 DOI: 10.18231/2394-2754.2017.0088

Management of heart diseases in pregnancy at a tertiary centre: A case series

Harsha Ramdurg

Assistant Professor, Dept. of Obstetrics & Gynecology, ESIC Medical College,

Email: harsha.ramdurg@gmail.com

Abstract

Introduction: Cardiac disease in the pregnant patient can present challenges in cardiovascular and maternal-fetal management. The present study is a retrospective analysis of the cases treated at our institute of heart disease in pregnancy.

Objectives: The study was conducted to study the epidemiological, clinical and outcomes in patients of cardiac illness in pregnancy

Materials and Method: All pregnant patients of cardiac illness were admitted to the institute from 2015 to 2016 were studied. Data was collected from patient records operative notes and discharge summaries

Results: 80 institutional deliveries were conducted in the above time period. Five cases cases of heart diseases complicating pregnancy were studied:2 cases of peripartum cardiomyopathy, one each of aortic stenosis, pulmonary stenosis and mitral stenosis with mitral regurgitation. However, one patient of peripartum cardiomyopathy patient was excluded as the patient was brought in an unconscious condition with poor Glassgow coma scale and on ventilator support and relatives declined treatment and was lost to follow up. All the other patients had satisfactory outcome.

Conclusion: Early identification of the cardiac lesions can lead to effective and safer delivery at places where advanced care is available.

Keywords: Peripartum cardiomyopathy, Aortic stenosis, Pulmonary stenosis, Mitral stenosis, Mitral regurgitation.

Received: 24th May, 2017 **Accepted:** 6th July, 2017

Introduction

Cardiac diseases complicate 1% to 4% of pregnancies in women without preexisting cardiac abnormalities.[1] Cardiac disease in the pregnant patient can present challenges in cardiovascular and maternal-fetal management.[2] It is important to understand that even in normal patients, pregnancy imposes some dramatic physiologic changes upon the cardiovascular system.[3]

Specific congenital or acquired cardiac lesions can be classified as low, intermediate, or high risk during pregnancy. We retrospectively analyzed the cases treated at our institute cases of heart disease in pregnancy and studied the outcome.

Aims and Objectives

The study was conducted to study the epidemiological, clinical and outcomes in patients of cardiac illness in pregnancy.

Materials and Method

All pregnant patients of cardiac illness were admitted to the Vaatsalya Life Hospital from 2015 to 2016 were studied. Data was collected from patient records operative notes and discharge summaries.

Results

A total of 80 deliveries were conducted at the institute during the study period. Of these there were five patients with cardiac illness. Hospital being a referral institute usually receives complicated cases in comparison to regular cases and hence a referral bias towards higher percentage of these complicated cases. The distribution of cases was as follows: Peripartum cardiomyopathy 2, MS with MR 1, AS 1, PS 1.

However, one patient of peripartum cardiomyopathy patient was excluded as the patient was brought in an unconscious condition with poor Glassgow coma scale and on ventilator support and relatives declined treatment and was lost to follow up.

Details of individual management of the rest of cases were as follows:

Case 1: Aortic stenosis: A 30-year-old primi gravida with primary infertility of seven years, conceived spontaneously without any previous treatment history presented to emergency department with full term pregnancy with breathlessness. Patient had tachycardia, tachypnea and normal blood pressure. Pulse rate was 110/ minute while blood pressure was 110/70 mm of Hg. Cardiac examination revealed ejection systolic murmur. Per abdomen examination revealed a term uterus, breech presentation with contractions. Per vaginal examination showed 2 cms dilatation, 50% effaced with breech at -1 station. Echocardiography demonstrated features of moderate aortic stenosis. There was no history of cardiac disease in the past.

Patient was started on antibiotics and decision for emergency caesarean section was taken. LSCS was done under GA, patient withstood the procedure well. Post operatively patient was managed with antibiotics, LMWH and fluid restriction.

Post operative period was uneventful and patient gradually improved.

