

## Cardiac Murmurs

### Definition / Supporting Information

The priority for the clinician is to distinguish innocent murmurs from those that indicate a cardiac abnormality.

**Keywords / also known as:** heart murmur

### Essential History

**Ask about:**

- Perinatal history
  - Prematurity
  - Maternal diabetes
  - Maternal infections during pregnancy eg Rubella
  - Multiple gestation pregnancy
  - In vitro fertilisation pregnancy
  - Maternal drug use (either legal or illicit), known teratogens
  - Abnormal amniocentesis
  - Abnormal foetal ultrasonogram
  - Maternal history of congenital heart disease
- Patient history
  - Current or recent fever, recent infections
  - Concurrent syndromic disorder or genetic disease
  - Concurrent metabolic disorder or storage disease
  - Sickle cell anaemia or blood dyscrasias resulting in anaemia
  - History of cardiotoxic chemotherapy
  - Hypertension
- Family history
  - Congenital heart disease
  - Sudden cardiac death
  - Unexplained death in young people
  - Hypertrophic cardiomyopathy

### 'Red Flag' Symptoms and Signs

**Ask about:**

- Poor weight gain (see Faltering Growth)
- Difficulty feeding (see Appetite Loss)

- Respiratory distress (see Dyspnoea)
- Poor exercise tolerance
- Chest pain with exercise
- Prolonged or unexplained fever
- Unexplained syncope (especially syncope resulting in injury)

**Look for:**

- The following features should prompt an urgent referral in the presence of a new murmur:
  - Cold extremities with variable / poor quality pulses, prolonged capillary refill
  - Cyanosis, pallor
  - Respiratory distress (retractions, grunting, nasal flaring) (see Dyspnoea)
  - Reduced oxygenation on pulse oximetry in room air
    - Right hand and either foot if infant
  - Thrills
  - Hepatomegaly
  - Abdominal distension, ascites
  - Oedema
  - Enlarged thyroid

## Differential Diagnosis / Conditions

- Systolic murmurs
  - Ejection (crescendo–decrescendo) murmurs
    - May be innocent or abnormal
    - Innocent systolic ejection murmurs are usually not greater than grade I or II.
      - May be associated with fever due to common infections in a child and disappear when the child recovers from the illness
    - Abnormal murmurs result from obstructed blood flow across a semilunar valve (aortic or pulmonary stenosis), in which case an ejection click may precede the murmur, or excessive volume crossing a normal semilunar valve (atrial septal defect) without associated clicks.
    - Abnormal murmurs may be of any grade of intensity.
  - Holosystolic (pansystolic) murmurs
    - Result from movement of blood from a higher-pressure chamber to a lower-pressure chamber, such as with a ventricular septal defect or mitral regurgitation
  - Late systolic murmurs
    - Associated with mitral valve prolapse and resultant mitral regurgitation

- Classically preceded by a mid- or late-systolic click
- Diastolic murmurs
  - All are pathological and require referral to a paediatric cardiologist
- Continuous murmurs
  - Caused by:
    - Aortopulmonary connection (eg, patent ductus arteriosus)
    - Arteriovenous connection (eg, arteriovenous malformation)
    - Turbulent flow in collateral arteries (eg, coarctation of the aorta)
    - Turbulent flow in veins (eg, venous hum)
    - Surgical shunt
  - These murmurs are pathological, except for the innocent venous hum.
- A to-and-fro murmur describes an ejection murmur heard in systole, coupled to a decrescendo murmur early in diastole.
  - To-and-fro murmurs are not true continuous murmurs.
  - Combined aortic stenosis and aortic insufficiency or combined pulmonary stenosis and pulmonary insufficiency produce to-and-fro murmurs.

**Table 1 Common Innocent Murmurs**

Murmur	Intensity	Timing	Location	Quality
Still	I-III/VI	Early-mid systolic	LM-LLSB or apex	Vibratory, musical
Pulmonary	I-III/VI	Early-mid systolic	LUSB	Low-pitched, ejection flow
Venous hum	I-III/VI	Continuous	Right or left infra- or supraclavicular	Low-pitched, disappears with head turn, supine position, jugular compression

LM-LLSB, left mid to left lower sternal border; LUSB, left upper sternal border.

## Investigations

To be undertaken by specialist practitioners (eg, Paediatric / Paediatric Cardiology Team(s) or Paediatrician with Expertise in Cardiology (PEC)):

- Echocardiography is the definitive investigation for children with asymptomatic murmurs and will distinguish an innocent from an abnormal murmur where there is any doubt.
- Electrocardiography (ECG) can be useful where echocardiography is not immediately available.

- Chest X-ray
  - To determine the size of heart, the status of pulmonary vasculature, and evidence of congestive cardiac failure

## Treatment Approach

To be undertaken by non-specialist practitioners (eg, General Practitioner (GP) Team):

- It is often difficult to differentiate an innocent murmur from an abnormal murmur.
  - If innocent murmur is established, reassurance is the mainstay of management.
  - If the child has a fever, the murmur should be reassessed when the child is well, as long as no 'red flag' signs are present.
  - There should be a low threshold for referral to the PEC or Paediatric Cardiologist depending on local protocols.

To be undertaken by specialist practitioners (eg, PEC / Paediatric Cardiology Team):

- The specific management of cardiac murmur depends on the underlying cardiac lesion.

## When to Refer

Refer urgently to specialist practitioners (eg, PEC / Paediatric Cardiology Team) if:

- In the presence of any 'red flag' symptoms and signs
- Auscultation of a gallop rhythm
- Cyanosis
- Congestive heart failure
  - Rales (crackles)
  - Respiratory distress (see Dyspnoea)
  - Hepatomegaly
  - Oedema

Refer to specialist practitioners (eg, PEC / Paediatric Cardiology Team) if:

- Patient, maternal, or family history raises the index of suspicion for heart disease
- Evident dysmorphism
- Diastolic murmurs
- Continuous murmurs, except venous hum
- Systolic murmurs grade IV or higher
- Systolic murmurs not clearly fitting the pattern of innocent murmur
- A thrill is present
- Clubbing is present
- Chest wall deformities, such as pectus excavatum

- Chest wall asymmetry
- Higher blood pressure in upper limbs compared with lower limbs
- Abnormal electrocardiogram
- Symptoms suggest reactive airway disease and do not improve with appropriate medical therapy
- There is doubt as to whether a murmur is innocent or abnormal

### ‘Safety Netting’ Advice

- With any murmur, the parent should be informed of the symptoms and signs to be aware of and when to present for urgent review.
  - The symptoms and signs are outlined under the ‘Red Flag’ Symptoms and Signs section.

### Patient / Carer Information

***\*Please note: whilst these resources have been developed to a high standard they may not be specific to children.***

- [Heart Murmurs in Children](#) (Web page), Patient

### Resources

#### National Clinical Guidance

[Transient loss of consciousness \(‘blackouts’\) management in adults and young people](#) (Web page), NICE clinical guideline CG109, National Institute for Health and Care Excellence.

#### Suggested Resources

***\*Please note: these resources include links to external websites. These resources may not have national accreditation and therefore PCO UK cannot guarantee the accuracy of the content.***

[Heart Murmurs and Your Child](#) (Web page), KidsHealth, Nemours.

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**Clinical Expert Reviewers:** Dr P Venugopalan and Dr Madhu Gangadhara

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**AAP Reviewer:** Thomas McInerney, MD, FAAP

**Paediatric Trainee Reviewer:** Dr Amy Douthwaite

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