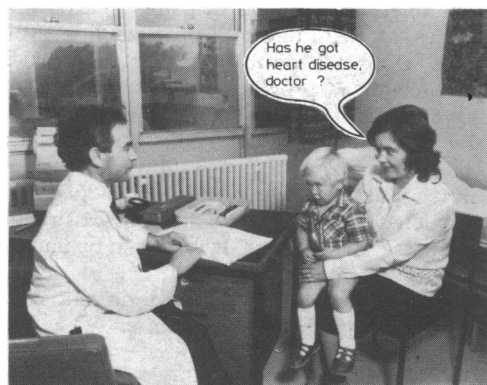


ABC of 1 to 7

H B VALMAN

SYSTOLIC MURMURS

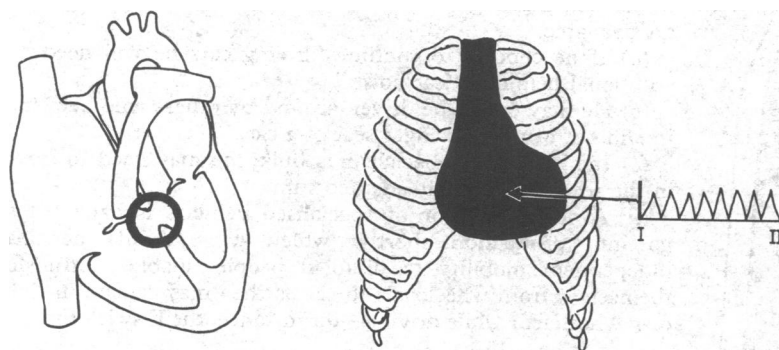


Congenital heart disease occurs in about one in every 100 live births but the commonest clinical problem is the child with a murmur discovered during a routine examination or during an acute illness. Most of these children have no cardiac disease.

The minority with physical disease usually have a ventricular septal defect or mild pulmonary stenosis. Most of the ventricular septal defects close spontaneously before the child reaches the age of 5 years.

Loud murmurs are always due to cardiac disease. Soft murmurs may be either caused by cardiac disease or have no pathological significance (benign or innocent murmurs).

Loud systolic murmurs

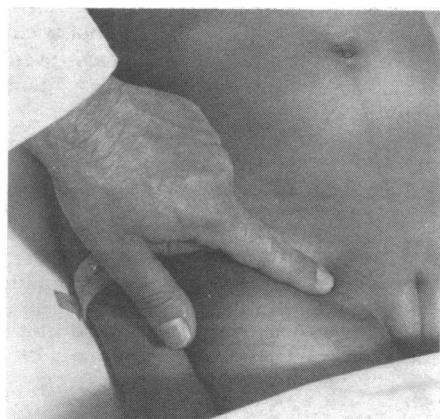


Ventricular septal defect is the most common congenital heart disease in childhood. It produces a loud murmur maximal in the fourth left intercostal space close to the sternum. Although it is maximal at that site it radiates in all directions and may be heard as high as the clavicle.

Pulmonary stenosis causes a loud systolic murmur maximal in the pulmonary area, which is conducted to the left lung posteriorly.

Aortic stenosis produces a murmur which may be maximal to the right of the upper sternum and to the left of the midsternum and is well conducted to both sides of the neck.

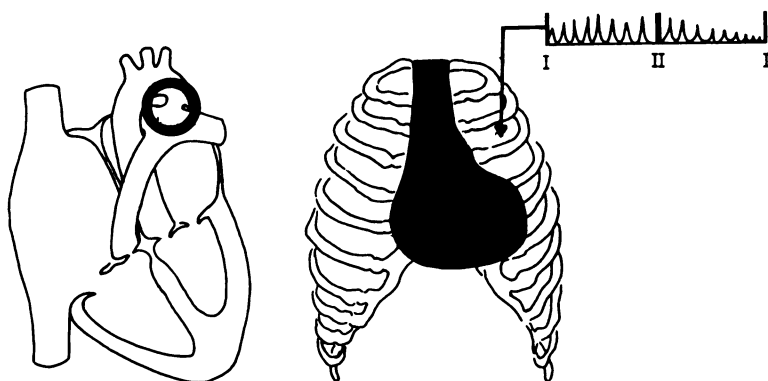
Soft systolic murmurs due to organic disease



Atrial septal defect causes a soft systolic murmur in the pulmonary area due to increased flow of blood through the pulmonary valve. This lesion is often first noted in adult life, when the symptoms appear. In atrial septal defect the second heart sound is widely split and does not vary with respiration. In contrast, in normal children the second heart sound is widely split in inspiration and less in expiration.

Children with coarctation of the aorta often have a short systolic murmur heard over the back between the scapulae. The diagnosis is not missed if the femoral arteries are palpated routinely. Children with coarctation of the aorta often have other lesions, such as aortic stenosis, and the finding of a murmur due to that lesion may bring the coarctation to light.

