MEDICAL PRACTICE

*Clinics in General Practice***A child with a systolic murmur**

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British Medical Journal, 1976, 2, 797-799**The trainee's problem**

The mother was a little belligerent last evening when I suggested that the boy—aged 6 and the youngest of her four children—could be brought to the surgery in the family car for advice about his diarrhoea and fever. Perhaps it was because of the resultant slightly tense atmosphere during the consultation that my examination strayed to include a listen to the chest, but there was no doubting the fairly widespread though soft systolic murmur best heard down the left side of the sternum and across to the apex.

The mother noticed that I had been surprised and quickly asked if there was something wrong with the child's heart. Fortunately I said I had noticed a murmur, because two years previously this had also been noted by a doctor in another part of the country. He had arranged a specialist opinion but a pregnancy termination and her husband's redundancy (he is now a dairy-farm labourer) had been blamed for three failures to keep hospital appointments.

The mother feels that there cannot be much wrong with her child, whose ability for physical exercise seems boundless. She is probably right, and in any case her family commitments and previous record of keeping appointments do not suggest she will follow through any arrangement for a specialist opinion that we make. Should this child be referred to a cardiologist?

Incidentally, I was so caught up with the cardiac part of the consultation that I forgot to check the stool for pathogens because of the father's occupation. What should I do about this?

General practitioner's comments

We are faced with more than one problem, which necessitates examination in more depth. Firstly, we have to consider mother's belligerence, lack of concern about her son's cardiac condition, reluctance to accept her first doctor's recommendation, past history of termination, and behaviour during the consultation. Secondly, we have the social aspect of the husband's redundancy, change of location in the country, and change of employment to that of a "dairy-farm labourer." Thirdly, we have the boy's immediate problem of diarrhoea and fever and the less urgent problem of his cardiac murmur. Fourthly, we must attempt to restore some confidence in the doctor and assess the best approach and priority when dealing with these problems.

The mother's belligerence in demanding a home visit for her son is common enough when the doctor-patient relationship is immature and may reflect mother's problems with her previous general practitioner. This automatically puts both patient and doctor on the defensive, each convinced that they are in the right. There is no reason why the patient should not have been seen in the surgery, as transport was available; but there are times, particularly with new patients, when a home visit would have been more suitable. In retrospect this would have been the case here.

Her apparent lack of concern about the possible implications of her son's cardiac condition and her insistence that his ability for physical exercise seemed boundless may be correct, or it may be that he is a difficult, demanding child, the youngest of four, who appears to her to have boundless ability to irritate her. Alternatively, she may be covering up for her own lack of concern by insisting that his function is normal to absolve herself from having to follow the advice of her former doctor. We would suspect that her termination was on the grounds of her inability to cope with conditions as they were at that time. Her behaviour during the consultation in asking whether there was anything wrong with the boy's heart, when she knew that there was, is part of her cover-up.

The social aspect of her husband's change of employment to that of a dairy-farm labourer may have meant a loss of wages.

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We don't know about his previous employment, and as a dairy-farm labourer presumably he does not receive craftsman rating in agricultural wages. One must find out if they have ever lived in the country before, whether they are now in a tied cottage, and whether they find the isolation aspect of living on a farm and having to cope with weekly rather than daily shopping, together with other loss of amenities, disruptive to their previous style of life; how close they are to other farm employees and how well they get on with them; whether the husband is, in fact, happy with this change of employment and getting on with his head dairyman; whether he provides support for his wife at home or if he is keeping unusual milking hours, thus further disrupting the routine of the family.

The boy's immediate problem is his diarrhoea and fever. There is a possibility of a salmonella infection, particularly of the typhimurium type, in anyone connected with animals, especially dairy cattle, which excrete these pathogens. The whole family should be screened and the bacteriologist given a history of the duration of the illness and a list of members of the family's symptoms.

