

Cardiac Disease during Pregnancy: Nursing Management

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Abstract

The physiological changes during pregnancy place a considerable load on the heart and the cardiovascular system. Cardiac disease is an important cause of maternal mortality and morbidity in antepartum and postpartum period. Pregnancy and labour inevitably increase the cardiac strain and any complication will further add to this burden. The ratio between the two has fallen over the past two decades from 10:1 to about 3:1 or even 1:1 in advanced countries. Among all types of heart disease 80% is occupied by rheumatic heart disease with mitral stenosis in pregnancy (Dutta, 2008). In Nepal maternal death is caused due to heart disease did not even feature in 1998 but in 2008/2009, 69% of maternal death due to direct cause and 31% deaths are due to indirect cause. In indirect cause death due to heart disease occupies 7% (Family health division, 2008/2009). Nurses those are working in the field of maternity should manage the pregnant women having heart disease. Management must be started from preconception and continue till postnatal period. Focus must be given on early detection, grading, diet, weight gain, prevention and treatment of infection, rest, assessment of respiration, heart rate, hospital delivery, position, pain management, prevention of cardiac failure, fluid restriction, active management of third stage of labour, critical emphasis must be given within 24 hours for the prevention of cardiac failure and follow up.

Introduction

Pregnancy makes a significant demand on the cardiovascular system. Therefore, it follows that woman with cardiovascular compromise due to cardiac disease need specialist input and careful management from preconception to postnatal period. Maternal cardiac disease has the potential to remain undiagnosed during pregnancy, but presentation often occurs after 20 weeks gestation and frequently at the time of delivery or immediately post-partum. This is most likely to happen in women who have avoided, or not presented for, antenatal care. A working knowledge of the nurses regarding normal physiology of pregnancy is often helpful in the management of patients with heart disease. Familiarity of the nurses with the management of commonly encountered cardiac diseases during pregnancy is becoming increasingly important for proper management and prevention of complication (Hacker, Gambone & Hobel, 2010).

Normal Physiologic Changes during Pregnancy

Major hemodynamic alterations occur during pregnancy, labor, and delivery and the postpartum period which begin to take place during the first 5 to 8 weeks of pregnancy and reach their peak late in the second trimester. In patients with preexisting cardiac disease, cardiac decompensation often coincides with this peak. Blood volume increases 40% to 50% during normal pregnancy. The increase in blood volume is greater than the increase in red blood cell mass, contributing to the fall in hemoglobin

concentration (i.e., the “anemia of pregnancy”). Similarly, cardiac output rises 30% to 50% above baseline, peaking by the end of the second trimester and reaching a plateau until delivery. Blood pressure typically falls about 10 mm Hg below baseline by the end of the second trimester. Each uterine contraction displaces 300 to 500 ml of blood into the general circulation. Stroke volume increases, with a resultant rise in cardiac output by an additional 50% with each contraction. Thus, it is possible for the cardiac output during labor and delivery to be 75% above baseline. Blood loss during delivery (300 to 400 ml for a vaginal delivery and 500 to 800 ml for a cesarean section) can contribute to hemodynamic stress. During postpartum relief of inferior vena caval compression results in an increase in venous return, which augments cardiac output and causes a brisk diuresis. The hemodynamic changes return to the pre pregnant baseline within 2 to 4 weeks following vaginal delivery and within 4 to 6 weeks after cesarean section. Normal pregnancy is typically associated with fatigue, dyspnea, decreased exercise capacity, mild peripheral edema, jugular venous distention and audible physiologic systolic murmurs. (http://www.nda.ox.ac.uk/wfsa/html/u09/u09_003.htm)

Classification of Heart Disease

The universally adopted classification which depends upon the cardiac response to physical activity is the classification given by New York Heart Association. This classification is graded as follows.

Grade I: Uncompromised. Patient with cardiac disease but no limitation of physical activity; ordinary physical activity does not cause undue fatigue, palpitation, dyspnoea or angina pain.