Case 2: Pulmonary Stenosis: A 26-year-old primi gravida presented to emergency department with full term pregnancy with breathlessness and labor pains. Cardiac examination revealed murmur of pulmonary stenosis. Per abdomen examination revealed a term uterus, with contractions. Fetal heart sounds were regular. Per vaginal examination showed 3cms dilatation, fifty percent effaced with vertex at -2 station and contracted pelvis.

Echocardiography demonstrated features of moderate pulmonary stenosis.

LSCS was done under GA, patient withstood the procedure well. Post operatively patient was managed with antibiotics and fluid restriction.

Post operative period was uneventful and patient gradually improved.

Case 3: Peripartum cardiomyopathy: A 20-year-old primi gravida presented to emergency department with 38 weeks of gestation with breathlessness. Patient had tachycardia, tachypnea and hypertension. Pulse rate was 104/ minute while blood pressure was 140/100 mm of Hg. Cardiac examination revealed murmur. Per abdomen examination revealed a term uterus, with contractions. Fetal heart sounds showed late decelerations. Per vaginal examination showed 3cms dilatation with premature rupture of membranes (PROM) and liquor was meconium stained. Echocardiography demonstrated features of dilated cardiomyopathy. Urine examination revealed albuminurea by dipstick method.

Patient was started on Lasix, antibiotics and decision for emergency caesarean section for fetal distress was taken. LSCS was done under GA, patient withstood the procedure well. Post operatively patient was managed with antibiotics, diuretics, LMWH, beta blockers and fluid restriction.

Post operative period was uneventful and patient gradually improved. After 6 months, echocardiography showed no features of residual cardiac dysfunction.

Case 4: Mitral stenosis with regurgitation: A 20-year-old second gravida presented to labor room with full term pregnancy with labor pains. She was a known case of RHD diagnosed as mild MS with moderate MR on benzathine penicillin prophylaxis. There was no breathlessness.

Cardiac examination revealed murmur. Per abdomen examination revealed a term uterus, acting with regular fetal heart sounds. Per vaginal examination showed 5 cms dilatation, fifty percent effaced with vertex presentation. Pelvis was adequate.

Echocardiography demonstrated mild MS with moderate MR.

Antibiotic prophylaxis was given. Patient delivered vaginally after 3 hours. Second stage was shortened by using outlet forceps. Injection Lasix was given immediately after delivery to reduce the preload on the heart.

She was treated with beta blockers and oral diuretics. Post delivery period was uneventful and she improved.

Discussion

Aortic stenosis (AS): Although the course of pregnancy in patients with congenital AS may be satisfactory, mortality is high in cases of valve areas under 0.75 cm^2.[4] Aortic stenosis leads to left ventricular flow obstructions in the valvular, subvalvular or supravalvular spaces. Patients become symptomatic when the valve area is reduced by 70 %, or when the left ventricle/ aortic valve gradient is greater than 50 mmHg.[5]

In our case aortic stenosis was detected during third trimester. Patient had remained asympomatic pror to this. In our patient LSCS was done as she primi with breech presentation in labour. She was treated with fluid restriction and LMWH post operatively.

For patients with asymptomatic severe AS that have progressed through pregnancy the preferred mode of delivery is vaginal. Some groups favor vaginal delivery with early epidural and good pain management to attenuate the increase in catecholamine release and cardiac output during labour.[6]

The decision for caesarean section should be based on obstertric indications and the anticipated cardiopulmonary tolerance of the patient during delivery. Patients with severe heart failure or dilated aortic root (>50 mm) should be delivered via caesarean section. Some centers advocate routine caesarean section for patients with severe AS though that is not currently supported by the guidelines.[7-10]

Pulmonary stenosis (PS): Pulmonary stenosis (PS) accounts for 10% to 12% of congenital heart disease in adults, and the probability of survival to child bearing age is high.[11] Isolated pulmonic stenosis (PS) during pregnancy is most commonly due to a congenital obstruction at the valvular level but can also occur at the subvalvular or supravalvular level and as a consequence of deterioration of a homograft inserted as part of the Ross procedure.[12,13]

In our case patient had isolated pulmonary stenosis and asymptomatic prior to pregnancy. LSCS was done as she had contracted pelvis. She was treated with fluid restriction and antibiotics.

