SPECIAL ARTICLE

Perioperative anesthetic management for cesarean section in patients with cardiac disease

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ABSTRACT

The perioperative anaesthetic management of a pregnant patient with pre-existing cardiac disease undergoing caesarean section poses a challenge for an anaesthesiologist. The anaesthesiologist must have the knowledge of its pathophysiology, clinical features, diagnostic evaluations and anaesthetic modalities and various drug interactions during anaesthesia. This review summarises the current management of a parturient with cardiac disease requiring surgical delivery.

Key words: Cesarean section, epidural anesthesia, cardiac disease, haemodynamics, parturient

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INTRODUCTION

Pregnancy significantly increases demands on the cardiovascular system. There is a risk of increased peri-partum morbidity and mortality due to pre-existing heart disease.

The prevalence of clinically significant cardiac disease in pregnancy is 0.1%-4.1%, of which congenital heart disease (CHD) accounts for 70-80%. This is because more women with CHD now survive to adulthood due to surgical techniques and/or drug therapy. The incidence of ischaemic heart disease (IHD) is rising due to the later age at which women are conceiving and an increase in those with IHD risk factors, including diabetes, obesity, and smoking.[1]

Common cardiac lesions seen during pregnancy in our population, range from congenital cardiac defects, valvular heart diseases to peri-partum cardiomyopathy. A keen understanding of the underlying pathophysiology, in addition to the altered physiology of pregnancy, is the key to manage such patients. Disease specific goals of management may help to preserve the hemodynamic and ventilator parameters within an acceptable limit. The aim of this review is to discuss the current anesthetic management of parturient with common cardiac conditions, presenting for emergency caesarean section.

PREOPERATIVE PREPARATION

Parturient with cardiac disease require multidisciplinary planned management pre-, peri-, and postpartum. Following considerations are important in the management of a parturient with heart disease.

Anticoagulation

Warfarin use during first trimester is associated with a risk for embryopathy, although absolute incidence is unknown. Risk appears to be dose related, usually seen during 6-12 weeks of gestation with a very low incidence in patients taking 5 mg per day or less.[2] Multiple studies have shown that heparin therapy is associated with a higher incidence of thrombotic complications during pregnancy.[3] Low-dose warfarin use throughout pregnancy is the safest approach from the maternal perspective.

While risks and benefits of various regimens must be discussed with the patient, a rational alternative is to switch from warfarin to subcutaneous unfractionated heparin before the sixth week of gestation and to resume warfarin after the

twelfth week.[4] Heparin should be restarted at the 36th week of gestation to minimize the risk of foetal intracranial haemorrhage during delivery. Alternatively, elective caesarean section can be planned for 36 weeks and heparin can be held four hours before surgery.[3] General anesthesia should be considered for emergency caesarean section in patients on anticoagulation prophylaxis as regional anesthesia can lead to epidural hematoma.

Endocarditis prophylaxis

Risk of infective endocarditis following vaginal delivery is very low. The American College of Cardiology (ACC) / American Heart Association (AHA) guidelines governing the use of prophylactic antibiotics were revised in 2007 and in 2014, while decisions must be tailored to the individual patient; the guidelines no longer formally support the routine use of antibiotics at the time of vaginal delivery irrespective of the cardiac lesion.[5] Indications for prophylactic antibiotics at the time of dental procedures during pregnancy are the same as in the non-pregnant state. Recommendations for routine antibiotics after a skin incision for caesarean section are unchanged.

When antibiotic prophylaxis is recommended in high-risk patients, the preferred regimen is ampicillin 2 g intravenous or intramuscular plus gentamicin 1.5 mg/kg (maximum 120 mg) intravenous administered within 30 minutes before delivery, followed by ampicillin 1 g intravenous or intramuscular (or amoxicillin 1 g orally) six hours later. If antibiotic prophylaxis is recommended in moderate-risk patients, the preferred regimen is the same, except that the gentamicin and second dose of ampicillin or amoxicillin may be eliminated. In the event of a penicillin allergy, vancomycin 1g intravenous is recommended instead of ampicillin.[6, 7]

Investigations:

In addition to a detailed history and clinical examination, following investigations are required[8]:

(i) Electrocardiogram (ECG) to determine rhythm and aetiology of heart failure (acute coronary syndrome and myocarditis).

(ii) Chest radiograph for heart size, pulmonary congestion, lung consolidation, and pleural effusions.

