Definition
Coarctation of the aorta (CoA) is a narrowing in the aortic arch, usually just distal to the origin of left subclavian artery and can occur either pre, post or peri-ductally. It can occur as a single lesion or in combination with other defects.

Aetiology: Like many congenital heart defects, the cause of CoA is unknown, but is diagnosed in 6-8% of all children born with congenital heart disease.

Pathophysiology
The aortic narrowing found in CoA means that the left ventricle must pump at a far higher pressure to force the blood through the narrowed segment. This can result in less oxygen rich blood being delivered to the lower body. If left untreated, within the heart this can result in the left ventricular hypertrophy and dilation of the proximal portion of the aorta. This can lead to cardiac failure. Distally to the coarctation, major organs may receive a reduced blood supply which too can lead to failure.

Treatment – CoA can be surgically corrected
Whilst awaiting surgery may be required to maintain duct patency, and anti heart failure medication (diuretics and Digoxin) for those in failure.

An isolated CoA is normally surgically repaired through a thoracotomy. Either the narrowing is cut out and the ends anastomosed, or the aorta is enlarged by the placement of a patch.

Post-operative prophylactic antibiotics are required.

Signs and Symptoms
The majority of CoA are identified at birth, following the closure of the ductus arteriosus, however the initial signs and symptoms may differ slightly depending on where the coarctation lies in relation to the duct.

Particular signs and symptoms for CoA include:
- Bounding pulses in the upper limbs but severely diminished or absent femoral/pepal pulses.  
- Pink upper extremities and cyanosed lower extremities.
- Reduced blood pressure in the lower limbs when compared to the upper limbs.
- Cramping or painful legs
- Chest x-ray or physical assessment may suggest an enlarged heart
- Headache and epistaxis
- Signs of heart failure (tachycardia, pulmonary oedema, tachypnoea)
- Poor feeding

Postoperative nursing care
Post-operatively all children will be admitted to the PICU. Routine ICU care should be provided, in addition to that written below:

- Thoracotomy incisions and chest drains can be very painful. A pain assessment should be completed, adequate sedation and analgesia administered, and constant re-assessments made.
- Consideration of the incision site should also be made when positioning the child.
- Following major surgery, pupil size and reaction should be checked on admission to the PICU and then daily until discharge.
- Fluids will be restricted in the immediate days post-op: careful measuring of the input/output and balance is vital to ensure that the child doesn’t become under or over hydrated.
- Urine output should be carefully monitored as renal failure can occur as a result of reduced blood supply to the kidneys. Aim for 1ml/kg/hr. Diuretics may be required.
- Record and observe drains for content and amount – report if excessive (>3ml/kg/hr) or abnormal (milky). Milk drains often to prevent blockage.
- Children with CoA are at an increased chance of developing Necrotising Enterocolitis (NEC) and so feeds should be started cautiously and Expressed Breast Milk (EBM) given if available. Observe for signs of NEC (increased bloody/bileous aspirates, distended red abdomen, increasing girth).
- Observe, record and report vital signs. Hypertension is possible and should be treated with anti-hypertensives. Fever in a patient who has had a patch repair is a warning sign of patch infection.
- Blood cultures should be taken and the patient cooled.
- The wound should be observed for signs of infection (redness, warmth, swelling, pus). Give all antibiotics as prescribed.
- Re-coarctation is possible, therefore continue to assess for reduced or weakened BP, O₂ saturations and pulses in lower limbs.
- Take regular arterial blood gases to monitor gas exchange and electrolytes imbalance; potassium should be maintained above 4mmol/L.

References:
3. Children’s Hospital Boston. Coarctation of the Aorta
6. Texas Heart Institute: Coarctation of the Aorta
7. PICU Guidelines – Texas Children’s Hospital
8. PICU Guidelines – Texas Children’s Hospital