Pregnancy following heart transplantation: a case report

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Introduction

The success of developments in heart transplantation has given women recipients the opportunity to have children. The first successful pregnancy in a patient who had received a heart transplant was reported by Lowenstein *et al.* in 1988.[1] The cardiovascular effects of pregnancy demonstrate the durability of transplanted hearts. We report a successful pregnancy in a 20-year-old patient who had previously had a heart transplant; we also discuss the management of such patients.

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Case report

A 12-year-old patient had a cardiac allograft transplantation for post-myocarditis cardiomyopathy. Apart from two episodes of rejection, which were successfully controlled with high-dose corticosteroids, her condition remained satisfactory. At the age of 20 she made a conscious decision to become pregnant and stopped taking the contraceptive pill.

Early pregnancy was unremarkable. At 20 weeks gestation, she complained of ankle swelling. She was hypotensive (80/65 mmHg), tachycardic (110–120 bpm) and had a JVP of 6–8 cm. Echocardiography showed an ejection fraction of 56%. A cardiac biopsy showed rejection was not taking place. Her haemoglobin (Hb) was found to be 5.9 g/dl despite previous treatment with ferrous sulphate and folic acid for chronic anaemia. She was transfused with three units of CMV-negative packed cells. Following bed rest her blood pressure returned to normal as did her central venous pressure. No further action was taken. Her medication remained unchanged from admission (frusemide 40 mg o.d., cyclosporin 1.25 mg b.d., prednisolone 7.5 mg o.d. and azathioprine 100 mg daily).

She then remained well until the onset of labour at 36 weeks gestation. She was assessed cardiovascularly at the time and found to be in a stable condition. No cardiac drugs were given. Analgesia was provided with inhaled nitrous oxide with intravenous pethidine (PCA). No cardiovascular complications resulted from this analgesic regimen. As pain relief was satisfactory, it was decided that an epidural and its cardiovascular effects could be avoided.

Normal vaginal delivery occurred after a first and second stage lasting six hours 25 minutes. The baby girl weighed 2,310 g and had an Apgar score of 7/10. No congenital abnormalities were present and no complications ensued. Post-partum haemorrhage amounted to 600 mls. Mother and baby were discharged three days later. The baby was to be bottle fed. At six weeks mother and baby were well and discharged from obstetric follow-up.

Discussion

An increasing number of young women have cardiac transplants performed. The management of pregnancies in these patients is therefore increasing in importance. Most young women with successful and stable heart transplants and good left ventricular function have no serious haemodynamic problems during pregnancy. A number of issues have to be addressed, however, including immunosuppression during pregnancy, infection control, maternal monitoring and anaesthetic management.

Immunosuppression is a key factor in the management of these patients. Typically, these patients are treated with cyclosporin, azathioprine and prednisolone[2] although developments in the use of tracolimus are on-going. As yet, the effects on the fetus are not clear but concerns have been raised about cyclosporin and azathioprine. The evidence, however, is not conclusive. Glucocorticoids are relatively safe in pregnancy.[3] The patient in our case remained on cyclosporin, azathioprine and prednisolone with no change in dose throughout her pregnancy; no harm coming to the fetus.

Infection control is paramount in the success of any pregnancy. Immunosuppression makes this task all the more difficult. It has been recommended that prophylactic antibiotics are administered in all cardiac transplant births, including normal spontaneous vaginal deliveries.[4] Our patient did not receive this but no bacterial infection ensued.

Maternal monitoring must be rigorous during pregnancy because of the constant risk of rejection. However, invasive monitoring is unnecessary in a patient with good ventricular function.[5] Echocardiography is required to assess basic cardiac function and echocardiographic guided endomyocardial biopsy may be necessary.[6,7] Our patient, when she was unwell at 20 weeks had a myocardial biopsy that indicated that rejection was not taking place.

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Anaesthetic management of these patients is an important consideration. Since the transplanted heart is denervated, an alteration in cardiac output is reliant on circulating catecholamines affecting heart rate and pre-load (Frank-Starling Mechanism) affecting contractility. Vena caval obstruction must therefore be avoided. The patient in our case did not receive anaesthesia as pain could be controlled using PCA. Epidurals have been safely used in this population but pre-load must be maintained to avoid hypotension.

Careful follow-up is necessary for these patients – both from the cardiac and obstetric point of view. Heart transplanted patients have been linked with a higher frequency of malignancy.[8] Our patient had recently had a normal cervical smear and regular checks have been maintained. Surveillance for the effects of glucocorticoids is also needed. Our patient underwent bone density studies after her pregnancy. Bisphosphonate therapy was commenced.

Once a transplant recipient has given birth, consideration has to be given to future pregnancies. Lack of evidence means that the safety of subsequent pregnancies is not known. A small study by Branch *et al*.[9] seemed to show that risks to mother and fetus were not increased by the second pregnancy. However, further studies are required in this area to give definitive answers.

Since 1996, the United Kingdom Transplant Support Service Authority (UKTSSA) have been keeping records of these pregnancies. In this time there have been 14 such cases, 11 of which were successful. Worldwide 40 pregnancies have been reported in the literature. Documentation of future post-cardiac transplant pregnancies is essential if management of this ever-increasing situation is to evolve.

In summary, this patient could have had a range of cardiovascular complications. Her general good health and good left ventricular function prior to conception were the crucial factors in the success of the pregnancy. Close liaison between obstetricians, cardiologists and anaesthetists also ensured passage through labour was uneventful.

Key messages

- The incidence of pregnancy in women who have received a heart transplant is increasing
- Good general health and good left ventricular function prior to conception are crucial to the pregnancy's success
- Careful management – including immunosuppression, infection control and anaesthesia – during pregnancy is particularly important, as is follow-up after delivery
- There is a lack of evidence of subsequent pregnancies in these patients

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