

Maternal and Perinatal Outcome of Heart Disease Complicating Pregnancy in Tertiary Care Centre

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Abstract: Management of heart disease complicating pregnancy in a tertiary care centre is a great challenge to obstetricians and cardiologists. To know the maternal perinatal outcome of heart disease complicating pregnancies so that the quality of treatment in a tertiary care centre can be improved. Cardiac disease in pregnant women most commonly due to RHD, CHD, less commonly due to ischemic heart disease or cardiomyopathy. Though the frequency of RHD has decreased worldwide but still in developing countries like India, RHD is predominant. Admission of heart disease in pregnant women is approximately 30 of 2278 total deliveries from the month of June 2018 to August 2018 in MGMGH. The purpose of this study is to analyse all heart diseases in pregnancy and to characterize the clinical course, treatment and perinatal outcome in antenatal and postnatal women. Details of all antenatal or women less than 6 weeks postpartum admitted to MGMGH in the month of June to August 2018 were reviewed. Obstetric data included gestational age at the time of delivery, type, indication, location of delivery, congenital, rheumatic heart disease, operated, newly diagnosed were categorised depending on the major system involved. Out of 2278 deliveries from June 2018 to August 2018 in MGMGH, Trichy, 30 were heart disease complicating pregnancy. Rheumatic heart disease and congenital heart disease were more common. Operated congenital heart disease was also more common. Postnatally most of them required ICU monitoring and management. Incidence of Postpartum cardiomyopathy was very less in this study. Early anticipation of complications and close monitoring in the antenatal and perinatal period decreased maternal morbidity and mortality.

Keywords: Heart disease, Rheumatic heart disease, Congenital heart disease.

INTRODUCTION

Maternal mortality and morbidity reflects the quality of the health care system. Admission of heart disease complicating pregnancy occur approximately in 0.81% of admissions from June to September in MGMGH, Trichy. Heart disease complicates less than one percent of all pregnancies. Prevalence of risk factors among reproductive aged women are inactivity, obesity, smoking, high cholesterol, diabetes mellitus.

In our Indian perspective valvular heart diseases and operated heart diseases were more common than congenital heart diseases. Successful cardiovascular surgery has been reported during pregnancy [1, 2]. The overall experience, however, suggests a moderate increase in maternal risk and an unpredictable risk to the fetus or neonate [2, 3]. The use of percutaneous balloon valvuloplasty during pregnancy has been reported in patients with both mitral and aortic stenosis [4-6].

Criteria for maternal outcome included:

- Change in New York Heart Association (NYHA) functional class;
- Newly diagnosed or known case of heart disease or operated lesion
- Age and parity of the patient
- Mode of delivery.
- Maternal outcome

Criteria for fetal outcome included:

- Preterm labor,
- Stillbirth,
- Birth weight.

METHODS

This is a prospective study of all pregnant women and women less than 6 weeks postpartum admitted with heart disease in Mahathma Gandhi Memorial Government Hospital, Trichy, Tamilnadu, India, from June 2018 to August 2018. Obstetric data

included NYHA class at the time of admission gestational age at the time of admission and gestation age during delivery type, indication, location of delivery, congenital, rheumatic heart disease, operated, newly diagnosed were categorised depending on the major system involved.

Inclusion criteria

All obstetric women with diagnosed cardiac lesions admitted in Mahatma Gandhi Memorial Government Hospital, from June 2018 to August 2018.

Rheumatic heart disease, congenital heart disease, operated heart disease, cardiomyopathy, were included in the study

Exclusion criteria

- Patient with breathlessness, palpitation, evaluated and found to have nil cardiac lesions.
- Anaemia complicating pregnancy.
- Antenatal mothers with Respiratory system involvement.

RESULTS

Table-1: This table shows patients with heart disease complicating pregnancy

Total maternal admissions	Patients with heart disease	Admitted antepartum	Postpartum
2278	30	27	3

Admitted in MGMGH from June 2018 to August 2018. Incidence of heart disease was 0.81%, out

of which 90% admitted antenatally and 10% admitted postnatally.

