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Case Report

A miraculous pregnancy following a myocardial infarction and coronary artery bypass grafting: a case report and review of literature

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ABSTRACT

Cardiovascular disease is estimated to occur in 0.4-4.1% of pregnant women, whereas coronary heart disease complicates only 0.01% of all pregnancies. In recent times, MI has been observed to occur more frequently in young women. This might be attributed to the fact that women are deciding to become pregnant at advanced age. In such high-risk cases, proper pre-pregnancy, antenatal, intrapartum and post-partum care should be taken. Pregnant women with heart disease should be managed by a multidisciplinary team approach comprising of obstetricians, intensivists, cardiologists and neonatologists. Here, a case of pregnant woman with past history of MI; treated with coronary artery bypass grafting (CABG) is presented and the management is highlighted.

Keywords: High risk pregnancy, Coronary artery, Bypass grafting, Management

INTRODUCTION

Women of reproductive age are generally at low risk of serious cardiac conditions. Cardiovascular disease is estimated to occur in 0.4-4.1% of pregnant women, whereas coronary heart disease complicates only 0.01% of all pregnancies.¹ Pregnancy causes a number of changes in cardiovascular function resulting in increased cardiac work. While women with heart disease may be in a physiologically compensated state prior to pregnancy, the cardiovascular changes that occur during pregnancy can precipitate a decompensated state relatively unresponsive to medical therapy. Advances in cardiac surgery has improved quality of life and level of functioning of cardiovascular system of patients with congenital or acquired heart disease.²

Although myocardial infarction (MI) during pregnancy has been reported in many cases and the management in this situation is clearly presented in current guidelines, but data on pregnancy after MI are scarce.³ However, it is not

surprising because this is a complex issue involving thorough evaluation of cardiovascular status in each pregnant woman and assessment of risk for developing coronary complications. The safety of pregnancy after MI remains a significant dilemma for both the obstetrician and the cardiologist.

Management of pregnant women with cardiac surgery requires multidisciplinary team consisting of cardiac surgeon, cardiologist, obstetrician, and intensivist. Patients should be informed fully about the maternal and fetal risks associated and importance of therapeutic anticoagulation throughout pregnancy. The present manuscript report case of pregnant woman with past history of MI; treated with CABG.

CASE REPORT

Forty one years old female presented to emergency with complaint of abdominal pain for last five days and pedal edema since one month. Patient does not remember her

exact date of last menstrual period but she gave history of nine months of amenorrhea. The patient has been married for the past 16 years and hasn't received infertility treatment in the past. She is a known case of chronic hypertension and diabetes and is taking regular medications. She had a MI about 8 years ago and underwent percutaneous transluminal coronary angioplasty (PTCA) with stenting. After two years of PTCA, she underwent coronary angiography which revealed single vessel disease-critical 95% stenosis in the left anterior descending artery. Coronary artery bypass grafting was performed. This was a miraculous pregnancy for her. She was unaware of her pregnancy for the entire 9 months, so she did not receive any antenatal care during her pregnancy. Patient was hemodynamically stable and was NYHA class II at the time of presentation. After admission cardiology and physician opinion was taken. Her fundus examination showed grade 1 hypertensive retinopathy. Patient had moderate anemia and was managed with injectable iron. She was diagnosed with hypothyroidism and started on tablet eltroxin. Patient underwent elective lower segment caesarean section in view of breech presentation. A healthy female baby was born with a birth weight of 3 kg and did not have any congenital anomalies. Her intraoperative and postoperative period was uneventful. Because of high cholesterol values bottle feeding was recommended and patient was discharged on tablet atorvastatin 10mg, tablet aspirin 75 mg, tablet clopidogrel 75 mg and tab metformin 500 mg. During further follow-up, the patient and her baby remained in good health.

DISCUSSION

Due to recent advances in cardiac surgeries and therapeutic interventions, management of pregnant women with heart disease despite challenging, has significantly improved.⁴ Overall maternal and fetal morbidity and mortality from cardiac disease are directly related to the severity of cardiac disease. Maternal mortality ranges from 0.4% in the New York heart association (NYHA) class I-II disease to 6.8% in class III-IV disease. Major concern for a pregnant woman with a cardiac disease is cardiac decompensation because of the inability to meet the additional demands imposed by the physiologic changes of pregnancy and parturition.⁵ It is essential to understand the impact of the physiologic changes of pregnancy upon the specific heart lesion to properly counsel and manage these patients. Pregnant women with heart disease should be managed by a team of representatives from obstetrics and perinatology, anesthesiology, neonatology, cardiology, cardio-thoracic surgery, intensive care, nursing, and social worker.⁶

Pre-pregnancy risk assessment plays a crucial role in the management of women with a history of MI and CABG. There are many factors that influence the course of coronary heart disease in pregnant women. The changes that occur to a woman's body in pregnancy significantly affect the cardiovascular system; therefore, left ventricular

systolic function, the condition of coronary arteries, time elapsed from MI, and ischemic symptoms are very important.⁶ Pre pregnancy assessment of the cardiac patient should include complete medical history, physical examination, ECG at rest, exercise test, and an echocardiogram. If necessary, coronary CT angiography or even routine coronary angiography should be performed. Women with significantly decreased ejection fraction, heart failure symptoms, angina pectoris, and advanced changes in coronary arteries should be discouraged from getting pregnant to avoid the situation of heart failure.⁷ All medicines used by women planning to become pregnant should be reviewed to see which of the drugs should be continued, safely discontinued, or replaced by a safer alternative. A plan for cardiology and obstetric supervision and check-up visits during pregnancy should be made. Normal pregnancy care such as folic acid supplementation should not be forgotten either. Unfortunately, all these were not done in our patients as she was unaware of her pregnancy.

