Post operative care of a child following a Blalock-Taussig shunt for Tricuspid Atresia

Primary Author: Neliswa Madingana

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

Condition

Tricuspid atresia is a congenital heart disease in which the tricuspid valve (valve between the right atrium and the right ventricle of the heart) fails to develop in utero. This results in a missing or very small right ventricle which is unable to return blood to the lungs. Survival is dependant on additional cardiac defects being present. Primary palliative surgery is staged, the first being a modified Blalock-Taussig (BT) shunt.

Aetiology: Like many congenital heart defects, the cause of tricuspid atresia is unknown. It is very rare occurring in 2/10,000 live births; this equates to 1-2% of children born with a cardiac defect, and is the third most common cyanotic heart defect. Prevalence is equal in boys and girls.

Pathophysiology

Since there is no opening from the right atrium to the ventricle, flow of blood through the heart is reliant on an interartial connection (a patent foramen ovale or an atrial septal defect). All the deoxygenated blood in the right atrium flows through the connection mixing with oxygenated blood in the left atrium and then through to the left ventricle.

With tricuspid atresia, blood flow to the lungs is interrupted. At birth, blood flow to the lungs is facilitated by the patent ductus arteriosus (PDA) which allows flow from the aorta to the pulmonary artery. However, once the PDA closes, blood flow to the lungs is dependant on the presence of a Ventricular Septal Defect (VSD). The size of the VSD and degree to which the right ventricle has developed determines the amount of blood that flows to the lungs. If the VSD is large, pulmonary blood flow may be excessive, but if the VSD is small, significant hypoxia and cyanosis can result.

Signs and Symptoms

(Dependant on degree of interartial/ventricle communication, but becomes evident in the neonatal period)

- Usually cyanosed at birth
- An audible cardiac murmur
- Respiratory distress develops shortly after birth as the PDA closes
- Difficulty in feeding and poor weight gain
- Signs of cardiac failure can develop
- Tachycardia
- Sweating

First stage palliative surgery: BT shunt

The Blalock-Taussig shunt is performed if the blood flow to the lungs is insufficient. It allows more blood to flow to the lungs through a connection which is made between the right subclavian artery and the right pulmonary artery. After the shunt is placed, blood flows into the common atrium, through the left ventricle and out into the aorta, where some blood will pass through the shunt to the pulmonary arteries. This operation is normally done in the first few days or weeks of life, but does not correct the cyanosis. It will be followed by two further operations at a later date.

Nursing Care

Post-operatively all children will be admitted to the PICU where routine ICU care should be provided. In addition, the focus of care is on the balancing of systemic and pulmonary circulations, as described:

- Thoracotomy incisions and chest drains are very painful. Perform regular pain assessment and administer adequate sedation and analgesia. Re-assess 2hourly. Well managed pain = reduced oxygen demand.
- Following major surgery, check pupil size and reaction on admission to the PICU and then daily until discharge. This ensures early detection of any serious neurological events.
- Fluids will be restricted in the immediate days post-op: Measure the input/output and calculate the balance hourly to ensure that the child doesn’t become under or over hydrated. Avoid large boluses of fluid to avoid over distending the single ventricle.
- Monitor urine output hourly to detect any signs of renal failure occurring 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 draining more than 3ml/kg/hr. ‘Milk’ drains often to prevent blockage. Chylothorax, caused by a chyle leak is common.
- Be cautious when introducing feeds following a BT shunt – considering giving as little as 1ml/hr to preserve gut integrity. Always give expressed breast milk if possible.
- Observe, record vital signs initially ½ to ½ hourly, then hourly. Report changing trends. The patient will be on inotropes so report if any signs of cardiac output (poor peripheral perfusion, urine output, HR, BP and metabolic acidosis) are present and administer prescribed treatment promptly.
- Take regular arterial blood gases to monitor gas exchange; maintain pCO2 4.5 – 6kPa. Administer O2 in low concentrations to prevent excessive pulmonary vasodilation.
- Monitor bloods: Keep K+ ≥4mmol/L, and Hb high in view of chronic arterial desaturation.
- Observe the wound for signs of infection (redness, warmth, swelling, pus). Give all antibiotics as prescribed.
- Administer prescribed anticoagulants to prevent blockage of the shunt.

References

2. Children’s Hospital Boston. ‘Tricuspid Atresia’ http://childrenshospital.org/la/365881ma S18BAV5150P0.html ‘How we care for Tricuspid Atresia’ (Accessed online 10th Feb).

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Tricuspid Atresia with Blalock-Taussig shunt

Aim to ICU care should be provided. In addition, the focus of care is on the balancing of systemic and pulmonary circulations, as described:

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