The boy's more chronic heart murmur, which may be only functional, will need a definite diagnosis eventually. In view of his mother's previous reluctance to attend the cardiology clinic, as indicated by three failures to keep appointments, it is, firstly, most important to form some area of communication with her. Once this is established we shall find out why it is that she was reluctant to allow her son to be seen and examined by the cardiologist. So far as possible the referral should be made out to be a routine procedure in any child with a cardiac murmur. It must be emphasised that most murmurs are functional, and that the boy will not require heart surgery or frequent follow-up appointments at the area hospital. Once she agrees to the logic of referral one must choose a cardiologist who is used to paediatric cases and can find the time to speak to the parents in terms they understand.

The best plan would be to ask the health visitor, as part of the practice team, to visit the home to arrange for stool specimens from all the family. If she times her arrival for the afternoon she will be able to talk to the mother about any of the problems that have been mentioned and also observe the return of the children from school. She should arrange to return next day to collect the specimens, thus introducing herself not only in her clinical capacity but also as an ally between doctor and patient. Communication between doctor and the health visitor should be maintained until the health visitor feels that she has discovered enough of the background and won enough confidence with the parents to ask them to attend the surgery with the boy to see the doctor.

Once she has established a relationship, which may take weeks or months, then there is more likelihood of mother's co-operation in dealing with the organisation of hospital outpatient appointments, and indeed in dealing with the health of her whole family.

Consultant's comments

Our patients became used to having home visits from their general practitioners during an era when examination procedures were simple and specific remedies were few. The mother needs to learn that modern medicine is more than just a good bedside manner, and that home visiting is often both uneconomic and inefficient, because of lack of the facilities which exist in the modern general practitioner's surgery. Far better for the doctor to spend time examining his patient than driving his car. Most "bolshie" patients respond to explanation. Often, also, patient anger reflects patient anxiety, and this subsides with the realisation that the doctor is taking trouble.

The problem of an asymptomatic systolic murmur in a perfectly healthy child is common. When a systolic murmur is the only positive finding on cardiovascular examination the cause is often innocent. A venous "hum" should first be

excluded. This usually makes a continuous rather than a systolic murmur and is abolished by lying the child flat. If the murmur remains, turbulent blood flow through the outflow tract of the right ventricle is probably the commonest cause. The murmur is mid-systolic, its onset being delayed after the first heart sound until the pulmonary valve has opened, with the intensity peaking as the right ventricle reaches its maximum pressure, then falling again with the fall in right ventricular pressure to cease before the second heart sound. Such murmurs are best heard at the left sternal edge and towards the apex; they vary from soft to surprisingly loud, and they may also vary as much as this in the same patient between rest and exercise. They often are vibratory and tend to get softer with increasing age. This is the same murmur as the one that is so common during pregnancy.

Systolic murmurs may also signal organic heart disease, and the absence of symptoms does not deny the possibility of serious structural abnormality in the heart. The possibilities include congenital pulmonary or aortic stenosis, atrial septal defect, ventricular septal defect, mitral regurgitation, and coarctation of the aorta to name the common ones. Fortunately, all of these defects give rise to other abnormal physical signs in addition to the systolic murmur, but the clues may admittedly be a little esoteric for the non-specialist.

Thus valvular pulmonary stenosis is usually associated with an ejection click that introduces the murmur as the abnormal valve domes upwards at the start of ventricular ejection, and the pulmonary valve closure sound is soft and delayed. When pulmonary stenosis is severe and associated with a ventricular septal defect then the child may be blue because some blood takes the easy way out and shunts from the right ventricle to the aorta through the defect, thereby bypassing the lungs. This is the tetralogy of Fallot, but when the pulmonary stenosis is only slightly less severe the child may be clinically pink and present just with a systolic murmur. This will be associated with a single second heart sound owing to absence of audible pulmonary valve closure in most cases.

