INTRODUCTION

Cardiac disease is one of the leading indirect causes of maternal mortality and morbidity in the UK. The situations carrying the highest risk are pulmonary hypertension (e.g. Eisenmenger syndrome), severe left ventricular outflow tract obstruction (e.g. severe aortic stenosis) and cyanotic heart disease. Pregnancy is generally not recommended where the patient reaches functional class 3 or 4 NYHA (New York Heart Association) whatever the underlying condition. However if it occurs termination may be advised as the maternal mortality and morbidity is high. Even termination of pregnancy carries significant risk of further compromise to the maternal cardiac status. Whether a surgical approach is safer than the medical one it is not very clear as the evidence is scarce.

MATERIAL AND METHODS

We present two cases of first trimester surgical termination of pregnancy in two patients suffering with severe aortic stenosis and idiopathic dilative cardiomyopathy, respectively. A literature review was performed in an attempt to ascertain whether a surgical approach would be safer in women with severe pre-existing cardiac conditions. Conclusion: Surgical abortion in women with pre-existing cardiac conditions seems to be safer as it can be performed in a planned manner making better use of resources. The anaesthetic risk can be minimized by preferring a general anaesthetic which has less dramatic effects on the cardiovascular function. Oxytocics can be used cautiously and endocarditis prophylaxis does not seem to be needed.

Key Words: safety, medical termination of pregnancy, abortion, cardiac disease
CASE 1

A 30 year old primigravida was seen in the joint Cardiology/Obstetric antenatal clinic at 8 weeks gestation. She was a Duchene muscular dystrophy (DMD) carrier and suffered with idiopathic dilative cardiomyopathy which was believed to be a rare consequence of that. A dual chamber intra-cardiac device (ICD) was inserted 4 years ago when she developed frequent episodes of non sustained ventricular tachycardia. Her medication at the time of the conception included Carvedilol, Amiodarone as well as Midodrine started following a syncope episode.

Her clinical condition was stable but the echocardiography showed an ejection fraction of only 25% with global reduction in the left ventricular function, significant dilatation of the left ventricle and mild mitral regurgitation. A chorionic villous biopsy was performed due to the 1 in 4 risk of the fetus being affected by DMD revealed that the baby was affected with the disease. The patient opted to have a surgical termination of pregnancy.

The procedure took place at 13 weeks gestation in the cardiac theatre using a combination of spinal/epidural anaesthesia. Cervical priming was undertaken with Gemeprost 1 mg vaginally. The patient had an uneventful suction-curettage with a total estimated blood loss of 100 ml. During the procedure endocarditis prophylaxis was provided in the form of Amoxicillin and Gentamycin and she also received 3 IU of intravenous oxytocin. She was admitted to the High Dependency Unit for 24 hour observation. The woman made a full, uneventful recovery being discharged after 2 days on Medroxyprogesterone acetate (Depo provera) 150 mg as contraception.

CASE 2

A 25 years old Asian woman attended the ANC at 11 weeks gestation. She was suffering with mixed aortic disease and was on the waiting list for aortic valve replacement. Her first pregnancy was uneventful ending with a vaginal delivery but in the second one she had a Caesarean section at 34 weeks gestation for severe AS (peak pressure gradient = 80-90 mmHg).

The woman was found to have an aortic valve peak gradient of 80 mmHg with good left ventricular function, moderate regurgitation and a bicuspid aortic valve. She was offered surgical termination of pregnancy in view of the poor prognosis carried by her condition. The procedure was performed in the cardiac theatres with a cardiovascular surgeon in standby. General anaesthesia was preferred due to less risk of hypotension. She had a suction curettage with an estimated blood loss of 100 ml. Later on the patient was transferred to HDU where she made an uneventful recovery. She was discharged home on the third day after receiving Medroxyprogesterone 150 mg injection as contraception.

DISCUSSION

Cardiac disease is the second most common indirect cause of maternal death in the UK and it gives a maternal mortality rate of 2.2/100,000 maternities. Pregnant women with cardiac disease should be managed by a multidisciplinary team involving an obstetrician, cardiologist, anaesthetist and genetic counselor. Risk assessment and inclusion of the patient in one of the NYHA classes are important means of predicting the outcome and establishing the appropriate course of management.

