

Heart Murmurs in the Neonate

An approach to the neonate with a heart murmur

This guideline is applicable to medical and nursing staff caring for newborn infants in Lothian.

Summary:

1. All neonates noted to have a heart murmur should be examined by an experienced paediatrician (middle grade/ANNP).
2. All neonates with a heart murmur should have pre and post ductal saturations measured. Pre ductal saturations are measured from the right arm and post ductal from either lower limb.
3. All neonates noted to have a heart murmur should remain in hospital until 24 hours old unless a definitive echocardiographic diagnosis is reached before this time.
4. Echocardiography remains the gold standard investigation of neonatal heart murmurs.
5. There is no evidence to support the routine use of CXR, ECG or 4 limb BP in the assessment of the asymptomatic neonate with a heart murmur.
6. In cases where an ECG has been performed, a normal result should not be considered confirmation of an innocent murmur.
7. Clinical examination findings and pulse oximetry should be used to inform decisions about the timing of review +/- need for urgent echocardiography.
8. Parents of neonates with heart murmurs who are discharged prior to definitive diagnosis should be given written information about warning signs and advised who to contact if they have concerns.

Introduction:

- A heart murmur heard in the neonatal period may be associated with congenital heart disease.
- However, it must be remembered that not all infants with congenital heart disease have heart murmur in the neonatal period.
- **A neonate with a murmur and any of the following findings needs urgent assessment including echocardiogram:** signs of heart failure or shock (see below), lower limb saturations <96% in the absence of respiratory disease, >2% difference between pre and post ductal saturations, absent/weak femoral pulses.

The investigation of the neonate with a heart murmur (see flowchart)

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Investigation will vary depending upon available expertise. The following recommendations represent the minimum requirements to ensure the safe management of neonates with heart murmurs and the timely identification of congenital heart disease.

- All infants with a heart murmur on neonatal examination should be reviewed by a member of the senior neonatal team (consultant/middle grade/ANNP).
- All infants with a heart murmur should remain in hospital until > 24 hours old (unless definitive diagnosis is reached before this).
- All infants with a heart murmur should have a detailed cardiovascular clinical examination which must include measurement of pre and post ductal saturations.
- If a baby with a heart murmur is discharged before a definitive diagnosis is reached, the parents should be given a written information leaflet describing warning signs and advising them of what to do in the event that their baby became unwell.

Clinical examination:

Will include:

- Signs of heart failure (tachypnoea, increased respiratory effort, hepatomegaly, shock)
- Palpation of brachial and femoral pulses
- Presence of cyanosis (as measured by lower limb saturations – a reading <96% or >2% difference between pre and post ductal saturation should prompt further investigations)
- Heart sounds
- Presence of a heave
- Murmur – intensity, character, location and radiation

Echocardiography:

- This is the gold standard investigation for differentiating between innocent and pathological murmurs. Where it is not feasible to perform echocardiogram for all infants with heart murmurs, information gathered from examination findings, oxygen saturations +/- ECG can be used to determine the need for the timing of echocardiography and follow up.

Investigation and management of neonatal heart murmurs (See flowchart)

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- **Likely significant congenital heart disease – urgent echocardiogram and review (same day)**

Infants with a heart murmur and any of the following warning signs: lower limb saturations <96%; 2% pre/post ductal difference; absent/weak femoral pulses; signs of heart failure or shock. These infants require admission to a neonatal unit for consideration of Prostaglandin and urgent discussion +/- transfer to a cardiac centre. Discuss pre-transport management with both the cardiologist and neonatologist at Yorkhill. If a person competent to perform an echocardiogram is available while transport is awaited then this can be linked by telemedicine link/used to update surgical centre. **This should not be allowed to delay transfer.**

- **Asymptomatic but clinically pathological murmur – prompt echocardiogram (pre-discharge neonatologist or as soon as possible Cardiology service next working day)**

Infants without any of the above warning signs but with **any** of the following abnormal clinical findings: dysmorphism; heave; abnormal heart sounds; loud murmur (>2/6); pansystolic, diastolic, continuous murmur; murmur location other than left sternal edge; radiation; abnormal ECG.

- **Low risk of congenital heart disease – pre-discharge neonatologist or Cardiology service echo in the next week**

Well infants with no signs of heart failure, normal pulses, lower limb saturations ≥ 96%, soft (1-2/6) systolic murmur at the left sternal edge with no radiation.

Additional Notes:

Electrocardiogram (not to be performed routinely)

- ECG has been shown to be a sensitive and specific tool for diagnosing atrioventricular septal defect (more common in infants with Trisomy 21) but has not been shown to aid significantly in the diagnosis of other structural congenital heart disease.
- A normal neonatal ECG shows right axis deviation because of the right ventricular dominance of the newborn heart. Left axis deviation in a newborn is a significant abnormal finding and should prompt further investigation.

- Whilst an abnormal ECG should prompt further investigation, a normal ECG should not be considered reassuring if there are abnormal clinical findings or lower limb saturations <96%.

CXR and 4 limb BP (not to be performed routinely)

- There is no evidence to support the use of CXR or 4 limb blood pressure measurements in the assessment of neonates with heart murmurs.

Adapted from PECSIG guideline 2013, Reviewed against WOS Murmur guidance, and local pulse Oximetry Guidance