(iii) Echocardiography to evaluate and monitor regional and global ventricular function, valve structure and function, pericardial effusion, and mechanical complications of myocardial infarction. The pulmonary artery systolic pressure may also be estimated from the tricuspid regurgitation jet.

(iv) Blood tests: full blood count, coagulation screen, C-reactive protein, creatinine and electrolytes, glucose, liver function tests in all patients. Troponin, creatine phosphokinase-MB and brain natriuretic peptide levels may assist in con-firming the diagnosis and allow an estimation of severity in heart failure and MI.

(v) Coronary angiography, to determine if revascularization should be contemplated.

(vi) Transesophageal echocardiography is useful in detection of myocardial ischemia.

(vii) Coronary angiography and catheterisation are useful to evaluate select patients with ischaemic heart disease.

MONITORING DURING ANESTHESIA

Non-invasive monitoring:

12-lead ECG monitoring is recommended especially with high risk patients along with pulse oximetry, end tidal carbon dioxide monitoring with capnograph, non-invasive blood pressure and temperature measurement.

Invasive hemodynamic monitoring:

Key monitoring techniques in high risk patients include – transoesophageal echocardiography (TOE), invasive arterial blood pressure monitoring (IABP), and pulmonary artery catheterisation.

TOE is allows for a comprehensive evaluation of cardiac structure and function when compared to pulmonary artery catheterisation.[9]

ANESTHETIC CONSIDERATIONS

Decision regarding type of anesthesia for emergency caesarean section (CS) will be guided by the nature and severity of the cardiac lesion of the woman as well as by the urgency of the surgical delivery. Both regional and general anesthesia have been described in most cardiac conditions.[10] Although there is no evidence to support any particular technique, cardiovascular stability is the goal.[11]The aim is for gradual, careful introduction of general or regional anesthesia with invasive monitoring in place. Commonly used local anesthetic agents for regional blockade in caesarean section are lignocaine, levobupivacaine, ropivacaine and bupivacaine.

Oxytocin bolus should be avoided due to tachycardia

and hypotension in most cases. Continuous infusion is preferred.[11,12] Ergometrine should be avoided in severe cardiac disease, as it leads to vasoconstriction and hypertension and increases the risks of MI and pulmonary oedema.

Valvular Heart Disease

In general regurgitant valvular lesions are well tolerated during pregnancy, whereas stenotic lesions have a greater potential for decompensation.

Mitral stenosis

Rheumatic mitral stenosis is the most common clinically significant valvular abnormality in pregnant women and may be associated with pulmonary congestion, oedema and atrial arrhythmias during pregnancy or soon after delivery.[13]

Normal mitral valve orifice has a surface area of 4-6cms^2 and symptoms develop when area is reduced to 2cm^2 or less. Patients with moderate to severe mitral stenosis often experience hemodynamic deterioration during the third trimester or at the time of labour and delivery. The physiological increase in blood volume and rise in heart rate lead to an elevation of left atrial pressure, resulting in pulmonary oedema. Additional displacement of blood volume into systemic circulation during contractions makes labour particularly hazardous.[14]

In symptomatic patients, medical treatment should be the first line of management. Treatment involves bed rest, oxygen therapy and diuretics. Beta adrenergic blockers are useful to prevent tachycardia during pregnancy. Propranolol or atenolol decreases the incidence of maternal pulmonary oedema without adverse effects in the foetus or neonate. Recent trials conclude that digoxin has no role in prevention and in the treatment of cardiac failure.[15]

Anesthetic management:

Goals:[15]

1) Maintenance of acceptable slow heart rate.
2) Immediate treatment of acute atrial fibrillation and reversion to sinus rhythm.
3) Avoidance of aortocaval compression.
4) Maintenance of adequate venous return.
5) Maintenance of adequate SVR.
6) Prevention of pain, hypoxemia, hypercarbia and acidosis which may increase pulmonary valvular resistance.

Choice of anesthesia:

Anesthetic options for caesarean section in patients with mitral stenosis must take into account the additional potential hazards of marked fluid shifts secondary to anesthesia technique and operative blood loss.