Surgical termination

Surgical therapeutic abortion is one of the commonest procedures performed in early pregnancy and special considerations should be given to women with pre-existing cardiac diseases due to the increased risk of vasodilatation and myocardial depression following anaesthesia. The indications for termination could be divided into maternal and fetal. Most commonly the decision is based on the maternal cardiac status yet the social circumstances may play an important role in some cases. The fetal risk of cardiac defects particularly with maternal congenital heart disease is significantly increased (3-10%) and can constitute an indication for termination on its own. There are two methods of performing a termination: surgical (suction-curettage) and medical (Mifepristone and Misoprostol). Currently there is no evidence on the safest approach in women with pre-existent cardiac disease and the decision rests on specific risk factors for individual heart conditions along with the side effects of the medication, possible complications of surgery and the risk of the anaesthetic.

In both our cases the surgical approach was preferred as it allowed the procedure to be performed in a more scheduled manner having readily available the right resources to obtain the best outcome. As for the severe aortic stenosis this was well justified (need for cardiovascular surgeon in standby, procedure performed in cardiac theatre) one could argue that for a patient with idiopathic cardiomyopathy the medical management could have been a safe alternative. However bleeding and pain can be quite severe and unpredictable with medical termination particularly
at gestation of more than 8 weeks which could both compromise the maternal cardiac status. Surgical termination has a relative short duration and reduced risk of failure when performed for gestations of over 7 weeks. The complication rate has been significantly reduced since the introduction of the vacuum aspiration and the use of cervical priming.\textsuperscript{5-7} The table below illustrates the most frequently occurring hazards with surgical and medical termination. (Table 1)

**Table 1. Surgical vs. medical termination: most common complications.**

<table>
<thead>
<tr>
<th>Complications</th>
<th>Surgical TOP</th>
<th>Medical TOP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemorrhage</td>
<td>No significant difference in Hb post-abortion as compared with medical termination\textsuperscript{,8,9}</td>
<td>Longer period of bleeding but no significant change in Hb.\textsuperscript{8,9}</td>
</tr>
<tr>
<td>Infection</td>
<td>No difference\textsuperscript{,8,9}</td>
<td>No difference\textsuperscript{,8,9}</td>
</tr>
<tr>
<td>Failure</td>
<td>2.3 : 1000\textsuperscript{10}</td>
<td>2.5 : 100</td>
</tr>
<tr>
<td>Perforation</td>
<td>1.4 :1000\textsuperscript{10}</td>
<td>N/a</td>
</tr>
<tr>
<td>Cervical trauma</td>
<td>1 : 100\textsuperscript{10}</td>
<td>N/a</td>
</tr>
<tr>
<td>Pain</td>
<td>1 :100\textsuperscript{9}</td>
<td>More severe with advancing gestation\textsuperscript{9}</td>
</tr>
<tr>
<td>Retained products of conception requiring re-evacuation</td>
<td>3.1:100 (up to 9 weeks)\textsuperscript{9}</td>
<td>4.8:100 (up to 9 weeks)\textsuperscript{9}</td>
</tr>
<tr>
<td></td>
<td>2.1:100 (11-13 weeks)\textsuperscript{9}</td>
<td>5.4:100 (11-13 weeks)\textsuperscript{8}</td>
</tr>
</tbody>
</table>

**Medical termination**

Medical termination is routinely performed in the UK using oral mifepristone 200 mg followed in 36-48 hrs by vaginal misoprostol 600 µg. Mifepristone is an orally active synthetic steroid with antiprogestosterone and antiglucocorticoid activities used as an abortifacient in conjunction with misoprostol. The main adverse events reported with the mifepristone used alone as abortifacient are bleeding and infection.\textsuperscript{12} A systematic analysis of morbidity and mortality with this drug revealed five cases of death due to septic shock in healthy, young women, three of them being related to a rare bacterium, Clostridium sordellii. An interesting theory has recently been published linking the rapid onset of sepsis with mifepristone’s blockade of glucocorticoid receptors at doses of more than 400 mg.\textsuperscript{13} However the occurrence of these complications seems to be sporadic and at higher doses than the standard ones used in the UK. The risk of haemorrhage with mifepristone alone is high particularly at gestations of more than 49 days. Although the sequential use of mifepristone and misoprostol reduces the risk of bleeding haemostatic curettage may still be needed in up to 2.6% of cases.\textsuperscript{8}

