTERY ANEURYSM:
 - LUQ pain, undifferentiated shock or intra-abdominal haemorrhage
 - Special concern in THIRD TRIMESTER OF PREGNANCY
 - Poor prognosis due to its intraperitoneal location → i.e. no tamponade effect
- SUBCLAVIAN/INNOMINATE ARTERY ANEURYSM:
 - Can lead to limb ischaemia
- ANASTOMOTIC ANEURYSM:
 - Commonly rupture and cause catastrophic bleeding
 - May erode into adjacent intestine and cause aortoenteric fistula → consider in patient with AAA repair and UGI/LGI bleeding