Table-2: NYHA CLASS of the patients at the time of admission

Nyha class	No of cases at the time of admission	Percentage
1	20	66.6
2	7	23.3
3	2	6.6
4	1	3.3

This table shows the NYHA CLASS of the patients at the time of admission. 66.6% of the patients were under class 1, 23.3% of the patients were under class 2, 6.6% were under class 3 and 3.3% under class 4.

Table 3 shows the age of the patient during her admission. 53.3% between 19 and 25, 33.3% between 26 and 30, 13.3% between 31 and 35.

Table-3: Shows the age of the patient during her admission

Age at the time of admission	No of cases	Percentage
19 TO 25	16	53.3
26 TO 30	10	33.3
31 TO 35	4	13.3

Table-4: Shows various heart diseases cases received in MGMGH June 2018 to August 2018

Heart disease	No of cases	% Of cases
Rheumatic heart disease (valvular lesion)	17	56.6
Congenital heart disease	5	16.6
Operated valvular heart disease	3	10
Operated congenital heart disease	4	13.3
Hypertrophic cardiomyopathy	1	3.3

This table shows various heart diseases cases received in MGMGH June 2018 to August 2018. Out of 3663 maternal admissions for the period of 3 months, the incidence of heart disease complicating pregnancy

is 0.81%, out of which most common is rheumatic heart disease of 56%, followed by congenital heart diseases of 16.6%. Cardiomyopathy affects least percentage of patients of 3.3%.

Table-5: Shows the no of preterm deliveries 20% and term deliveries were 80%

Gestational age at the time of delivery	No of cases	Percentage
Less than 37 weeks	5	20
More than 37 weeks	20	80

This table shows the no of preterm deliveries 20% and term deliveries were 80%.

Table-6: Shows the maternal outcome of the heart disease patients admitted at MGMGH

Mode of delivery	No of cases	% of cases
Labour natural	14	51.8
Caserean section	9(electivescscs-4, emergency lscs-5)	33.3
hysterotomy	1(abruption)	3.7
mva	1(spontaneous abortion)	3.7
Antenatally discharged	2	7.4

This table shows the maternal outcome of the heart disease patients admitted at MGMGH, trichy, out

of which 51.8% had labour natural, 33.3% had caserean section.

Table-7: Shows maternal outcome of heart disease cases admitted at MGMGH

Maternal outcome	No of cases	% of cases
Discharged postnatally	14	46.6
Discharged antenatally	2	6.6
Icu admission	19	63.3
Ventilatory support	3	10
Referred to higher centre	3	10
expired	1	3.3
Near miss	1	3.3

This table shows maternal outcome of heart disease cases admitted at MGMGH. There was one maternal death and the cause of death being RHD with

peripartum cardiomyopathy. Rheumatic heart disease in pregnancy is associated with significant maternal and perinatal morbidity.

Table-8: Shows the perinatal outcome of the babies

Preterm baby	1	4
Low birth weight	2	8
Spontaneous expulsion of dead fetus	1	4
IUD due to abruption	1	4

This table shows the perinatal outcome of the babies. Out of 25 deliveries 4% were preterm, spontaneous expulsion and IUD. 8% were low birth weight babies. 80% of the babies were clinically normal and were given to mothers immediately for breastfeeding.

The indication for caserean section being mostly obstetric indication. Pregnancy was allowed to continue upto term and labour was awaited for spontaneous onset. Anticoagulants like heparin or warfarin was continued throughout pregnancy.LSCS was done only for obstetric indication. Infective endocarditis prophylaxis was given for all necessary patients.

Induction, management of labour, delivery, and post-partum surveillance require specific expertise and collaborative management by skilled cardiologists, obstetricians, and anaesthesiologists, in experienced maternal–fetal medicine units.