Isolated valvular PS, even when severe, is usually well tolerated during pregnancy. In spite of the limited number of patients with PS reported, the available information indicates that pregnancy in patients with PS is tolerated well and that, in contrast to MS and AS, the severity of PS does not adversely impact maternal or fetal outcome. Balloon valvuloplasty is recommended in non-pregnant patients when the gradient across the right ventricular outflow track is >50 mm Hg at rest (70) or when the patient is symptomatic. Such a procedure, however, is rarely indicated during pregnancy in patients

who are either asymptomatic or mildly symptomatic before pregnancy. Vaginal delivery is tolerated well and can be permitted in the great majority of patients with PS.[7]

Peripartum cardiomyopathy (PPCM): The definition of PPCM includes four criteria:

1. development of cardiac failure in the last month of pregnancy or within five months of delivery,
2. absence of an identifiable cause for the cardiac failure,
3. absence of recognizable heart disease before the last month of pregnancy, and
4. left ventricular(LV) dysfunction (ejection fraction of less than 45% or reduced shortening fraction).[14,15]

Our case fits into the definition as she presented in the last trimester, had recognized LV dysfunction on echocardiography without any other recognizable cardiac cause. She also had preeclampsia. However, our patient did not have the other risk factors as she was nulliparous and was of young age.

The treatment for PPCM is the same as for other forms of congestive heart failure (fluid and salt restriction, β-blocker, diuretic, and digoxin), except for angiotensin-converting enzyme inhibitors and angiotensin-receptor blockers, which are contraindicated in pregnancy.[16]

Due to high risk of venous and arterial thrombosis anticoagulation with subcutaneous heparin should be instituted in these patients more so in bedridden patients, those with lVEF <35%, presence of atrial fibrillation, mural thrombi, obese patients and those with history of thromboembolism.[17,18]

Our patient was treated with furesemide and was started on low molecular weight heparin, beta blockers, antibiotics and fluid restriction post operatively after caesarean section.

Although peripartum cardiomyopathy shares many features of other forms of dilated cardiomyopathy, an important distinction is that women with this disorder have a much higher rate of spontaneous recovery of left ventricular function on echocardiography in post partum period; nearly half of the women will normalize their ejection fraction during follow-up within six months.[17]

Mitral Stenosis with Mitral regurgitation: Mitral stenosis is the most commonly encountered valvular lesion in pregnancy[19-22] and is caused in almost all cases by rheumatic heart disease. Although rheumatic MS is often accompanied by some degree of mitral regurgitation (MR),[19,22] pregnancy-related hemodynamic and symptomatic problems are predominantly due to valve stenosis.

A strong association between patients' NYHA functional class and both maternal and fetal complications was confirmed by Bhatla et al.[22]

A substantial increase in rate of premature birth was also reported by Silversides et al.[20] The rate of prematurity was 14% in patients with mild MS, 28% in patients with moderate MS, and 33% in patients with severe MS.

Optimal management of the already pregnant patient with MS should aim at reducing the heart rate and left atrial pressure. Both heart rate and symptoms can be effectively controlled by restricting physical activity and administering beta-adrenergic receptor blockers.[23] Left atrial pressure can also be reduced by a decrease in blood volume through restriction of salt intake and the use of oral diuretics. Aggressive use of diuretics, however, should be avoided to prevent hypovolemia and the reduction of uteroplacental perfusion.[24]

In our case patient delivered vaginally and was treated with diuretics to reduce the preload and with beta blockers to control the heart rate.

