MITRAL STENOSIS

Background

The etiology of mitral stenosis (MS) in women of childbearing age is most commonly related to rheumatic heart disease. Some women have had valvuloplasty prior to pregnancy. After valvuloplasty, women have variable degrees of residual inflow obstruction. Pregnancy in women with prosthetic valves is discussed elsewhere. (see Prosthetic Valves)

Mild, moderate and severe MS are defined as mitral valve areas greater than 1.5 cm², between 1.0 and 1.5 cm² and less than 1.0 cm², respectively.

Patients with MS can develop atrial arrhythmias (especially atrial fibrillation), heart failure (right and left sided), pulmonary hypertension and thromboembolic complications. The stroke risk is highest for patients with MS and atrial arrhythmias.

Effects of Pregnancy-Related Hemodynamic Changes

Pregnancy is associated with significant hemodynamic changes including increases in blood volume and heart rate. (see Hemodynamics in Pregnancy) Adapting to the increased blood volume and the increased heart rate (shorter diastolic filling time) can be challenging in the setting of an inflow tract obstruction. Women with significant MS who do not well adapt to the changes of pregnancy may develop symptoms of exercise intolerance, arrhythmias, or heart failure (right or left).

In addition, pregnancy is a hypercoagulable state and the risk of thromboembolism is higher, especially in women with MS. This is a particularly important issue for women with MS who have had atrial arrhythmias or prior thromboembolic complications.

Maternal Cardiac Complications

Cardiac complications during pregnancy are common. The risk is dependent on the severity of MS. (1, 2) Heart failure and atrial fibrillation are the most common cardiac complications during pregnancy. Some women with atrial fibrillation with rapid ventricular rates develop concomitant heart failure. Increases in heart rate leading to shortened diastolic filling time is the main mechanism for this. In one series, rates of adverse maternal cardiac complications during pregnancy for women with mild, moderate and severe MS were 26%, 38% and 67% respectively. (2) Other cardiac characteristics can also have an impact on outcomes (see General Considerations).

Fetal Complications

Women with MS are also at risk for fetal complications including prematurity, low birth weight babies, intrauterine growth retardation and stillbirths. (1, 2)
Management Strategies

Preconception counseling/Contraceptive methods

The severity of MS and the functional status of the woman are important determinants of outcome during pregnancy. Women with a history of heart failure or arrhythmias are at higher risk for complications during pregnancy. Other cardiac characteristics can also have an impact on outcomes (see General Considerations).

Women with severe MS should be considered for intervention prior to pregnancy. When intervention is required, valvuloplasty is optimal in women of childbearing age. Indications for surgical or interventional procedures prior to pregnancy are based on current guidelines. (3)

A discussion about contraceptive methods is appropriate in women with MS. In general, most forms of contraception are safe in women with MS. However contraceptives containing estrogen should not be used in women with atrial arrhythmias or prior thromboembolic events because of the associated thrombotic risk. (see Contraception)

Medication use should be reviewed if a woman is contemplating pregnancy or is pregnant. The MOTHERISK website (http://www.motherisk.org) is an excellent resource.

Ante-partum Care

Coordinated care between a heart specialist and a high-risk obstetrician should be implemented at a high-risk pregnancy center. The frequency of follow-up visits and echocardiograms should be dictated by the woman’s functional status and the severity of her valve lesion.

Treatment for exercise intolerance or heart failure is necessary in some women. Heart rate control with a beta blocker is an important part of heart failure therapy, helping to prolong the diastolic filling time and allow effective atrial emptying and ventricular filling. (4) High doses of beta blockers may be needed as pregnancy progresses. Diuretic are added in women who remain symptomatic despite beta blocker therapy.

If atrial fibrillation develops during pregnancy, conversion to sinus rhythm is usually advisable. DC cardioversion is often used when women have rapid ventricular rates, are unstable or unresponsive to medical therapy. (see Arrhythmias)

Because of the stroke risk, anticoagulation is required for all women with atrial fibrillation (paroxysmal or persistent) or prior thromboembolic events.

Women with refractory cardiac symptoms during pregnancy may need to be considered for intervention. Initial therapy should include bed rest, treatment of aggravating factors such as anemia, and treatment of heart failure or arrhythmias. Valvuloplasty may be needed in women with refractory symptoms. Echocardiographic assessment of mitral valve anatomy and suitability for valvuloplasty is important. Compared to open mitral valve commissurotomy, percutaneous balloon mitral valvuloplasty is safer for the fetus/neonate. Valvuloplasty should only be performed by operators and in centers with expertise in the procedures. (5,6,7) Valvuloplasty during pregnancy exposes the fetus to radiation. Special attention should be given to minimizing radiation exposure in the fetus by shielding the gravid uterus and keeping fluoroscopy time to a minimum. However, the amount of radiation exposure is typically within safety guidelines and radiation exposure is not a contraindication to a needed balloon mitral valvuloplasty. Echocardiographic guidance can reduce fetal exposure to ionizing radiation.
Cardiopulmonary bypass surgery for mitral valve replacement during pregnancy carries a high risk of fetal loss and is only performed when women are refractory to therapy and valvuloplasty is not possible.

**Labour and Delivery**

Labour and delivery should be planned carefully with a multidisciplinary team well in advance. It is important to communicate the delivery plan to the woman and to other physicians involved in her care. The best delivery plan is not useful if information is not readily available when needed.

Generally, vaginal delivery is recommended. Good pain management for labour and delivery is important in order to minimize maternal cardiac stress. To decrease maternal expulsive efforts during the second stage of labour, forceps or vacuum delivery is often utilized. To decrease potential harmful complications from difficult mid cavity-assisted delivery, uterine contractions are often utilized to facilitate the initial descent of the presenting part.

The need for maternal monitoring is dictated by the severity of MS and functional status of the women. Women with significant MS and atrial arrhythmias may require electrocardiographic monitoring at the time of labour and delivery.

In general, endocarditis prophylaxis at the time of labour and delivery is not recommended in women with MS. However, some experts continue to administer antibiotics because they feel that the risks of adverse reactions to antibiotics are small and the risk of developing endocarditis has major health consequences.

**Post-partum Care**

The hemodynamic changes of pregnancy may take up to six months to fully normalize. Major adverse hemodynamic changes can occur in the first few post-partum days, and active therapy should be continued, under observation, for 72 hours, prior to hospital discharge. Women should be seen again early after pregnancy (usually within 6-8 weeks). The frequency of additional follow up visits should be dictated by the clinical status of the woman.

**References**