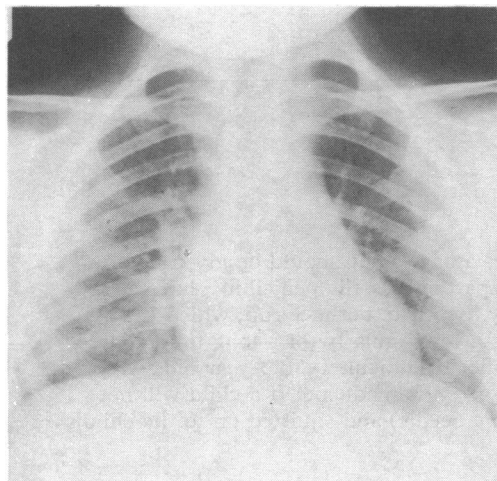
Differential diagnosis



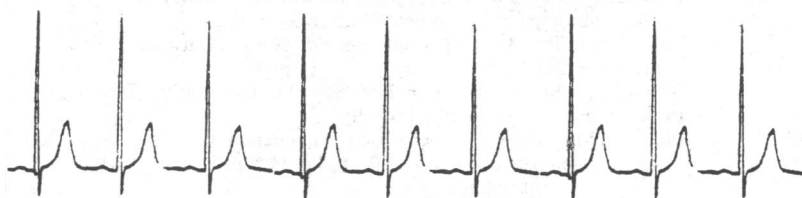
For those who are not cardiologists systolic murmurs which spill over into diastole may be difficult to differentiate from purely systolic murmurs. There are two important examples: *patent ductus arteriosus* and the *venous hum*. Most children with persistent patent ductus arteriosus have no symptoms. The murmur is maximal in the second left intercostal space lateral to the pulmonary area. The murmur may radiate down the left sternal edge and to the apex. The murmur is described as sounding like machinery. High volume pulses are present when the ductus is widely patent. Other types of congenital heart disease, particularly ventricular septal defect, may also be present.

The venous hum is a continuous murmur throughout systole and diastole and is heard best under the inner end of the right clavicle with the child sitting up. It can be abolished by lying the child down. It is a normal finding.

Soft systolic murmurs of benign origin



Comment		Date 10 OCT 1979	
0 7.3	WBC	4.0	11
4.5 5	NEUT	4.0	11
1 1.5	LYM	32.3	17.0
3 4.3	PCV	36	50
0 7.5	MCV	90	100
2 5.2	MCH	27	32
3 3.6	MCHC	32	36
100-1500	PLT	4818	5
100-400	MON	365	5
10-100	EOS	146	2
Basophil			
Blast			
Pro			
Myel			
Meta			
100 WBC	Norm		
RETIC %			
PLATELETS	1000		
LAB. No.			
WARD			
DR			



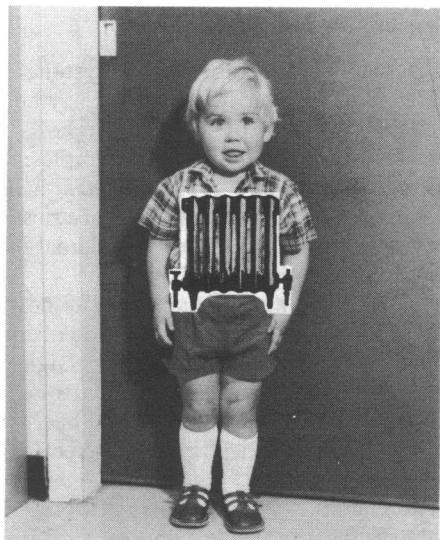
Benign systolic murmurs are soft, short, and low pitched. They are heard maximally to the left of the sternum. The murmur becomes louder when the patient lies down and softer when he stands up. Organic disease is usually excluded by the character of the murmur and the absence of any symptoms or abnormal signs in the cardiovascular system. The femoral pulses must be checked. A normal chest radiograph and electrocardiogram may help to confirm the diagnosis but where the diagnosis is still uncertain the opinion of a paediatric cardiologist and echocardiography may be helpful.

Fever or anaemia intensify benign murmurs and a murmur that sounded loud at the time of an acute illness may be almost inaudible in an outpatient clinic a few weeks later. Anaemia may be difficult to diagnose clinically and a haemoglobin estimation is advisable.

Benign murmurs: discussion with parents



Benign or innocent murmurs do not indicate heart disease and need no treatment. Many parents fail to understand what the murmur means despite careful explanation, and unnecessary fear and anxiety is generated. Despite reassurances by a doctor the parents may restrict the physical activities of the child, to his detriment. The parents may misinterpret what is told to them and believe that their child *has* heart disease.