Aortic stenosis of the valve itself is the most common but it may, like pulmonary stenosis, exist at subvalvar level and is rarely supra-valvar. Aortic valve stenosis of moderate severity is commonly not associated with any symptoms in childhood and is discovered accidentally. A harsh systolic murmur is best heard at the apex, in the second right intercostal space, and over the carotids. Like pulmonary valve stenosis the murmur of aortic valve stenosis is usually introduced by an ejection click. This is best heard at the apex, where it sounds like a split first sound, and the second heart sound may be quite normal. An immediate diastolic murmur of slight aortic regurgitation is sometimes audible. When the aortic stenosis is more severe the carotid pulses may be of small volume, slow rising, and have a palpable thrill over them, and the left ventricle may be enlarged. In such cases the aortic stenosis is severe. Coarctation of the aorta may also present with a systolic murmur that is often not impressive, usually best heard at the left sternal edge, and placed a little later in systole. The condition is not usually difficult to diagnose because the blood pressure in the arms is usually raised and the arterial pulses in the neck are unduly prominent. The systolic murmur is also heard over the narrow segment of the aorta and over the second dorsal vertebra posteriorly. Collateral pulses may be felt around the tips of the scapulae in older children and the femoral pulses are weak and delayed because blood is carried into the distal segment of the body beyond the coarctation by means of collateral vessels.

Atrial septal defect usually produces quite a prominent pulmonary ejection systolic murmur that is not dissimilar to the innocent murmur but which is accompanied in the case of atrial septal defect by an abnormal second heart sound, which shows unduly wide splitting with little or no respiratory variation, and also with tricuspid diastolic murmur caused by increased flow through the tricuspid valve as well as out through the pulmonary outflow tract.

Ventricular septal defect and mitral regurgitation are each associated with pansystolic murmurs. When small or moderate in size, a ventricular septal defect causes a pansystolic murmur, usually with a thrill at the left sternal edge in the third or fourth interspace. The murmur starts with the first heart sound, which it buries, and continues on through the second heart sound, which may also be submerged. There may be a mitral third sound and a diastolic murmur owing to increased flow through the mitral valve. Mitral regurgitation caused by rheumatism is now uncommon in British children but is still seen among immigrants. There may be no history of rheumatic manifestations and no evidence of arthritis or illness in the child. The systolic murmur

is maximal at the apex of the heart, and the left ventricle may be hyperactive if the regurgitation is more than slight. There may also be a third heart sound or soft mid-diastolic murmur.

Most organic abnormalities cause other recognisable stigmata of structural abnormality in the heart, and generally the louder the murmur the more likely it is to be organic. A palpable thrill usually signals an organic murmur. Referral to a specialist should be undertaken when the general practitioner is in doubt, because otherwise the parents and later the child are going to be worried both by uncertainty and by recurrent rediscovery of the same murmur. The specialist may be able to reassure the parents after a simple clinical examination supported by an electrocardiogram and x-ray films of the chest. If a cardiologist finds one of the abnormalities here described he may well be able to make the final diagnosis without further specialised tests. He may be able to reassure the parents both that the condition is too mild to warrant further action and that the child's activities should not be restricted in the future. He may need to warn the parents of the risks of infective endocarditis and of the importance of oral hygiene in its prevention, particularly if he finds evidence of mild aortic valve disease. He will also in this instance mention the possible progression of the aortic valve abnormality and will undoubtedly want to follow up the patient for this reason. If further investigation is required it may take the form of echocardiography, cardiac catheterisation, or angiocardiography.

Echo pictures of the heart are obtained "non-invasively" by beaming low-energy pulsed ultrasound waves at the heart. These are reflected off the surfaces they encounter, and some are received back by a transducer, which converts the ultrasound energy to electrical energy. This can be fed into an oscilloscope to make a picture that gives information about the anatomical disposition and movements of the various parts of the heart. This technique now aids accurate assessment of many congenital cardiac abnormalities.

Cardiac catheterisation and angiocardiography may be required when the diagnosis of abnormality is in doubt, when the condition is less straightforward, or when the severity of the abnormality is in question. Such an investigation is usually done under a general anaesthetic in young children. It carries a low risk, takes about an hour, and should permit detailed diagnosis of the abnormalities, so that the parents can be told immediately of the diagnosis and its implications, whether any treatment is required, what the treatment is, and, if surgery is needed, what the risks and results are likely to be.

When a general practitioner refers a child for a specialist opinion he should be able to outline the likely course the investigations may take in order to allay anxiety. He should not go into detail about the likely consequences of this or that diagnosis but wait until the specialist has given his opinion and made whatever tests are needed. Only in this way can conflicting advice be avoided.

