

Disorders of the Aorta - 2023

Aorta

- Largest artery in body
- Supplies blood (O₂) to all vital organs
- Under great stress from constant pressure of blood
- Most common problems affecting aorta
 - Aortic Aneurysms
 - Aortic Dissection

Aortic Aneurysms

Definition

- Outpouchings or dilations of the arterial wall
- May involve aortic arch, thoracic aorta, or abdominal aorta

Types

- Fusiform
 - Involving the complete circumference of the artery
- Saccular
 - Only affecting one side of the artery

Etiology and Pathophysiology

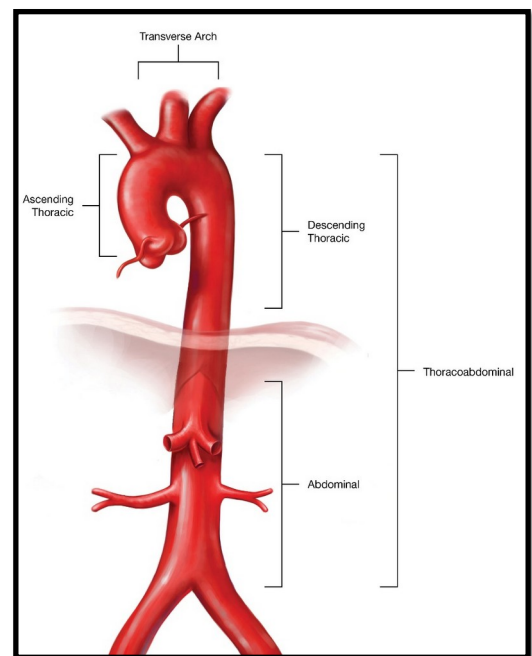
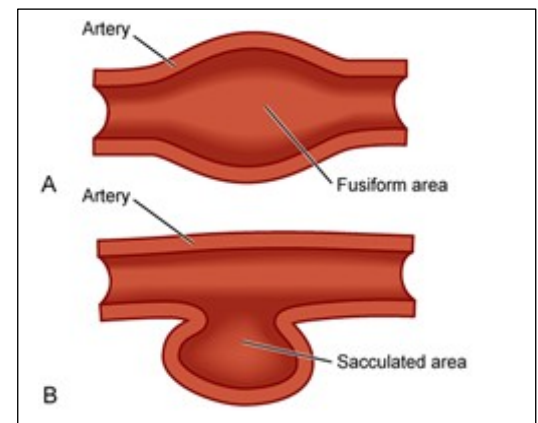
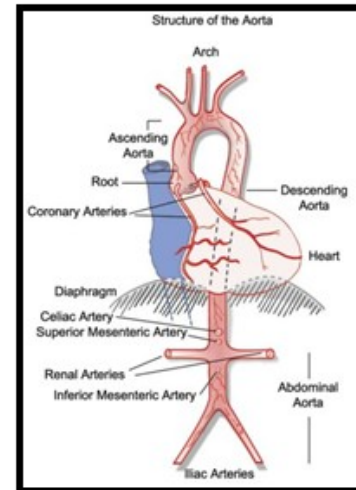
- May have aneurysm in more than one location
- Growth rate unpredictable
 - The larger the aneurysm, the greater the risk of rupture

Risk Factors

- Atherosclerosis
- Male gender
- Uncontrolled HTN
- Tobacco use
- Hyperlipidemia
- Blunt force trauma
- Family hx
- History of syphilis
- Age

Clinical Manifestations

- Thoracic aortic aneurysms
 - Ascending aorta and aortic arch
 - Often asymptomatic
 - Most common manifestation
 - Most common manifestations
 - Severe chest/back pain
 - Hoarseness, cough, SOB, trouble swallowing
- Abdominal aortic aneurysms (AAA)



- Most common location
- Often asymptomatic
- Most common manifestations
 - Low back pain
 - Pulsating abdominal mass
 - Bruit over area of aneurysm
 - Epigastric discomfort/altered bowel elimination

Complications

- Rupture = most serious complication!
 - Massive hemorrhage
 - Most do not survive long enough to get to the hospital
 - If survive, active resuscitation and immediate surgery
 - If rupture occurs into the retroperitoneal space, bleeding may be controlled by surrounding anatomic structures preventing death.
- Dilated aortic wall becomes lined with thrombi that can embolize
 - Leads to acute ischemic symptoms in distal branches

Diagnostic Studies

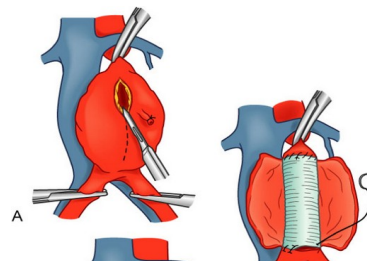
- X-rays
 - Chest
 - Abdomen
- ECG
- Echo
- Ultrasonography
- CT scan or MRI
- Angiography

Collaborative Care

- Goal – prevent aneurysm from rupturing—adequate BP Control!
- Early detection/treatment imperative
- Once detected
 - Studies done to determine size and location