Individualisation of anesthetic management according to the parturient cardiovascular status, the practitioner's knowledge and experience of the exiting treatment options is the key to success in these patients.[15]

For past two decades, regional anesthesia was proved to be safe technique in cardiac patients presenting for caesarean section. Epidural and continuous spinal anesthetic techniques are attractive options. Epidural anesthesia is preferred in patients with mitral stenosis as the onset of blockade is slow. Therefore hemodynamics are more controllable. Prophylactic ephedrine administration should be avoided. If a need for vasopressor arises, the drug of choice in patients with MS is low dose phenylephrine.[14]

General anesthesia also provides very stable hemodynamic course, if the cardiovascular effects associated with laryngoscopy, intubation and oral suction are minimized.A beta-blocker such as esmolol and a modest dose of opioid should be administered before or during the induction of general anesthesia. Modified rapid sequence intubation using etomidate, remifentanyl and succinylcholine is an ideal choice in severe stenosis with pulmonary hypertension. Maintenance of anesthesia can be carried out with oxygen and nitrous oxide 50:50, isoflurane, opioids and vecuronium.[15]

Irrespective of mode of delivery and anesthetic technique, these patients are at greater risk of hemodynamic stress due to auto-transfusion of term uterus. This may lead into pulmonary hypertension, pulmonary oedema and cardiac failure. Therefore intensive monitoring and therapy should be continued till the hemodynamic parameters return to normal.

Mitral regurgitation

Pure mitral regurgitation is rarely a problem. Chronic regurgitant lesions are generally tolerated well during pregnancy. Common causes of MR include rheumatic fever, myocardial degeneration, ischaemic papillary muscle disease and endocarditis. Regurgitation of blood through an incompetent mitral valve results in chronic volume overload and

dilatation of LV.[14]

Anesthetic management:

Goals: [1]

1. Prevention of increase in SVR.
2. Maintenance of normal to shortly increased HR in sinus rhythm.
3. Aggressive treatment of acute atrial fibrillation.
4. Avoidance of aortocaval compression.
5. Maintenance of venous return
6. Prevention of increase in central vascular volume
7. Avoidance of myocardial depression during general anesthesia
8. Prevention of pain, hypoxemia, hypercarbia and acidosis which may increase pulmonary vascular resistance.

Choice of anesthesia:

Epidural anesthesia minimises the increase in SVR associated with pain and may even lead to modest decrease in SVR which promotes the forward flow of blood and minimises pulmonary congestion. In contrast to patients with mitral stenosis, patients with mitral regurgitation may benefit from the chronotropic effect of ephedrine if vasopressor is required. If general anesthesia is required, ketamine and pancuronium are desirable agents in these patients. BP monitoring and pulmonary artery catheter monitoring are advisable.[1]

Aortic stenosis

Pregnancy in patients with aortic stenosis is uncommon but may coexist in patients with AS due to congenital bicuspid aortic valve or rheumatic heart disease.

Mild to moderate AS is well tolerated during pregnancy but critical AS can rapidly deteriorate the hemodynamics and precipitate congestive heart failure (CHF), carrying a high risk for maternal and foetal mortality.[1]

Anesthetic management:

Goals:[16]

1) Maintenance of normal sinus rhythm and adequate SVR
2) Maintenance of intravascular volume and venous return
3) Avoidance of aortocaval compression
4) Avoidance of myocardial depression during general anesthesia

It is important to maintain a normal heart rate and sinus rhythm. Because patients with aortic stenosis have fixed stroke volume, a slow heart rate decreases cardiac output. Patients with AS do not tolerate a significant decrease in SVR which results in hypotension and decreased perfusion of the hypertrophic left ventricle. Patients with aortic stenosis also do not tolerate decrease in either venous return or left ventricular filling pressure. Adequate end diastolic volume is necessary to maintain left ventricular stroke volume. Left uterine displacement must be maintained during the induction and maintenance of anesthesia. Maintenance of venous return and left ventricular end diastolic volume is critical.[16]

Choice of anesthesia:

Traditionally epidural anesthesia is contraindicated due to risk of fall in SVR, resulting in hypotension, poorly tolerated in patients with fixed cardiac output.[17]

General anesthesia is often selected in preference to epidural or spinal anesthesia because the sympathetic blockade produced by regional anesthesia can lead to significant hypotension. General anesthesia should be accompanied with caution, combination of etomidate and modest dose of opioids with succinylcholine for rapid sequence intubation. Neuromuscular blocking drugs with minimal hemodynamic effects are best used. Myocardial depression associated with volatile anesthetic agents should be avoided. Drug of choice for uterine contraction is ergometrine at the end of delivery. A combination of low dose thiopental and ketamine may be a suitable induction regimen if etomidate is unavailable.[14]