Vaginal delivery can be permitted in most patients with MS, including those with severe stenosis, whereas cesarean section is indicated mostly for obstetric indications. The second stage of labor should be shortened by the use of outlet forceps or vacuum extractor.[25] Epidural anesthesia is recommended for pain relief[26] and has been shown to minimize intrapartum fluctuations in cardiac output[27] and to lower left atrial and pulmonary artery pressures.[28]

Increased venous return in the early puerperium may result in a marked increase in left atrial and pulmonary pressure[29] and can lead to the development of pulmonary edema. For this reason, hemodynamic monitoring should continue for 12 to 24 h after the delivery. The use of tocolytic agents with beta-mimetic effect is contraindicated in patients with MS because of their strong chronotropic effect,[30] and the use of magnesium sulfate, which has negligible hemodynamic effect, is preferred.

Conclusion

Despite advances in the management of high-risk pregnant patients with heart disease in specialized centers, in our country the most vulnerable population has no access to centers where high technology is available. Early identification of the cardiac lesions can lead to effective and safer delivery at places where advanced care is available. Delay in diagnosis can prove to be fatal as seen in one of the cases which was brought to us in an unconscious condition on ventilator support. An effective team work of an obstetrician, anesthetist and cardiologist is necessary for giving the best results.

References

1. K. Pushpalatha. Cardiac Diseases in Pregnancy-A Review. JIMSA October - December 2010 Vol. 23 No. 4: 269-274.
2. Warnes CA, Williams RG, Bashore TM, Child JS, Connolly HM, Dearani JA, et al. ACC/AHA 2008 Guidelines for the Management of Adults with Congenital Heart Disease: Executive Summary: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (writing committee to develop guidelines for the management of adults with congenital heart disease). Circulation

