Nursing a Preterm Neonate with Patent Ductus Arteriosus in the Neonatal Intensive Care Unit

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Practice guideline only. Please consult your own hospital’s protocols/policies.

Definition
Patent ductus arteriosus (PDA) is a congenital heart defect which may present soon after birth. When the Ductus Arteriosus is patent, blood flows between the aorta and the pulmonary artery.

Aetiology: The preterm infant is at risk of developing a Patent Ductus Arteriosus because of an immature response to the increase in the pO2. This means that the smooth muscles in the Ductus Arteriosus do not contract and close the Ductus.

Signs and Symptoms
• A murmur may be heard on auscultation of the heart.
• Fast breathing.
• Increased work of breathing.
• Shortness of breath may occur.
• Excess blood flow in the lungs may lead to pulmonary oedema.
• Poor feeding.
• Excessive or poor weight gain.
• Bounding peripheral pulses.

Treatment of Patent Ductus Arteriosus
• Infants who are asymptomatic do not require treatment but should be carefully monitored.
• Some infants may require oxygen therapy.
• Fluid intake should be closely supervised.
• Patent Ductus Arteriosus may be managed medically or surgically.
  o Indomethacin or ibuprofen may be used to aid closure of the Patent Ductus Arteriosus. If this is unsuccessful, surgery may be indicated.
  o Surgical treatment involves ligation of the Ductus through a lateral thoracotomy.

Pathophysiology
Before birth, the aorta and the pulmonary artery are connected by a shunt called the Ductus Arteriosus. This shunt allows some blood to bypass the foetal lungs and enter the systemic circulation of the foetus. Within minutes or up to a few days after birth, the shunt closes as part of normal adaptation to extra-uterine life.

In some babies however, the Ductus Arteriosus remains patent (open). After birth the pressure in the aorta is higher then the pressure in the pulmonary artery, therefore blood from the aorta moves across the Patent Ductus Arteriosus into the pulmonary artery, increasing the volume of blood in the pulmonary circulation. This creates increased pressure in the pulmonary arteries. The result is that the neonate may develop cardiac failure with pulmonary oedema and hepatomegaly in some cases.

Complications
• Congestive heart failure
• Hepatomegaly and Pulmonary oedema.
• Prolonged ventilation in ventilated infants.

Nursing Care
In addition to the routine Neonatal ICU care, the following specific care should be provided:
• Ensure that the mother/care giver and family are informed of the condition to facilitate their understanding and reduce both their and the babies anxiety.
• Ensure that all intravenous fluids are carefully controlled to prevent overload of fluids which would further burden the compromised circulatory system.
• Because of the potential for overload, fluid balance should be accurately recorded.
• Administer all medications as prescribed.
• Monitor weight gain carefully and observe for signs of oedema. A rapid weight gain and oedema would indicate possible fluid retention which may precipitate congestive cardiac failure.
• Report increased oxygen requirements which may be a symptom of pulmonary oedema.
• If the infant is not able to feed, encourage the mother to express breast milk and cup or tube feed the infant.
• If not in Kangaroo Mother Care, nurse the infant in a cot or in a nest for comfort and to provide boundaries.
• Monitor urine output in infants on Indomethacin as this drug may inhibit renal function.

Post surgical repair:
• As above but also carefully observe and maintain homeostasis post surgery.
• Keep the infant as peaceful as possible post surgery to prevent complications.

References