- Nobel, P. A., and Light, G. S. (1977). Theophylline induced diuresis in the neonate. *Journal of Pediatrics*, **90**, 825-826.
- Shannon, D. C., Gotay, F., Stein, I. M., Rogers, M. C., Todres, I. D., and Moylan, F. M. B. (1975). Prevention of apnea and bradycardia in low birthweight infants. *Pediatrics*, **55**, 589-594.
- Vaucher, Y. L., Lightner, E. S., and Watson, P. D. (1977). Theophylline poisoning. *Journal of Pediatrics*, **90**, 827-830.

V. F. LARCHER, H. R. GAMSU, M. C. SANDERSON,
M. R. DRAYTON, AND B. SANDHU

*Department of Child Health, King's College Hospital
Medical School, London SE5 8RX*

Correspondence to Dr V. F. Larcher.

Aortic homograft valve replacement for postendocarditis aortic incompetence in early childhood

A case report

Acute bacterial endocarditis in infancy and early childhood has a high mortality. Its incidence and mortality increase if there is associated congenital heart disease. The mainstay of the clinical management of children with acute bacterial endocarditis has been chemotherapy in addition to drugs for congestive heart failure. Prosthetic valve replacement has been used in a few cases. Homograft valve replacement in a child under 2 years has apparently not been reported in the UK. We now report a case of bacterial aortic valvulitis with ventricular septal defect in a 21-month-old child, successfully treated by surgical closure of the septal defect and by homograft replacement of the aortic valve.

Case report

A 21-month-old girl was admitted to hospital, with a 2-week history of malaise, loss of appetite, listlessness, and irritability preceded by an attack of acute gastroenteritis. At age 3 months, a heart murmur attributed to a small ventricular septal defect had been noted. Clinical examination showed severe peripheral oedema and hepatomegaly; she was afebrile and acyanotic. Both ventricles were overactive on palpation; there were widespread precordial loud systolic and diastolic murmurs maximal at the left 4th interspace.

Despite treatment with digoxin and diuretics, her condition deteriorated and she developed a high pyrexia. Initial blood culture yielded no bacterial growth, but because of increasing heart failure, associated with pyrexia, anaemia, splenomegaly,

and signs of aortic incompetence, acute bacterial endocarditis was suspected. Treatment with IV potassium penicillin and cloxacillin was therefore begun.

Laboratory investigations showed Hb 7.0 g/dl, WBC $14.2 \times 10^9/l$ ($14\,200/mm^3$) with 60% polymorphs, and ESR 57 mm in 1st hour. β -Haemolytic streptococcus group A was grown from a throat swab; blood cultures later yielded a growth of nonhaemolytic streptococcus.

Chemotherapy produced only an initial improvement. Cardiac catheterisation and angiography showed gross aortic incompetence through a tricuspid valve, an abscess of the interventricular septum in the subaortic region with a small left to right ventricular shunt, and a nonleaking aneurysm into the right atrium.

On admission to Harefield hospital, signs of aortic incompetence and congestive heart failure were confirmed. Medical treatment with IV penicillin and cloxacillin, oral digoxin, frusemide, and spironolactone was continued. On the 10th day after admission she developed signs of cerebral embolism with left-sided hemiplegia. Five days later, she developed pulmonary oedema which responded to intensive medical treatment.

In view of the embolic phenomenon and the occurrence of pulmonary oedema, operation under moderate surface-induced hypothermia and cardiopulmonary bypass was performed on 8 April 1974.

Operative findings. These were: bicuspid and incompetent aortic valve whose cusps were covered with massive soft vegetations (Fig. 1); aneurysmal dilatation of the aortic root bulging into, but not entering, the right atrium; and a high ventricular septal defect, 3 mm in diameter.

