British Heart Foundation

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HEART MURMURS IN CHILDREN

Although a heart murmur is an important presenting feature of a cardiac disorder in infancy and childhood, innocent murmurs are very common, occurring in up to 80% of children at some time or other. These murmurs are frequently detected during a febrile illness and are also exacerbated by nervousness or on exercise. It is important to distinguish between innocent and pathological murmurs and to arrange more detailed evaluation of the child if there is any doubt. Children should be routinely screened for heart murmurs and other evidence of cardiac disorder between 6 and 8 weeks of age and at subsequent examinations during childhood. Serious cardiac pathology may exist without symptoms.

Innocent murmurs
The commonest innocent murmur in children (usually heard at age 3-6 years, although also occasionally in infants) is the ***parasternal vibratory ejection systolic murmur (Still's murmur)*** which has a very characteristic low-frequency 'twanging' or musical quality. It is localised to the left mid-sternal border or midway between the apex and left lower sternal border, is of short duration, low intensity and is loudest when the child is supine often varying markedly with posture. It can be made to disappear on hyperextension of the back and neck (Scott's manoeuvre).

The ***venous hum*** is a superficial continuous murmur heard beneath the clavicles and in the neck which can be abolished by head movements, by compression of the ipsilateral jugular vein or by lying the child supine.

The ***innocent right ventricular outflow tract murmur (pulmonary flow murmur)*** is a soft early to mid-systolic ejection murmur heard at the right upper sternal border but does not radiate to the back. In the premature and newborn infant an innocent pulmonary flow murmur may be audible radiating to the axillae and to both lungs at the back.

Innocent ***carotid bruits*** are common in normal children.

What is not innocent ?
In addition to listening for murmurs careful attention should be paid to the presence of other evidence of cardiac pathology. Certain features indicate that a murmur is likely to be pathological and that prompt expert evaluation is needed:

- Cyanosis or clubbing
- Abnormal cardiac impulse
- Abnormal breathing (tachypnoea, intercostal recession)
- Thrill over precordium or suprasternal notch
- Cardiac failure
- Abnormal heart sounds
- Failure to thrive
- Presence of click
- Abnormal pulses - diminished or absent femorals
- Radiation of murmur to the back
- Arrhythmia
- Murmur which is purely diastolic

Pathological systolic murmurs
Systolic murmurs maximal at the upper sternal borders are more likely to be ejection in type due to heart outflow abnormality or increased flow - aortic valve, subvalve or supravalve stenosis and HOCM being maximal on the right radiating to the neck whilst pulmonary valve, subvalve or supravalve stenosis or atrial septal defect murmurs are louder on the left and radiate to the back. Those at the lower sternal border are more likely to be of regurgitant type due to ventricular septal defect, mitral or tricuspid regurgitation. Some pathological systolic murmurs are heard widely over the whole precordium and different types of murmur may coexist. Coarctation of the aorta is an important cause of a murmur over the back particularly in the interscapular region.

Pathological diastolic murmurs
Diastolic murmurs should always be regarded as pathological. Early diastolic decrescendo murmurs are associated with incompetence of a semilunar valve - the aortic valve in bicuspid aortic valve or Marfan syndrome, the pulmonary valve following surgery for tetralogy of Fallot or pulmonary stenosis and more rarely in conjunction with pulmonary hypertension.
Mid or late diastolic murmurs are found at the lower sternal borders in patients with abnormality of the mitral or tricuspid valves.

Continuous murmurs
Continuous murmurs cross the second sound and are a feature of persistent ductus arteriosus or arteriovenous

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malformation. With the exception of the venous hum (see above) they are always pathological.

Investigations
Chest X-ray and electrocardiogram may give useful clues to the cause of a heart murmur and cross-sectional echocardiography, ***in expert hands,*** usually enables a complete diagnosis to be achieved. Cardiac catheterisation may sometimes be required.

Summary
Children should be screened for the presence of cardiac disorder by careful clinical examination soon after birth, again at 6-8 weeks and during later childhood. These examinations must include palpation of the femoral pulses to exclude coarctation of the aorta that is sometimes missed at early neonatal examination. During auscultation attention should be paid not only to the presence of a murmur, but also to abnormalities of the heart sounds, particularly the second sound in order to detect atrial septal defect or pulmonary hypertension. The absence of symptoms does not exclude important pathology. If in doubt, referral to a paediatric cardiologist is essential.

References:

1. Perloff J. "The Clinical Recognition of Congenital Heart Disease". 4th Edition Philadelphia: Saunders 1994

2. Park MK. Paediatric Cardiology Handbook. Mosby-Year Book 1991