Both general anesthesia and epidural anesthesia have significant risks but incremental induction of either epidural or spinal anesthesia should be considered a reasonable alternative to general anesthesia for caesarean section in women with aortic stenosis. Epidural blockade facilitate a gradual onset of anesthesia and sympathetic block and therefore a sudden and profound decrease in SVR is avoided. Epidural anesthesia does not affect myocardial contractility and with proper fluid loading good control of circulation can be accomplished.[9]

Aortic regurgitation

Aortic regurgitation in young women may be due to a dilated aortic annulus as in Marfan's syndrome, a

bicuspid aortic valve or endocarditis. The reduced SVR if pregnancy reduces the volume of regurgitant blood. Isolated aortic regurgitation can usually be managed with vasodilators and diuretics.[13]

Anesthetic management:

Goals:[1]

1. Minimising pain and therefore catecholamine induced increase in SVR.
2. Avoiding bradycardia, which serves to increase time for regurgitant flow.
3. Avoiding myocardial depressants which may exacerbate failure.

Choice of anesthesia:

Epidural anesthesia is preferred in these patients as it decreases the after load and prevents increase in SVR and acute left ventricular volume overload.

If general anesthesia is required, residual valvular or myocardial dysfunction will influence the choice of anesthetic drugs.[18] General anesthesia can be induced preferably with etomidate to prevent severe hemodynamic swings, followed by intubation of trachea with succinylcholine. Fentanyl and remifentanyl are the preferred drugs to provide analgesia. Remifentanil is used as an infusion during induction and maintenance of anesthesia and provides hemodynamic stability[1].

Congenital heart disease

Left to right shunts

Acyanotic conditions such as a small atrial septal defect, ventricular septal defect, or patent ductus arteriosus may produce a small or moderate left-to-right intra-cardiac shunting, which is often well tolerated during pregnancy.

Atrial septal defect (ASD):

ASD is one of the most common congenital defects seen in pregnant women. Most patients are asymptomatic before pregnancy, but the chronic left-to-right shunt results in RV volume overload and enlargement, which may be exacerbated by the volume retention of pregnancy. Furthermore, right atrial enlargement may predispose to atrial arrhythmias.[19]

Ventricular septal defect (VSD):

VSD is commonly encountered as an isolated defect. As a rule, large defects lead to significant LV volume overload and heart failure early in life and are generally repaired in childhood. [19] Many ventricular septal defects (VSD) close spontaneously. In patients with large VSD, congestive heart failure, pulmonary hypertension or arrhythmias may develop. Most women with corrected VSD tolerate pregnancy well.

Patent ductus arteriosus (PDA):

Patent ductus arteriosus (PDA) accounts for 15% of all cases of congenital heart disease; most patients with a large PDA (>1 cm) receive early surgical intervention. Patients with a small PDA have typically normal pregnancies, but in those pregnant women with superimposed pulmonary hypertension, maternal mortality may reach 5-6% from ventricular failure. The progressive decrease in SVR development throughout pregnancy can be associated with shunt reversal and peripheral cyanosis.[20]

The effect of increase in cardiac output on the volume loaded right ventricle in atrial septal defect (ASD), or the left ventricle in ventricular septal defect (VSD) and patent ductus arteriosus, is counterbalanced by the decrease in peripheral vascular resistance. Consequently, the increase in volume overload is attenuated. In the absence of pulmonary hypertension, pregnancy, labour and delivery are well tolerated.[21, 22]

Left-to-right shunts can eventually lead to pulmonary hypertension and reversal of the shunt flow, with resulting cyanosis. So, serial examinations of such shunts with echocardiography are recommended during pregnancy. Arrhythmias, ventricular dysfunction, and progression of pulmonary hypertension may occur, especially when the shunt is large or when there is pre-existing elevation of pulmonary artery pressure.

Anesthetic management:

Goals:[1]

-Reduce SVR, reduce RV preload

-Decrease shunt flow

-Watch for arrhythmias and pulmonary hypertension.

Patients with any shunt lesions are at risk of systemic air embolization. Due to changes in loading conditions, left-to-right shunts associated with an atrial septal defect (ASD) may become right-to-left shunts under labour conditions. Thus, care should be taken to remove all air bubbles from all IV tubing. Loss of resistance to saline rather than air should be preferred when placing an epidural needle.[1]

Choice of anesthesia:

Epidural anesthesia is the preferred technique as

it reduces SVR to decrease the shunt flow. General anesthesia can be used but one should avoid changes in SVR and PVR.[1]

Right to left shunts

Tetralogy of Fallot (TOF):

Tetralogy of Fallot (TOF) is the most common cyanotic congenital cardiac defect overall. Accounts for 5% of congenital heart disease in pregnant women. Women with TOF will produce pulmonary regurgitation and can become symptomatic during pregnancy thus needing either diuretic treatment or admission for bed rest.[23]

They are also at risk of producing arrhythmias, endocarditis or right ventricular failure. In terms of RV failure, therapists should consider preterm delivery, while antibiotic prophylaxis in case of endocarditis is totally necessary.