Grade II: Slightly compromised. Patients with cardiac disease with slight limitation of physical activity come under this category. The patients are comfortable at rest but ordinary physical activity causes discomfort like fatigue,

palpitation, and dyspnoea or angina pain.

Grade III: Markedly compromised. Patients with cardiac disease with marked limitation of activity. The patients are comfortable at rest but discomfort occur less than ordinary activity cause fatigue, palpitation, and dyspnoea or angina pain.

Grade IV: Severely compromised. Patient with cardiac disease with discomfort even at rest and inability to carry out any physical activity without discomfort; symptoms of cardiac insufficiency or of angina syndrome present even at rest; discomfort is increased if any physical activity is undertaken.

(http://my.americanheart.org/professional/StatementsGuidelines/ByPublicationDate/PreviousYears/Classification-of-Functional-Capacity-and-Objective-Assessment_UCM_423811_Article.jsp)

Nursing Management

Preconceptional Counseling

Pre pregnancy counseling has a major preventive role in ensuring an optimal pregnancy outcome. Pre-pregnancy assessment is needed for future conception in the presence of cardiac disease, the current fitness and status of the patient to embark on a pregnancy and the anticipated complications during pregnancy and delivery and their risks to the mother and fetus. These must be discussed with the patient and her family. Any infection must be ruled out and treated effectively. There should be no root filling or capping of teeth in the cardiac disease, whether pregnant or not. Anemia must be treated as this can cause deterioration and contribute to failure in pregnancy. Women receiving anticoagulant therapy must be switchover from oral anticoagulants to heparin at about 6 weeks' gestation (Ricci, 2009).

Antenatal Care

Patient with heart disease should be cared from

the beginning to the end in referral hospital. The initial assessment should be made in consultation with a cardiologist. The patient's cardiac functional class should be decided during the first four months of pregnancy so the management will depend upon class. Complete bed rest should be given even for mild cold, because respiratory tract infections are more likely to precipitate failure. The patient should have 10 hours in bed at night and 2 hours rest at noon for the maintenance of adequate rest. Grade I and II need only be seen monthly during the early part of pregnancy, but grade III and IV cases should preferably be seen every week. Dental extraction, cleaning, scaling and fillings require prophylactic antibiotics. Safer antibiotics are amoxicillin, Ampicillin, clindamycin, cephalexin. This should be given 1 hour before procedure. Intramuscular injection of penicillin LA 12 [benzathine penicillin] may be given at intervals of 4 weeks throughout pregnancy and puerperium to prevent recurrence of rheumatic fever. Hemoglobin level must be checked at first visit and then at least once in each trimester and anemia is to be corrected by appropriate therapy. Prevent from urinary tract infection and urine culture must be done in all cases to exclude asymptomatic bacteriuria. All patients must be reassessed by cardiologist for her cardiac status between 28th to 32nd weeks. Patient should be weighed in each visit and it should not be allowed to exceed 0.6 kg in any one week. A clear counseling is to be done regarding prognosis and risks. The diet should contain low salt, less carbohydrate and fat but more protein. Diet sodium restriction to 2 g/day is recommended to limit edema and intravascular overload (Donald, 2007).

Anticoagulants are necessary in case of congenital heart disease and valve replacement. The patient having warfarin should be stopped it as soon as pregnancy is diagnosed and replaced by heparin therapy 5000 units twice daily subcutaneously up to 12th weeks. This is then replaced by warfarin tablet 3mg daily to be taken at the same time each day and

continued up to 36 weeks. Thereafter it is replaced by heparin up to 7 days postpartum. Warfarin is then to be continued. In each visit patient must be enquired about dyspnoea and cough, auscultate the lung bases for crepitations, note the pulse rate-if persistently high [more than 100/minute] requires hospitalization, reevaluation of the functional grading of the heart, and sonography at 20 weeks of pregnancy to exclude fetal congenital abnormalities (Cunningham, Leveno, Bloom, Hauth, Gilstrap & Wenstrom, 2005).

