



NCCU CLINICAL GUIDELINES
SECTION: 14

NEONATAL CARDIAC CONDITIONS:
MEDICAL AND SURGICAL MANAGEMENT

Section 14: Neonatal cardiac conditions
Care of the infant post cardiac catheterisation
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CARE OF THE INFANT POST CARDIAC CATHETERISATION

This policy provides specific care to infants post cardiac catheterisation to reduce the risk of complications. It refers to all infants returning to NCCU following Cardiac Catheter / Diagnostic & Interventional Procedures:

- Balloon Atrial Septostomy – to enlarge or create atrial septal defect.
- Pulmonary Valve Ballooning for Pulmonary Stenosis
- Aortic Valve Ballooning – for Aortic Stenosis
- Coarctation of Aorta Ballooning

The term 'Cardiac Catheterisation', refers to the passage of a fine tube into the heart chambers through a vein or an artery, usually from the right femoral area, although often the umbilical vessels are used. In infants with congenital heart disease, the femoral approach permits movement of a catheter into the left side of the heart through a patent foramen ovale, an atrial septal defect or a ventricular septal defect.

This procedure allows blood samples and pressure measurements to be obtained from within the various chambers of the heart. This provides information about the effects of the heart problem on the function of the heart and lungs. Catheter manipulation is performed under fluoroscopy with image intensification to reduce radiation exposure. This is undertaken in the cardiac catheter laboratory (Balloon atrial septostomy is usually performed at the bedside with echocardiographic guidance only).

Interventional cardiac catheterisation is directed at avoiding surgery with all its associated risks, wounds and lengthy hospitalisation. Procedures of this type may be used to stretch open a narrow valve or blood vessel, by using a catheter with an inflatable balloon. Alternatively, a tiny 'spring' coil may be inserted to block off an abnormal and unwanted blood vessel or an expanding plug may be placed to close a hole such as an ASD or VSD.

POST CARDIAC CATHETERISATION CARE

On collection of the infant from the Cardiac Catheter Laboratory, ensure the following information is ascertained:

- What procedure has been performed – either diagnostic or interventional catheterisation
- The findings of the catheter procedure
- Location of vascular access e.g., right or left femoral, jugular or subclavian neck access or umbilical access
 - Review the puncture site and check if there is any bleeding or haematoma
 - Ascertain presence of distal pulses to the puncture site
- What medications have been administered to the baby

- Any complications that may have been experienced
- Vital signs – i.e., heart rate, respiratory rate, blood pressure, oxygen saturations

On return to the Unit, observations to be monitored include vital signs and peripheral pulses. Use Neurovascular Observation Chart to monitor changes in conjunction with Neonatal Observation Chart MR489/491).

MONITORING AND OBSERVATIONS:

Check the following:	Interval times:
Respiratory <ul style="list-style-type: none"> • Oxygen saturation • Respiratory pattern / Rate 	15 minutes for 1 hour 30 minutes for the 2nd hour 1 hour for the 3rd and 4th hour 2 – 4 hourly until stable
Circulatory/vascular <ul style="list-style-type: none"> • Check for bleeding or haematoma • Presence or absence of distal pulses • Peripheral perfusion / Capillary refill 	15 minutes for 1 hour 30 minutes for the 2nd hour 1 hour for the 3rd and 4th hour 2 – 4 hourly until stable
Renal - Urine output	15 minutes for 1 hour 30 minutes for the 2nd hour 1 hour for the 3rd and 4th hour 2 – 4 hourly until stable
Distended abdomen	15 minutes for 1 hour 30 minutes for the 2nd hour 1 hour for the 3rd and 4th hour 2 – 4 hourly until stable
Level of consciousness	15 minutes for 1 hour 30 minutes for the 2nd hour 1 hour for the 3rd and 4th hour 2 – 4 hourly until stable

COMPLICATIONS

Cardiac catheterisation can lead to serious complications but the risk of a major complication during diagnostic cardiac catheterisation is less than 3%.

1. CATHETER INSERTION SITE HAEMORRHAGE AND/OR HAEMATOMA

Bleeding is the most common vascular complication. It may result in a local haematoma of little clinical significance. However, severe blood loss may develop if bleeding occurs in the retroperitoneal space. Symptoms include oozing or bleeding from puncture site or development of haematoma. Unexplained hypotension and a decreasing haematocrit level should suggest the possibility of a retroperitoneal haematoma.

Action - manual compression directly onto puncture site. Alert medical staff. Compression should be sufficiently applied to stop bleeding, however, not too much as to stop blood flow to distal limb. Bleeding should subside within 5 – 10 minutes.

2. INSERTION SITE OCCLUSION

Arterial - Symptoms include a slow, faint pulse or absent pulse distal to the insertion site, loss of warmth, sensation, and colour.

Action - advise medical staff IMMEDIATELY, as the child will require medical intervention. Use of Doppler can be considered to ascertain blood flow; however, this should follow medical assessment.

Venous - Symptoms include localised swelling and increase in pain scores.

Action - elevate affected limb

3. ARRHYTHMIAS

Atrial or ventricular premature beats, brief episodes of supraventricular tachycardia are common and can occur as a result of mechanical irritation by the catheter to the cardiac tissue. They are usually transient and resolve without treatment. Ventricular tachycardia or fibrillation is a rare occurrence but requires prompt defibrillation.

Action - Advise medical staff immediately as the infant may become compromised by the arrhythmia. Have printing module on hand so that any irregularities can be recorded.

4. CARDIAC TAMPONADE

May result from perforation to cardiac walls by catheter. Symptoms include decreased blood pressure, tachycardia, tachypnoea, cold clammy skin, decreased oxygen saturation, cardiac arrest.

Action - this is a medical emergency. Medical staff intervention is required for a pericardial tap or for insertion of an ICC.

5. ANAPHYLACTIC REACTIONS TO CONTRAST MEDIUM

This can cause inflammation of the lung and heart which further reduces the mixing of oxygenated air through the holes in the babies' heart. It may present with increased respiratory distress, GI upset, tachycardia, rash, oedema/swelling or cardiorespiratory collapse.

Action - This is a medical emergency. If suspected, notify medical team immediately. Treatment may include IM adrenaline, and sometimes intensive resuscitation.

6. PSUEDOANUERYSM

Is a potential cause of important femoral bleeding and must be recognized. A psuedoanuerysm develops if a connection persists between a haematoma and the arterial lumen. It presents as a pulsatile mass, sometimes with a systolic bruit. The diagnosis is confirmed by ultrasound. Management often is conservative, using prolonged compression.

Action - Notify the medical team, who may request an ultrasound.

7. CEREBRAL VASCULAR ACCIDENT

A stroke may not always be apparent during the procedure. The first symptoms may develop hours after the procedure is completed when debris loosened from the procedure finally break free and embolise.

Action – Notify the medical team, who should review the infant and may organise intracranial imaging.

REFERENCES

- Indications for cardiac catheterization and intervention in pediatric cardiac disease: A scientific statement from the American Heart Association. Feltes TF, Bacha E, Beekman RH, Cheatham JP, Feinstein JA, Gomes AS et al. *Circulation* 2011;123:2607-52
- Comparative risk of cardiac catheterisations performed on low birth weight neonates. Mobley MM, Stroup ER, Kaine SF. *Cardiology in the Young* 2013;23:722-726