Anesthetic management:

Goals: [1]

- Watch for arrhythmias and pulmonary hypertension
- Continuous monitoring, 12 lead ECG
- Avoid decrease in SVR
- To maintain adequate intravascular volume and venous return.

Patients with corrected TOF may demonstrate various atrial and ventricular arrhythmias, owing to surgical injury to the cardiac conduction pathways. Thus it seems prudent to obtain a 12-lead electrocardiogram (ECG), and to monitor the ECG continuously during labour.[1]

The anesthesiologist should avoid causing a decrease in SVR, which worsens the severity of the right-to-left shunt. It is also important to maintain adequate intravascular volume and venous return. In the presence of right ventricular compromise, high filling pressures are needed to enhance right ventricular performance and ensure adequate pulmonary blood flow. Administration of neuraxial analgesia during early labour is advisable to limit increases in pulmonary vascular resistance and consequent right-to-left shunting.[1]

Choice of anesthesia:

For caesarean delivery, neuraxial anesthesia should be administered slowly; single-shot spinal anesthesia is a poor choice because the abrupt reduction in SVR with this technique may cause reversal of shunt flow and hypoxemia.[1]

Primary Pulmonary Hypertension (PPH):

Syndrome of PPH is characterized by markedly elevated pulmonary artery pressure in the absence of an intra-cardiac or aorto-pulmonary shunt.[24] Pulmonary hypertension is tolerated poorly in the parturient. Deterioration typically occurs in the second trimester with symptoms of fatigue, dyspnoea, syncope and chest pain. This is due to the physiological increase in cardiac output and blood volume by 40-50%. During labour, uterine contractions effectively add 500 ml of blood to the circulation. The pain and expulsive effort of labour increase right atrial pressure, blood pressure and cardiac output. Women with PPH are advised against pregnancy. In early pregnancy a termination is considered. Where PPH is not diagnosed until late in pregnancy an elective delivery at 32-34 weeks gestation is preferred, as premature spontaneous labour is common.

Anesthetic management:

Goals:[25]

- Avoiding further increase in PVR
- Avoiding marked decrease in venous return
- Avoid marked reduction in SVR
- Avoid myocardial depression.

Choice of anesthesia:

Caesarean section is sometimes performed especially when delivery is preterm. If preload and after load are well maintained, regional or peripheral blocks are ideal. The single biggest predictor of outcome in patients with pulmonary hypertension is presence of RV failure.[25]

Regional anesthesia may be appropriate, but single-shot spinal administration should be avoided due to inability of the hypo-perfused RV to respond to decreased venous return. Close monitoring after delivery for at least 72 hours in monitored care unit is advised, since postpartum fluid shifts may decompensate the RV.[25]

Shunt reversal

If a right-to-left shunt is already present or develops as a result of shunt reversal, the outcome for mother and baby is, generally, poor. The anesthetist should be aware of the specific problems of right-to-left shunting which relate to:

1. Central cyanosis
2. Effect of changing the balance between pulmonary and systemic vascular resistances particularly the effect of pulmonary

hypertension and/or systemic hypotension on this relationship

3. Effect of a reduction in cardiac output on arterial oxygen saturation
4. Potential for air embolism and
5. Impairment of platelet function which is a feature of cyanotic heart disease.

Ischaemic heart disease(IHD) and myocardial infarction(MI)

Incidence is approximately 3–10 per 100,000 deliveries. In total until 2005 there have been 251 cases of MI reported in pregnancy. Incidence of IHD and MI is increasing among pregnant women, most probably as a result of increased incidence of smoking among females.[26, 27]

Diagnosis

Diagnosis of MI in pregnancy may be difficult and is challenging. Physiological adaptations of pregnancy may mimic the signs and symptoms of cardiac disease in non-pregnant patients. Such symptoms and signs include dyspnoea, palpitation, decreased exercise tolerance, nausea and heart burn, epigastric or chest pain (gastro-oesophageal reflux), peripheral oedema distended neck veins, lateral displacement of cardiac apex, and presence of a third heart sound and ejection systolic murmur. In non-pregnant patient these symptoms and signs are commonly observed in patients with IHD with associated myocardial damage. In pregnant patients these findings may be normal.

