



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 supra valve stenosis and HOCM being maximal on the right radiating to the neck whilst pulmonary valve, subvalve or supra valve 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

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

Factfile Supplement

October 2001

Thanks to all of you who contributed suggestions for future topics and for ways in which our Factfiles could be improved. I'm pleased to say that we had already commissioned articles on several of the topics that you would like to see covered and others will be tackled in due course.

One area of interest was on **congenital heart disease** and I'd like to draw your attention to some of the publications we have in this area:

- Children with heart conditions - a guide for parents
- Living with congenital heart disease - information and support for teenagers and adults
- Congenital heart disease factsheets

Copies of the above can be obtained from our Distribution Department on 0207 935 0185 extension 240 or via e-mail: distribution@bhf.org.uk

Changes to the format of Factfile will of necessity take longer as some will incur additional expense and this has to be budgeted for in the next financial year which commences April 2002.

The past 12 months have been difficult for the Education Department due to prolonged illness of a senior member of staff. Consequently we have had a succession of temporary staff who have helped out. Unfortunately, from time to time they have made errors and there are two in **Factfile 8/2001**. They are as follows:

- Further reading, reference 4 should read:
Nicotine replacement to aid smoking cessation.
Drug and Therapeutics Bulletin. 1999; 37: 52-54.
- The Quitline number is 0800 00 22 00

The following helplines in different languages are available:

Bengali	0800 00 22 44	(Mondays 1pm to 9pm)
Gujerati	0800 00 22 55	(Tuesdays 1pm to 9pm)
Hindi	0800 00 22 66	(Wednesdays 1pm to 9pm)
Punjabi	0800 00 22 77	(Thursdays 1pm to 9pm)
Urdu	0800 00 22 88	(Sundays 1pm to 9pm)
Turkish and Kurdish	0800 00 22 99	(Thursdays and Sundays 1pm to 9pm)

We apologise for any inconvenience this may have caused. We hope that the appointment of Claire Wilkins to the Education Department (with responsibility for Factfile) will ensure that future editions are produced on time and that errors are avoided.

Professor Sir Charles George
Medical Director