TECHNICAL PROBLEMS OF CARDIAC SURGERY IN INFANCY

PALLIATIVE VERSUS CORRECTIVE SURGERY IN THE INFANT AGE GROUP

By Peter Clarke

The greatest mortality and thus the greatest challenge in congenital heart disease lies in the infant age group. The advent of new techniques allowing openheart surgery in infants has made corrective procedures possible for even some of the most complex disorders and has heightened the demand in both cardiologists and cardiac surgeons to critically examine their present attitudes to the treatment of patients presenting with serious intra-cardiac problems within the first few months of life. In particular a constant review needs to be kept of the long-term results of treatment of those conditions where total correction is achieved to be sure they are superior to treatment undertaken as a staged procedure or indeed the natural history of the disorder.

These problems generally fall into one of the following five groups.

1. **Those conditions where the results of palliation have been poor and complete correction can be performed.**

An example of this group is obstructed total anomalous pulmonary venous return. Untreated most of these patients are dead within the first three months of life and the prognosis is poor once they present with symptoms. There is rarely an easily relieved discrete obstruction of the draining vein but as the pulmonary veins generally collect into a common confluence behind the left atrium side-to-side anastomosis to the atrium is easily accomplished at an open operation and appears the procedure of choice. The hospital mortality is mostly related to post-operative pulmonary problems and reflects the degree of preoperative pulmonary congestion. Because the most severe cases present early there is still an appreciable mortality in the first few months of life as is illustrated in our experience with this condition during the last three years. (Fig. 1).

CASES OF TOTAL ANOMALOUS PULMONARY VENOUS RETURN TREATED USING PROFOUND HYPOTHERMIA AND E.C.C.

Under 1/12	1/12 to 6/12	Over 6/12
5 (2)	3 (3)	3 (0)

Hospital mortality in brackets.
(Fig. 1)

It must be remembered that the anastomosis is unlikely to grow and if we salvage many patients in the first few months of life we may be seeing a new iatrogenic form of cortriatrium in the future.

2. **Those conditions where successful palliation has been followed by continuing mortality and morbidity and this must be weighed against the increased risk of early corrective surgery.**

An example is transposition of the great vessels. In this disorder the grim outlook for survival was dramatically improved by the introduction of the Blalock-Hanlon atrial septectomy as a palliative measure and more recently balloon septostomy performed at the time of cardiac catheterization. However even after an apparently satisfactory palliative septostomy these patients remain at a risk of having a cerebro-vascular accident of approximately 15% per year for at least the first two years of life and also an indeterminate but significant risk of developing increased pulmonary vascular resistance of a degree to preclude later correction.

Currently our practice is to perform a balloon atrial septostomy by the Rashkind method on these patients when first seen and electively correct them within the first year of life. Unless there is clinical evidence that the septostomy is unsatisfactory we prefer to wait until they are at least six months of age as our overall figures in openheart surgery in infants still suggests that it is safer after this time (Fig. 2). Three patients under six months of age were readmitted because of evidence of unsatisfactory mixing after septostomy and we elected to correct them in preference to surgical septectomy and all have done well. Some centres already advocate elective repair as early as three months of age but it will be a few years yet before we can be sure that the atria will accommodate themselves satisfactorily to allow for unobstructed venous return as the heart increases in size during later growth and in the longterm it is possible that we will see a greater number of late problems following enthusiastic correction at an early age.

CASES OF PROFOUND HYPOTHERMIA WITH PARTIAL E.C.C. UNDER 1 YEAR OF AGE.

Under 1/12	1/12 to 6/12	7/12 to 12/12
5 (2)	13 (7)	11 (0)

Hospital mortality in brackets.
(Fig. 2)

3. **Those patients where the results of early palliation and later correction have been satisfactory and if early total correction is undertaken it should be at a lower risk than the combined mortality of two-stage of procedures.**

An example is Fallot's anomaly. The best results of total correction have generally been in the age group between 5 and 10 years and the presence of a previous shunt has not significantly increased the risk of operation. However the shunt procedure itself carries a mortality especially when done in the first two months of life, and this must be taken into the overall balance.

There will probably continue to be a disparity of views as to the proper treatment of this disorder as the correction presents a demanding technical challenge to the surgeon and there seems little necessity to encourage early correction unless the symptoms warrant it.

When the patient does present with significant symptoms in the first year of life the technical challenge is in relation to the degree of pulmonary artery hypoplasia which varies considerably from case to case and the wisest course may be to correct those that are anatomically favourable and continue to treat those that are anatomically unfavourable in two stages.

4. **Those conditions where stable palliation can be achieved but at present corrective surgery is not feasible.**

An example is tricuspid atresia where the judicious use of atrial septostomy, systemic-to-pulmonary shunts or cava pulmonary shunts can give satisfactory palliation lasting for many years. At present no corrective procedures have been devised although some ingenious operations utilizing the hypertrophied right atrium as a pulsatile chamber in older subjects have recently been described.

As stable palliation can be achieved and in consideration of the rapid progress being made in cardiac

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surgery in general it seems reasonable to treat this group of patients in an enthusiastic manner.

5. **Those conditions where stable palliation is not possible nor can one seriously consider that corrective surgery will become a reality in the near future.**

An example is hypoplastic left heart syndrome and although palliative procedures for this disorder have been recently described it is questionable whether any active therapeutic measures are justified in these patients once a firm diagnosis has been established.

Finally we must remember in all our efforts to treat congenital heart disease in infancy that the stakes are high. A good result will produce a citizen with a potential for a normal contributative life but a poor result may be a longterm burden to the parents and the community in general. The costs of investigation and operation on these babies are also high and if they become excessive the community may well ask "are the results really worthwhile?"