Elevated levels of pregnancy associated plasma protein-A(PAPP-A) in pregnancy may reflect instability of atherosclerotic plaques and may have diagnostic value in unstable angina or acute MI during pregnancy[27]. Two-dimensional echocardiography and determination of ventricular ejection fraction are useful in assessing the severity of myocardial damage but are of limited value in making a diagnosis. Radio-nucleotide imaging is a useful technique to assess coronary artery patency but it carries a risk of radiation exposure to foetus. Transesophageal echocardiography is preferred alternative as it doesn't carry radiation exposure risk to foetus.

Studies have reported that coronary angiography and catheterisation can result in fatal coronary dissection, coronary dissection leading to bypass surgery, and maternal death [27, 29]. Hence invasive testing should be reserved for selected patients only.

Anesthetic management:

Goals:[1]

- Multidisciplinary approach

- Maintenance of uteroplacental perfusion

- Intervention for reversal of myocardial ischemia unresponsive to medical therapy

Choice of anesthesia:

Continuous epidural anesthesia is the preferred technique for caesarean delivery for women with ischemic heart disease. Single-shot spinal anesthesia results in a rapid onset of sympathectomy and a higher risk of severe hypotension.

When general anesthesia is required, a modified rapid sequence induction (e.g., using etomidate, remifentanil, and succinylcholine) can be performed over 1 to 2 minutes without compromising hemodynamic stability.

These women remain at increased risk for cardiovascular instability (myocardial infarction, pulmonary oedema) after vaginal or caesarean delivery. Such patients should be monitored in an obstetric intensive care setting for at least 24 hours after delivery. Cardiology consultation is helpful.[1]

Peripartum cardiomyopathy

Peripartum cardiomyopathy (PPCM) is defined as the onset of acute heart failure without demonstrable cause in the last trimester of pregnancy or within the first 6 months after delivery. The incidence is approximately 1 per 3000 to 1 per 4000 live births and mortality ranges from 30–60%.[30] The aetiology of PPCM remains unknown. Proposed causes include myocarditis of normal immune response to pregnancy and maladaptive response to the hemodynamic stresses of pregnancy.[31] PPCM is a form of dilated cardiomyopathy with left ventricular systolic dysfunction that results in signs and symptoms of heart failure. Treatment goals include preload and after load reduction and increase the contractile force of the heart. Combination of hydralazine and amlodipine provide after load reduction, while diuretics and nitroglycerin can be used for the pre load reduction. Oral inotropic therapy is provided by digoxin.[31]

Anesthetic management:

Goals:[32]

- Avoidance of drug-induced myocardial depression
- Maintenance of normovolaemia and

• Prevention of increased ventricular afterload

Choice of anesthesia:

Epidural anesthesia can safely and effectively be used with carefully titrated dose of local anesthetics, and hemodynamic monitoring in parturient with DCM. The changes in preload and after load produced by epidural anesthesia mimic the pharmacological goals. It is particularly advantageous in those patients with high susceptibility to aspiration of gastric contents.[33]

Low dose of local anesthetic in addition to opioids minimises the hemodynamic instability associated with spinal anesthesia.

General anesthesia should be administered in case of emergency and also in patients receiving anticoagulants. Opioids can be used as analgesics but should preferably be administered after delivery of the baby.

POSTOPERATIVE CARE

In postoperative period, patients with severe cardiac dysfunction delivered by Caesarean section should be kept in the high dependency unit / ICU for aggressive monitoring of

- Oxygen saturation
- Haemodynamics
- Fluid therapy

During first 24-72 hours significant fluid shift occurs, which may lead to congestive cardiac failure.

Adequate postoperative analgesia should be provided with opioids or alpha 2 agonists or in combination with opioids and NSAIDS intravenously. Patient controlled analgesia is an adequate alternative in cardiac patients.

Postoperative analgesia can also be provided in the form of continuous epidural analgesia.

CONCLUSION

Management of a parturient with cardiac disease requires an individualised approach with a joint effort by a team of obstetrician, cardiologist and anesthesiologist. With vast advancements in obstetric care, improvements in cardiac surgery, many patients with cardiac disease can now be safely delivered surgically by skilful anesthesiologists who are aware of the common potential intra operative problems and the ability to respond to undesired events immediately.

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