If the murmur is discovered during a routine examination and the doctor is convinced that it is benign there is no advantage in discussing it with the parents. On the other hand, if there is a doubt about the nature of the murmur the parents must be told that the child has a murmur. If the murmur has been noted on one occasion it is likely to be heard again at routine examinations and whenever the child has fever. If the child is acutely ill with a high fever and the mother is very anxious it may be better to postpone telling her about the murmur until the child has been examined in the convalescent period. If there is a possibility that another doctor will see the child at that time it may be better to discuss it at the first visit and avoid the possibility that it will be forgotten.

When the murmur is being discussed, preferably in the presence of both parents, it should be emphasised that it is a normal sound heard in children with normal hearts; that the noise is probably due to blood flowing through the tubes, and in some cases more noise is produced than in others, similar to the noise in some central heating systems. Doctors initially have to exclude disease but when they have done that the child should be considered completely normal and should be treated as a normal child. Ample opportunity must be given to allow the parents to ask questions to enable them to understand this difficult concept.

Dr H B Valman, MD, FRCP, is consultant paediatrician, Northwick Park Hospital and Clinical Research Centre, Harrow.

The illustrations of ventricular septal defect and patent ductus arteriosus were adapted, with permission, from *Essential Paediatrics* by David Hull and Derek I Johnstone, published by Churchill Livingstone.

Some useful drugs

Children treated at home and most of those in hospital need oral drugs three times a day. They should be given before meals and the child need not be woken specially for the drug. Some preparations, particularly the penicillins, have an unpleasant taste and the medicine should not be mixed with food as the child may then hate both. Syrup, which is a sucrose solution that forms the base of most elixirs, may cause dental caries if it is given regularly for a long time. The concentration of the drug in the elixir should be high to provide a minimum volume. In difficult 1- to 3-year-olds wrapping the child securely in a blanket may prevent spillage if only one adult is present to give the medicine. If a child will not accept a drug on a spoon the drug can be measured in a disposable syringe (with *no* needle) and squirted on to the child's tongue.

Aminophylline 3-5 mg/kg single intravenous dose given slowly
 Amoxycillin 25 mg/kg/24 h orally
 Ampicillin 50-100 mg/kg/24 h orally, intramuscularly, intravenously
 severe infections 300 mg/kg/24 h intravenously
 Beclomethasone dipropionate Rotacap 100 µg 3 times daily
 Betamethasone 3 mg per dose intramuscularly or intravenously
 Cephalixin 40-100 mg/kg/24 h orally
 Chloral hydrate 30 mg/kg/24 h orally
 Chlorpheniramine 1-2 mg per dose 3 times a day orally, intramuscularly, intravenously
 Cloxacillin 50-100 mg/kg/24 h orally, intramuscularly, intravenously
 Co-trimoxazole 6 mg/kg/24 h (as trimethoprim) orally
 Diazepam 0.1-0.2 mg/kg/24 h orally or slowly intravenously
 Dioctyl sodium sulphosuccinate 12.5 mg per dose 3 times daily orally
 Erythromycin 50 mg/kg/24 h orally
 Flucloxacillin 25-50 mg/kg/24 h orally
 Gentamicin 7 mg/kg/24 h intramuscularly or intravenously
 Hyaluronidase 300 units per dose intramuscularly
 Hydrocortisone 100 mg per dose intramuscularly or intravenously
 Ipecacuanha syrup (USP) 15 ml per dose
 Methylcellulose 9% solution 5 ml per dose 3 times daily orally

Naloxone 0.01-0.02 mg/kg per dose intramuscularly or intravenously (can be repeated after 3 minutes)
 Nitrofurantoin 3 mg/kg single dose daily by mouth as maintenance dose
 Nystatin 100 000 units per dose (four hourly) orally *after* food
 Paracetamol 75 mg/kg/24 h orally
 Paraldehyde 0.2 ml/kg per dose *intramuscularly*
 Penicillin Benzylpenicillin 50 mg/kg/24 h intramuscularly, intravenously
 severe infections 200 mg/kg/24 h intravenously
 Penicillin phenoxymethyl 50 mg/kg/24 h orally
 Phenobarbitone 5 mg/kg/24 h orally or intramuscularly
 Phenytoin 5 mg/kg/24 h orally or intramuscularly
 Promethazine hydrochloride 1 mg/kg per dose orally or intramuscularly
 Salbutamol oral: 1-2 mg per dose 3 times daily
 Rotacap: 200 µg per dose 3 times daily
 respirator solution (for nebuliser): 2.5 mg per dose
 Senna syrup (standardised) 2.5-5 ml per single daily dose orally
 Sodium cromoglycate Spincap 20 mg 3 times daily
 nebuliser solution 20 mg 3 times daily
 Sodium valproate 20-30 mg/kg/24 h orally
 Sulphafurazole 100 mg/kg/24 h orally
 Trimeprazine tartrate 3 mg/kg per dose orally