2008;118(23):2395–451.
3. Franklin WJ, Benton MK, Parekh DR. Cardiac Disease in Pregnancy. Coulter SA, ed. Texas Heart Institute Journal. 2011;38(2):151-153.
4. Gershon RY, Alleyne AS. Valoración preoperatoria de la parturienta con enfermedad concomitante. Part I, enfermedades cardiacas. En: Mark M, editor. Anestesia Obstétrica. 2a ed. Mc Graw Hill; 2001. pp. 31-47
5. Aguilera Castro Fernando, Díaz Paola, Calderón Juan Carlos, Gutiérrez Iovan. Heart Disease and Pregnancy: Case Series. Rev. colomb. anestesiol. (Internet). 2011 July (cited 2017 Jan 16) ; 39(2): 207-214.
6. Hatton R, Colman JM, Sermer M, et al. Cardiac risks and management of complications in pregnant women with congenital heart disease. Future Cardiol. 2012 Mar;8(2):315-27.
7. Elkayam U, Bitar F. Valvular Heart disease and pregnancy. JACC 2005; 2:223-230.
8. Regitz-Zagrosek V, Lundqvist C, Borghi C, et al. ESC Guidelines on the management of cardiovascular diseases during pregnancy. EHJ 2011:32; 3147-3197.
9. Ioscovich AM, Goldszmidt E, Fadeev AV, et al. Peripartum anesthetic management of patients with aortic valve stenosis: aretrospective study and literature review. Int J Obstet Anesth. 2009 Oct;18(4):379-86.
10. Traill TA. Valvular heart disease and pregnancy. Cardiol Clin. 2012 Aug; 30(3):369-81.
11. Hameed AB, Goodwin TM, Elkayam U. Effect of pulmonary stenosis on pregnancy outcomes--a case-control study. Am Heart J 2007;154:852-4.
12. Elkayam U., Gleicher N. Warnes C.A., Elkayam U. (1998) in Cardiac Problems in Pregnancy, Congenital heart disease in pregnancy, eds Elkayam U., Gleicher N. (Wiley-Liss, New York, NY), pp 39–55.
13. Campbell N., Rosaeg O.P., Chan K.L. (2003) Anesthetic management of a parturient with pulmonary stenosis and aortic incompetence for cesarean section. Br J Anaesth 90:241–243.
14. Pearson GD, Veille JC, Rahimtoola S, Hsia J, Oakley CM, Hosenpud JD, Ansari A, Baughman KL. Peripartum cardiomyopathy: National Heart, Lung and Blood Institute and Office of Rare Diseases Workshop recommendations and reviews. JAMA. 2000; 283(9): 1183–8.
15. Demakis JG, Rahimtoola SH, Sutton GC, Meadows WR, Szanto PB, Tobin JR, et al. Natural course of peripartum cardiomyopathy. Circulation. 1971;44:1053–61.
16. Libby P, Bonow RO, Mann DL, Zipes DP, editors. Braunwald's heart disease: a textbook of cardiovascular medicine. 8th ed. Philadelphia, PA: Saunders; 2007.
17. Mishra V.N, Mishra N, Devanshi. Peripartum Cardionyopathy. JAPI 2003 April (61):268-273.
18. Bates GM, Greer IA, Hirsh J et al; Use of antithrombotic agents during pregnancy; the seventh ACCP conference on Antithrombotic and Thrombolytic therapy. Chest 2004; 126: 627S- 644S.
19. Hameed A., Karaalp I.S., Tummala P.P., et al. (2001) The effect of valvular heart disease on maternal and fetal outcome of pregnancy. J Am Coll Cardiol 37:893–899.
20. Silversides C.K., Colman J.M., Sermer M., Siu S.C. (2003) Cardiac risk in pregnant women with rheumatic mitral stenosis. Am J Cardiol 91:1382–1385.
21. Sawhney H., Agarwal N., Surv V., Vasishta K., Sharma Y., Grover A. (2003) Maternal and perinatal outcome in rheumatic heart disease. Int J Gynaecol Obstet 80:9–14.
22. Bhatla N., Lal S., Behera G., et al. (2003) Cardiac disease in pregnancy. Int J Gynaecol Obstet 82:153–159.
23. Al-Kasab S.M., Sabag T., Al-Zaibag M., et al. (1990) β-adrenergic receptor blockade in the management of pregnant women with mitral stenosis. Am J Obstet Gynecol 163:37–40.
24. Elkayam U., Gleicher N.Cohen F., Garty M. (1998) in Cardiac Problems in Pregnancy, Diuretics in pregnancy, eds Elkayam U., Gleicher N. (Wiley-Liss, New York, NY), pp 351–358.
25. Elkayam U., Gleicher N.Essop M.R., Sareli P. (1998) in Cardiac Problems in Pregnancy, Rheumatic valvular disease and pregnancy, eds Elkayam U., Gleicher N. (Wiley-Liss, New York, NY), pp 55–60.
26. Elkayam U., Gleicher N. Ramanathan J., D'Alessia J.G., Geller E., Rudick V., Niv D. (1998) in Cardiac Problems in Pregnancy, Analgesia and anesthesia during pregnancy, eds Elkayam U., Gleicher N. (Wiley-Liss, New York, NY), pp 285–313.
27. Clark S.L., Cotton D.B., Lee W., et al. (1989) Central hemodynamic-assessment of normal term pregnancy. Am J Obstet Gynecol 161:1439–1442.
28. Hermmings G.T., Whalley D.G., O'Connor P.H. (1987) Invasive monitoring and anesthesia management of patients with mitral stenosis. Can J Anaesth 34:182–185.
29. Clark S.L., Phelan J.P., Greenspoon J., Aldahl D., Horenstein J. (1985) Labor and delivery in the presence of mitral stenosis: central hemodynamic observations. Am J Obstet Gynecol 152:984–988.
30. Elkayam U., Gleicher N.Goodwin T.M. (1998) in Cardiac Problems in Pregnancy, Tocolytic therapy in the cardiac patient, eds Elkayam U., Gleicher N. (Wiley-Liss, New York, NY), pp 437–499.