Should this boy with a fairly widespread soft systolic murmur be referred to a cardiologist? As described, the murmur may well have an innocent cause in a structurally normal heart and be magnified because the child is febrile. On this occasion the doctor would do well to focus on the acute illness, the diarrhoea and fever, and make a point of examining the heart again when the child is well. He could do this at a follow-up appointment for the child after his recovery from the diarrhoea without making a special visit. The murmur may well have gone, but if it is still present and is either pansystolic or is associated with any other abnormality then referral to a specialist should be advised and not be delayed because delay will only intensify worry.

The mother could be given a simple explanation of why congenital abnormalities in construction of the heart may not alter the plumbing sufficiently to impair the child's health or energy. She probably wants to know immediately and for certain whether or not there is any abnormality at all. She should be told that normality can be the most difficult diagnosis to make, whereas recognition of a major defect is often easy and instantaneous. She can then be reassured that the doctor's

uncertainty about the seriousness of the boy's murmur makes it more likely that there is nothing to worry about. If she is not keen to visit the hospital it is unlikely that any harm will be done by deferment for a year.

Finally, the diarrhoea. If it has lasted more than a day or two and is accompanied by fever then an infective cause becomes more likely. Causes of chronic or of intermittently recurrent diarrhoea also should be thought of and examination designed to exclude them. Even chronic malabsorption may occasionally present as acute diarrhoea. It is particularly important to do a stool culture to exclude *sonnei* dysentery or a salmonella infection, either of which might be carried by the father to the dairy farm. The mother should be told that a freshly passed stool should be examined by the hospital pathology laboratory. She should take the specimen there quickly so that an infective cause of the diarrhoea including parasitic infections can be recognised and steps taken to prevent other members of the family being infected, and especially to prevent the risk of the father carrying it to work.

Postscript to the problem

The child was referred to a cardiologist with a detailed referral letter and a reinforcing telephone call. The appointment was kept, and the murmur was found to be of no clinical significance. The mother was reassured and the patient discharged.

The consultation described had not been the family's first contact with the practice and already an unsatisfactory pattern of family behaviour and of use of the practice's resources was apparent. Numerous contacts with the practice are still a feature nearly two years later, most appearing to reflect marital problems. Neither doctors nor health visitors feel they are doing more than holding the jackets. On balance it was decided to take no further action on the diarrhoea and fortunately there were no repercussions.

Could several years of persistent bone pain be due to multiple screw holes each with a tube of condensed bone, no infection having occurred? Do screw holes (screws removed after one to two years) heal with or without radiographic rings and what is the natural life history of these rings? Should peri-screw condensation tubes be cored out to relieve persistent pain?

Multiple screw holes which persist after many years, and nearly all of them do, do not usually give rise to local pain if no infection has occurred. The radiographic rings are due to sclerosis brought about by the persistent pressure of the screw and are best seen around the margins of holes where skeletal traction has been instituted with a Steinmann's pin. There is never any reason for coring out peri-screw condensation tubes unless they are an actual sequestrum.

What are the benefits of physiotherapy in treating rheumatic diseases?

Generally, physiotherapy has two parts to play in treating rheumatic disease. Firstly and more important, physiotherapy—that is, therapeutic exercise programmes—helps to maintain function by maintaining muscle strength, joint mobility, and functional movements. The type of exercise given and its amount and frequency depend largely on the type of rheumatic disease treated. During active inflammatory stages of rheumatic disease exercises are often counter-productive as they merely increase the pain without producing any great benefit; but during the subacute and chronic stages exercises help considerably in maintaining function. Secondly, the more passive forms of treatment—heat, short wave diathermy, etc—are less important although undoubtedly warmth helps to relieve pain. Simple home measures—heat pads, hot water bottles etc with suitable analgesics—relieve pain as satisfactorily as any more formal type of physiotherapy, and it is generally thought that the skilled physiotherapist is better employed in exercise treatment than in pain relief by passive treatments.