Regarding admission, elective admission must be done in Grade I: at least two weeks prior to the expected date of delivery, in Grade II: at 28th week especially in case of unfavorable social surroundings and in Grade III and IV: as soon as pregnancy is diagnosed and the patient should be kept in the hospital throughout pregnancy. Emergency admission should be done in case of deterioration of the functional grading, appearance of dyspnoea or cough or basal crepitations or rising pulse rate and appearance of pregnancy complication like anemia, preeclampsia or abnormal weight gain (Donald, 2007).

Management during Delivery Intrapartum care

Most patients with cardiac disease go into spontaneous labour and delivery without any difficulties. The usual method of induction is by oxytocin infusion this should be through a concentrated drip that is 7.5 unit to 10 unit oxytocin in 500 ml IV drip, start at 5 drops per minute, increased half hourly as per contraction and increased up to 30 drops per minute. The fluid volume should be limited not more than 75 ml per hour for the prevention of cardiac overload. One should guard against infection with prophylactic antibiotics. Amniotomy is contraindicated for the prevention of ascending infection and chorioamnionitis (Dutta, 2008).

First Stage of Labour Induction

The patient should be confined to bed and be placed in lateral recumbent position to minimize aorto-caval pressure by the gravid uterus. Oxygen should be kept by the side of the patient and to be administered as and when required (5-6L/min if required). In the majority, analgesia is best given by epidural anesthesia. One should be cautious about intravenous fluid infusion. As a general rule the quantity of infused fluid should not be more than 75 ml/hour to prevent pulmonary edema. Pulse and respiration rate should carefully be watched. If the pulse rate exceeds 110 per minute in between uterine contractions, rapid digitalization is done by intravenous digoxin 0.5mg and intravenous frusemide can be given to prevent from cardiac overload. Continuous cardiac monitoring and use of pulse oxymetry are necessary (Pillitteri, 2007).

Second Stage

The second stage of labour should be short cut by forceps or ventouse under pudendal and/or perineal block anesthesia. Difficult forceps is to be avoided. Ventouse is preferable to forceps. The patient should not be encouraged to bear down forcibly. An episiotomy can be given to facilitate easy delivery (Dutta, 2008).

Third Stage

Active management of third stage of labour is needed which includes oxytocin 10 unit IM and controlled cord traction for delivery of placenta. Slight blood loss is beneficial but if it is excess, oxytocin can be given by infusion. This may be accompanied by intravenous frusemide 40 mg intravenously to relieve the heart of its volumetric load. The patient should be propped up as soon as the delivery is completed and episiotomy is sutured. Give morphine and oxygen at hand throughout. Transfer out the

patient from delivery room in propped-up position. If patient develop respiratory distress we should suspect for pulmonary edema and manage aggressively (Dawn, 2004).

Post partum care

The patient is to be observed closely for the first 24 hours. Oxygen is administered. Hourly pulse, blood pressure and respiration are recorded and carefully watched for signs of pulmonary congestion and edema. Breast feeding can be continued until the mother is comfortable. Anticoagulant therapy is not a contraindication of breast feeding. Sedatives are given in the first few days to reduce anxiety related tachycardia and the patient is initially treated with bed rest. The patient is allowed out of bed into a reclining chair when acute symptoms subside and patient can tolerate the effort. For contraception, barrier method of contraceptives [condom] is the best. Steroidal contraception and intrauterine device are contraindicated. Depot medroxy-progesterone acetate can be advised. Sterilization should be considered with the completion of the family at the end of first week in the puerperium. If the heart is not well compensated, the husband is advised for vasectomy (Luesley & Baker, 2004).

Conclusion

The prevalence of heart disease during pregnancy is increasing day by day. Nurse is the person who provides the care for the patient from preventive, curative, promotive and rehabilitative perspective. So for the effective management as well as quality care for patient with heart disease during pregnancy nurses must have knowledge, skill and attitude towards care. Proper nursing management ultimately helps for the reduction of maternal and neonatal morbidity and mortality. So care should be started before conception and continued till postnatal period.

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