Prostaglandins (PGs) of the E-type are potent vasodilators in most species and in most vascular beds. The effects of prostaglandins on human circulation have been evaluated outside the pregnancy on healthy subjects. Brecht et al showed that 400 mcg of misoprostol although did not alter the blood pressure, it significantly increased the heart rate (63 vs 59 beats/min).\textsuperscript{14} This was not clinically significant in healthy subjects but might compromise the cardiac status of a woman with severe pre-existing heart disease. An US prospective observational study showed that 600 mcg of misoprostol administered to healthy women undergoing midtrimester pregnancy termination had negligible effect on maternal pulse, mean arterial pressure and standard cardiac indices.\textsuperscript{15} However these findings can not be generalized to patients suffering with cardiovascular disease due to their special haemodynamic status which could make them more susceptible to the effects of prostaglandins.

**Use of oxytocics**

Oxytocin is a widely used drug in surgical terminations which initiates uterine contraction. Its primary haemodynamic effect is vasodilatation via receptors on vascular endothelium that trigger the nitric oxide pathway. A randomized, double blind study conducted in the UK showed a small but statistically significant drop in mean arterial pressure following a 10 IU bolus of oxytocin.\textsuperscript{16} There was also a large, statistically significant increase in heart rate
and cardiac output at 1 min following 5 units and 2 mins after 10 units. All these findings are particularly relevant in women suffering with cardiac disease who are unable to mount compensatory increases in cardiac output. Therefore oxytocin boluses should be avoided in such patients and uterine massage followed by slow infusions of 20 units over 4 hrs if necessary would be preferable instead.

**Infective endocarditis prophylaxis**

There are many anecdotal publications which suggest causal associations between various procedures and bacteremia and between procedures and endocarditis. Recent guidelines by the British Society for Antimicrobial Chemotherapy (BSAC) and the American Heart Association (Wilson et al. 2007) have challenged the existing dogma by highlighting the prevalence of bacteremias that arise from everyday activities such as toothbrushing, the lack of association between episodes of IE and prior interventional procedures, and the lack of efficacy of antibiotic prophylaxis regimens.17,18 Although the most recent NICE (National Institute of Clinical Excellence) guideline recommends no antibiotic prophylaxis at all there are suggestions from other expert groups that high risk patients may still benefit from it. This includes patients who had previous infective endocarditis, cardiac valve replacement surgery (prosthetic valves) or a surgically constructed systemic or pulmonary shunt or conduit. The antibiotic combination of choice in obstetrics and gynaecology would be amoxicillin 1 g iv and gentamycin 1.5 mg/kg iv given just before procedure or at the induction of anaesthesia. However the actual procedure itself needs to be considered as it carries different degrees of risk. For example surgical termination of pregnancy has a 5% risk of bacteremia but this very rarely leads to endocarditis. Therefore the use of antibiotics is of doubtful benefit for such procedures even in high risk patients.

**CONCLUSION**

Pregnant women with cardiac disease should be managed by a multidisciplinary team. Women with severely compromised cardiac status may require therapeutic abortion. The medical termination of pregnancy seems to be more risky partly due to the combination of drugs used which may have significant cardiovascular effects on women with pre-existing cardiac disease. Moreover pain, severe haemorrhage and risk of failure are significantly increased and may contribute as well. Surgical approach can be undertaken in a more scheduled manner and the anaesthetic risk can be minimized by using a general anaesthetic. Oxytocics can be used cautiously and endocarditis prophylaxis is not needed.

**REFERENCES:**