Through a longitudinal aortotomy, the diseased valve was excised, and the ventricular septal defect closed by direct suturing. The aortic root was enlarged using 2 gussets of aortic wall homograft, to accommodate an aortic valve homograft 15 mm in diameter (Fig. 2). The valve homograft was inserted in the subcoronary position by the standard two suture-line procedure. The gussets were oversewn with a piece of woven dacron for extra support. Postoperative progress was uncomplicated. At the time of discharge full power and movements had returned to the upper limb. Clinical reviews show continued satisfactory physical, mental, and haemodynamic states.

Discussion

Congenital malformations of the heart and the great vessels are present in about two-thirds of all children

Fig. 1 Operative findings. Stenosis and incompetent bicuspid aortic valve with heavy soft granulations and mycotic aneurysm in the right subaortic area bulging into right atrium.

Fig. 2 Aortic root enlarged with homograft patches of aortic wall.

with bacterial endocarditis, and Zakrzewski and Keith (1965) found that 98% of their patients under 2 years had congenital heart defects. Our patient had congenital ventricular septal defect and congenital malformation of the aortic valve.

β -Haemolytic streptococcus group A was isolated from the throat swab, and nonhaemolytic streptococcus was grown from the blood culture of our patient. Although streptococci are the causative organisms in about 65% of cases (Weinstein, 1972), other bacteria, including staphylococci and enterobacteria—such as salmonellae (Joffe *et al.*, 1974)—are increasingly associated with bacterial endocarditis in children.

Our patient showed the classical clinical signs of acute bacterial endocarditis, including the serious complications of congestive heart failure, cerebral

embolism with hemiplegia, and mycotic aneurysm of the sinus of Valsalva.

Intensive medical treatment was instituted before the child was referred for cardiac catheterisation. Despite the severe degree of congestive heart failure and the advice of Sears *et al.* (1973), we did not perform preoperative peritoneal dialysis. Surgical treatment was advised in order to remove the source of emboli and to treat intractable heart failure from aortic incompetence. Homograft valve replacement was easily and successfully performed. The reported cases of surgical treatment of bacterial endocarditis in children include aortic valve replacement with the Cutter-Smelleff prosthesis in a 12-year-old boy (Sears *et al.*, 1973), and tricuspid annuloplasty with closure of a ventricular septal defect in a 3-year-old boy with *Salmonella* endocarditis (Joffe *et al.*, 1974). Our case is the first instance of homograft replacement of a postendocarditis incompetent aortic valve and closure of congenital ventricular septal defect in a child under 2 years.

Summary

A case of postendocarditis aortic incompetence with congenital ventricular septal defect in a 21-month-old child, treated successfully by homograft aortic valve replacement and closure of the ventricular septal defect, is reported. It appears that no similar case has previously been reported in the UK.

We thank Dr D. Pickering of the Radcliffe Infirmary, Oxford for his help and the medical illustration unit of the U.N.T.H. Enugu for the illustrations.

References

- Joffe, H. S., Prosser, G. L., Chesler, E., and Schrire, V. (1974). *Salmonella* endocarditis: successful treatment in childhood. *American Journal of Diseases of Children*, **127**, 578–581.
- Sears, W., Pickering, D., and Watana, W. (1973). Cardiac failure due to acute bacterial endocarditis treated with peritoneal dialysis and aortic valve replacement. *Archives of Disease in Childhood*, **48**, 322–323.
- Weinstein, L. (1972). Infective endocarditis: past, present, and future. *Journal of the Royal College of Physicians of London*, **6**, 161–174.
- Zakrzewski, T., and Keith, J. D. (1965). Bacterial endocarditis in infants and children. *Journal of Pediatrics*, **67**, 1179–1193.

C. H. ANYANWU, P. ADAMS, R. RADLEY-SMITH, AND M. YACOB

Harefield Hospital, Harefield, Middlesex

Correspondence to C. H. Anyanwu, FRCS, Cardiothoracic Unit, Department of Surgery, University of Nigeria Teaching Hospital, Enugu, Nigeria.