Intens. Care Med. 4, 41 - 42 (1978)

Intensive Care Medicine

Two Mitral Valve Replacements During the Course of a Single Pregnancy*

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Abstract. A case of repeat mitral valve replacement during the same pregnancy is reported. Pre and post-operative care of the patient and her pregnancy are discussed. The hazards of anticoagulation during pregnancy are reviewed.

Key words: Pregnancy, Valve replacement, Anticoagulant therapy, Epidural, Forceps delivery.

Improved medical management of pregnant patients with heart disease has over the past 2 decades, reduced maternal and foetal mortality [1]. However, some patients are unable to tolerate the increased physiological load of pregnancy and require cardiac surgery whilst pregnant. This subject was reviewed in 1969 by Zitnik et al. [2] who reported on 22 patients who underwent cardio-pulmonary by-pass during pregnancy. Maternal mortality was 4.5%, 18% suffered spontaneous abortions whilst 13.6% of the babies died at birth. We wish to report the clinical course of a 35 year old woman who underwent 2 mitral valve replacements in the course of a single pregnancy, as this appears to be a unique event in the English medical literature.

Case Report

A 35 year old African woman with a history of 5 previous full term vaginal deliveries, presented in cardiac failure due to tight mitral stenosis. She failed to respond to medical treatment and for this reason was referred for closed mitral valvotomy, which because of the rigidity and heavy calcification of the valve, was precluded. Cardiopulmonary by-pass was instituted. The descending aorta was cannulated for arterial return and the right atrium for venous drainage. Hypothermia (30°C) was employed and the aorta cross clamped for 15 minutes. The mitral valve was replaced with a 27 mm Bjork-Shiley prosthesis. By-pass time was 45 min. During the procedure the mean aortic pressure was kept at approximately 50 mm Hg. Post-operative recovery was uneventful. Post-operative anticoagulant therapy was instituted with warfarin, and she was discharged from hospital when her prothrombin time was satisfactory.

At routine follow-up 2 weeks post-operatively she was found to be eight weeks pregnant. At 35 weeks of gestation she was readmitted to the maternity section and warfarin anticoagulation changed to heparin. Her clotting time varied from 5 to 20 min. during this period.

At term she developed severe chest pains and collapsed. Examination revealed signs of a low output state. Cardiac catheterisation showed an obstructed mitral valve prosthesis for which an emergency mitral valve replacement was again performed. By-pass techniques were similar to those of the first operation, although on this occasion the ascending aorta was cannulated for arterial return. The patient was admitted to the I.C.U. post-operatively in a haemodynamically stable state. She was electively ventilated. Labour began 6 hrs post-operatively for which a lumbar epidural anaesthetic was administered. The cervix was slow to dilate and foetal distress was present with type two dips noted on foetal monitoring. A 2 unit Syntocinon infusion was started leading to rapid progression of labour and a forceps-assisted delivery of an aponeic fullterm infant. The baby was immediately intubated and ventilated with a rapid response. The mother was weaned off the ventilator over a 12 hr period and made a complete recovery.

*Supported in part by a grant from the Stella and Paul Loewenstein Cardiac Trust Fund, University of the Witwatersrand

0340-0964/78/0004/0041/ $ 1.00

The infant developed seizures 24 hrs post delivery. Full neurological investigation revealed no obvious cause. The seizures stopped spontaneously and on discharge the baby appeared normal apart from a slight upper limb hypertonia. At routine post-natal follow-up (10 months of age), the infant exhibited delayed milestones, not having sat or crawled. The head circumference was 42 cm (< 3rd Boston percentile), there was marked head lag and generalised hypertonicity.

Discussion

The purpose of this report is to draw attention to the fact that despite 2 major surgical procedures involving significant haemodynamic changes, both mother and foetus survived. Moreover, the foetus developed normally such that he could be classified at birth as a full-term baby. Regrettably, at follow-up examination the infant was obviously retarded. Four possible causes for this appear to exist.

Firstly, there was a considerable period of hypotension associated with the mother's collapse prior to her second operation. Secondly during both cardio-pulmonary by-pass procedures (45 min. duration each), the mean arterial pressure was kept 50 mm Hg, perhaps relative hypotension. Also, the effect of this nonpulsatile flow in the mother on the foetus is unknown. Thirdly, the brief period of foetal distress during labour may have been a contributing factor. Finally, perhaps the most likely cause of infant abnormality is the administration of warfarin during gestation.

In a review by Oakley and Doherty [3] of 39 pregnancies in 34 patients after valve replacement, a marked difference in foetal survival was apparent between mothers on anticoagulant therapy and those not taking anticoagulants. Twenty-four pregnancies in twenty women who were not given anticoagulants produced twenty-three healthy babies and one spontaneous abortion. Fifteen pregnancies in fourteen women who received anticoagulants produced only seven healthy babies. Although the high foetal wastage can be largely attributed to bleeding problems, the teratogenic effects of the anticoagulants are also significant. These, as reported by Pettifor and Benson [4], include saddle nose deformity, optic atrophy, cataracts and mental retardation.

Anticoagulants, however do need to be used in patients with certain artificial valves: perhaps the best compromise would be to use heparin for the first trimester and then substitute oral anticoagulants until three weeks before term when heparin is again introduced. Ideally, valves which do not require the patient to be anticoagulated should be used whenever possible.

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