Irrespective of the estimated risk, women with coronary heart disease should be under supervision of an experienced cardiology and obstetric team from very early pregnancy. Gestational diabetes and pregnancy-induced hypertension may also affect negatively the cardiovascular system. Regular blood glucose and blood pressure measurements are important for early diagnosis and appropriate treatment. Women with diabetes and arterial hypertension prior to pregnancy require treatment modification, preferably when planning to become pregnant.

Pharmacotherapy typical for post-MI patients, although beneficial in general, is not widely recommended in pregnant women due to its harmful potential or established teratogenicity. Although the use of guideline-recommended drug therapy seems desirable for maternal protection even during pregnancy, only limited information is available on fetal safety for some of these drugs.³ Low doses of acetylsalicylic acid (ASA) seem to be safe in pregnancy (category C); teratogenicity has not been noted so far when used in cardiac doses. Our patient after CABG was receiving ASA 75 mg in whole pregnancy. She gave birth to healthy baby. But it should however be emphasized that safety of ASA in early pregnancy has not been unequivocally established.

There are no unequivocal guidelines for perinatal care. The controversy concerns mainly antiplatelet therapy whether it should be maintained, when it should be withdrawn, and when reinstated. Patient safety should be the main determinant. There are reports on discontinuation of dual antiplatelet therapy a week before delivery and replacement with low molecular weight heparin.⁵ Recent recommendations by the European Society of Cardiology have suggested using clopidogrel only when strictly needed (after stenting) and refraining from the use of glycoprotein IIb/IIIa inhibitors, bivalirudin, prasugrel, and ticagrelor. Thrombolytic drugs is relatively contraindicated.

cated in pregnancy because of insufficient information and a potential risk of maternal hemorrhage and fetal loss. In patients with coronary dissection (CD), fibrinolytic therapy is considered contraindicated because of the concern that it may act as a double-edged sword and facilitate the extension of the dissection. Because of the high incidence of CD as a mechanism for pregnancy-associated MI (PAMI), blinded use of fibrinolytic therapy in this population is risky and should probably be avoided.³

Statins have proven efficacy in reducing cardiovascular risk with an unclear effect on the human fetus. According to current guidelines, they should be withdrawn in pregnancy, even as early as three months before planning to become pregnant and even in women with primary hypercholesterolemia, which should not have a negative impact on the CAD course. Our patient had been using statins through out her pregnancy, that is during the period of intense organogenesis, but so far no adverse effects either on the infant or on the mother have been found.⁶

β -Adrenergic blockers reduce mortality after MI and are recommended as relatively safe drugs for pregnant women. Most β -blockers pass through placenta and into breast milk and, although without proven teratogenicity, may induce bradycardia and hypoglycemia in fetus.⁶ Because of the potential benefit of β -blockers in reducing shear stress and the relative safety during pregnancy, the use of these drugs seems advisable.

The mode of delivery depends on obstetric indications and the specific hemodynamic status. Stable patients can give birth naturally. Lateral position prevents from compression of the aorta and inferior vena cava, which in turn decreases the risk of hypotension and hemodynamic disorders during the pushing stage. It is recommended to use anesthesia and shorten the second stage of labor to “unload” the heart. Medications that cause vasoconstriction such as ergotamine and prostaglandins should not be used. Caesarean section is performed only for obstetric indications or if the patient is hemodynamically unstable.⁵ Although the cesarean birth is associated with greater blood loss, hemodynamic instability, and infections, we opted for cesarean section because of breech presentation of the fetus.

The goals of anesthetic management during labor and delivery in pregnant women with heart disease include (1) analgesia, (2) hemodynamic monitoring, (3) optimizing cardiovascular and respiratory functions by manipulating various hemodynamic factors and tailoring anesthetic technique for maternal and fetal well-being, and (4) resuscitation including airway and ventilatory management if need arises.⁸

In many cases, there is no consensus as to the optimal anesthetic technique and therefore there is no single recipe approach to their management. Although general and regional anesthesia both affect the hemodynamic changes occurring during labor and delivery, the choice of

technique is often immaterial if appropriate hemodynamic goals are considered and invasive monitoring is used to attain them.⁴ Noninvasive BP (NIBP), electrocardiogram (ECG) for arrhythmias and heart rate, pulse oximetry, respiratory rate, signs of persistent respiratory distress, four hourly temperature, and input–output fluid balance are minimum mandatory monitoring required in all cardiac patients undergoing labor and delivery. In case of parturients in functional class III and IV or Clark’s risk group 2 and 3, additional invasive monitoring such as intra-arterial pressure, PA pressure, PA wedge pressure, and arterial blood gas analysis may be required during trial of labor and vaginal delivery or caesarean section.⁴

The use of aspirin, clopidogrel, and prophylactic heparin precludes the use of regional anesthesia for cesarean section while general anesthesia (GA) with the use of boluses of esmolol, lignocaine, and fentanyl as an infusion to control the pain and cardiovascular parameters has been shown to cause minimal neonatal depression.⁹

The immediate postpartum period is critical, especially if pulmonary hypertension is present. Most fatalities occur in the 1st week after delivery, but others occur as late as 3–4 weeks after delivery. For this reason, invasive monitoring should not be discontinued immediately after delivery, and full therapeutic and monitoring support in a critical care area should be provided. The anesthesiologist has a role in assisting with postoperative pain management.

CONCLUSION

There is a dearth of information on how pregnancy affects the development of coronary heart disease. In order to provide the ideal environment for labour and delivery, it is crucial to understand the hemodynamics connected to heart problems and employ invasive monitoring appropriately. It can be concluded that treating these patients presents diagnostic and therapeutic challenges and should be approached by a multidisciplinary team that includes obstetricians, intensivists, cardiologists and neonatologists.

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