Collaborative Care

- Small aneurysm (4.0 - 5.4 cm)
 - Conservative therapy used
 - Risk factor modification
 - ↓ blood pressure, tobacco cessation, optimize lipid profile, gradual ↑ physical activity
 - Size 4 - 5.4 cm – ultrasound or CT scan monitoring q 6 to 12 months
 - Size < 4cm – ultrasound q 3 years
- 5.5 cm is threshold for repair
- ***Surgical intervention may occur earlier in:**
 - Patients with a genetic disorder (i.e. Marfan's syndrome, Ehler-Danlos syndrome)
 - Rapidly expanding aneurysm
 - Symptomatic patients (↑ HR, ↑ RR, ↓ BP)
 - High rupture risk

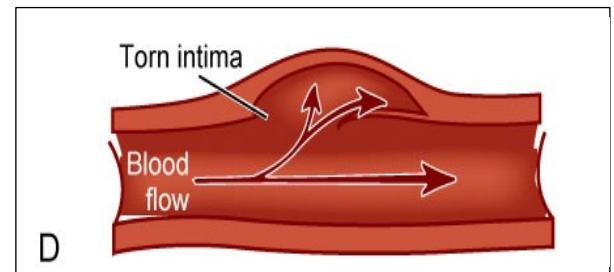


Surgical Procedures

- Open aneurysm repair (OAR)
 - Incising diseased segment of aorta
 - Inserting synthetic graft
 - Suturing the native aortic wall around graft
 - Acts as protective cover
- Endovascular (percutaneous) aneurysm repair (EVAR)
 - Alternative to open surgical repair (minimally invasive)
 - Involves placement of sutureless aortic graft into abdominal aorta inside aneurysm
 - Inserted via femoral artery catheter
 - Blood then flows through graft, preventing expansion of aneurysm
 - Aneurysm wall will begin to shrink over time
 - Must meet strict eligibility criteria to be a candidate
 - Graft dysfunction may require traditional surgical repair
 - Need for long-term follow-up

Aortic Dissection

- Often misnamed “dissecting aneurysm”
- Not a type of aneurysm
- Result of a false lumen through which blood flows



Classifications

- Type A dissection-ascending aorta and arch
 - Requires emergent sx
- Type B dissection- descending aorta
 - Allows for conservative management
- Acute- first 14 days
- Subacute- 14 to 90 days
- Chronic - > 90 days

Risk factors

- Gender
 - Men > women
- Age
 - Occurs most frequently in 60's and 70's
- Others
 - Aortic diseases, atherosclerosis, trauma, pregnancy, tobacco/cocaine use, congenital/connective tissue disorders (Marfan's syndrome), hypertension, family history, high-intensity weightlifting

Etiology and Pathophysiology

- Due to degeneration of the elastic fibers in the arterial wall
- Chronic hypertension hastens the process
- Tear in inner layer allows blood to surge between inner and middle layer
- Rupture through outside wall can cause death
- As heart contracts, each systolic pulsation ↑ pressure on damaged area
 - Further ↑ dissection

- May occlude major branches of aorta
 - Cutting off blood supply to brain, abdominal organs, kidneys, spinal cord, and extremities

Clinical Manifestations

- Depend on location of intimal tear and extent of dissection – pain may migrate
- Ascending Aorta
 - Sudden, severe to chest/back pain
- Descending Aorta:
 - Back, abdomen, or leg pain
- Pain described as
 - “Tearing”
 - “Ripping”
 - “Stabbing”

More Clinical Manifestations

- If aortic arch involved, neuro deficiencies may be present
- If ascending aorta, cardiovascular deficiencies
- With progression, decreased tissue perfusion to abdominal organs and lower extremities

Complications

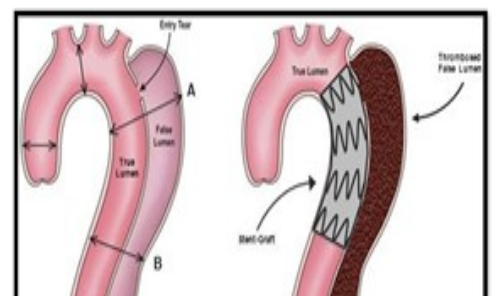
- Cardiac tamponade
 - Severe, life-threatening complication
 - Blood leaks into pericardial sac
- Aorta may rupture
 - Occlusion of arterial supply to vital organs
 - Results in exsanguination and death

Diagnostic Studies (Table 37-6)

- H & P
- EKG
- Chest x-ray
- CT scan
- MRI
- Transesophageal echocardiography (TEE)

Collaborative Care

- Initial goal
 - ↓ BP and myocardial contractility to diminish pulsatile forces within aorta
 - Drug therapy
 - IV β -adrenergic blocker
 - Calcium channel blockers
 - Pain Control
 - Morphine preferred
- Conservative therapy
 - If no symptoms (in descending aorta)
 - Can be treated conservatively for a period of time



- Pain relief and BP control
- Surgery delayed as long as possible

Surgical Procedures

- Endovascular dissection repair
 - Standard to treat acute *descending* aortic dissections w/ complications
 - Similar to EVAR (approach to repair aneurysms)
- Surgical therapy
 - Acute *ascending* aortic dissection = emergency!
 - Also indicated when drug therapy ineffective or when complications present
 - Involves resection of aortic segment and replacement with synthetic graft material
 - High in-hospital mortality rate even with prompt intervention

Aortic Aneurysm & Dissection

Nursing Management

- Provide emotional support for patient/caregiver
- Careful assessment of all body systems (pre- and post-procedure)

Discharge teaching

- Antihypertensive drugs for life
- Follow-up appointments
- Signs and symptoms to report