Timing of delivery Spontaneous onset of labour is appropriate for women with normal cardiac function and is preferable to induced labour for the majority of women with heart disease [7, 8]. Timing is

individualized, according to the gravida’s cardiac status, Bishop score (a score based upon the station of the presenting part and four characteristics of the cervix: dilatation, effacement, consistency, and position), fetal well-being, and lung maturity. In women with mild unrepaired congenital heart disease and in those who have undergone successful cardiac surgical repair with minimal residua, the management of labour and delivery is the same as for normal pregnant women.

Labour induction Oxytocin and artificial rupture of the membranes are indicated when the Bishop score is favourable. A long induction time was avoided if the cervix is unfavourable. While there is no absolute contraindication to misoprostol or dinoprostone, there is a theoretical risk of coronary vasospasm and a low risk of arrhythmias. Dinoprostone also has more profound effects on BP than prostaglandin E1 and is therefore contraindicated in active CVD. Mechanical methods such as a Foley catheter would be preferable to pharmacological agents, particularly in the patient with cyanosis where a drop in systemic vascular resistance and/or BP would be detrimental.

Vaginal or caesarean delivery [9, 10]

The preferred mode of delivery is vaginal, with an individualized delivery plan which informs the team of timing of delivery (spontaneous/induced), method of induction, analgesia/regional anaesthesia, and level of monitoring required. In our study vaginal delivery is 51.8% In high risk lesions, delivery should take place in a tertiary centre with specialist multidisciplinary team care. Vaginal delivery is associated with less blood loss and infection risk compared with caesarean delivery, which also increases the risk of venous thrombosis and thrombo-embolism. In general, caesarean delivery is reserved for obstetric indications Caesarean delivery should be considered for the patient on oral anticoagulants. Caesarean delivery may be considered in Marfan patients with an aortic diameter 40–45 mm [11, 12].

Delivery in anticoagulated women with heart disease

Women with prosthetic valves OACs should be switched to LMWH or unfractionated heparin (UFH) from the 36th week. Women treated with LMWH should be switched to i.v. UFH, at least 36 h before the induction of labour or caesarean delivery. UFH should be discontinued 4–6 h before planned delivery, and restarted 4–6 h after delivery if there are no bleeding complications. If emergent delivery is necessary while the patient is still on UFH or LMWH, protamine should be considered. If emergent delivery is necessary, fresh frozen plasma should be given.

Carpreg score (cardiac disease in pregnancy) [13]

One point for each

- History of prior cardiac event or arrhythmia
- New York heart association functional class of more than 2 or cyanosis
- Left heart obstruction (mitral valve area less than 2 cm², aortic valve area less than 1.5cm², or left ventricular outflow tract gradient more than 30mmhg)
- Left ventricular ejection fraction less than 0.40

Chance of cardiac complication

0 points: 5%

1 points : 27%

More than or equal to 2 points : 75%

Antibiotic prophylaxis for infective endocarditis [14]

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STANDARD: IV ampicillin 2g or cefazolin or ceftriaxone 1g

Pencillin allergy: IV cefazolin or ceftriaxone 1g or clindamycin 600mg

Oral: amoxicillin 2g

Criteria to give prophylaxis for infective endocarditis

- Patients with valvular prosthesis (mechanical or biological)
- Patients who have had previous endocarditis
- Patients with congenital heart defects
 - a) Cyanotic heart defects that have not been surgically corrected or that have been treated palliatively with creation of systemic to pulmonary shunt
 - b) Heart defects that have been treated surgically with implantation of conduits
 - c) All heart defects that have been treated surgically or interventionally in the first six months after the procedure
- Heart transplant recipients who have developed a cardiac valvulopathy.

Preconception counselling

It is essential to:

- Inform the patient about the risks as far as one can anticipate them;
- Carefully consider the potential risk to the fetus of maternal medication with agents such as angiotensin converting enzyme (ACE) inhibitors (risk of oligohydramnios, fetal and neonatal renal failure¹³) or amiodarone (risk of fetal hypothyroidism);
- Encourage pregnancy early in life;
- Inform the patient about the recurrent risks of congenital heart defects (as high as 6% in tetralogy of Fallot) [14];
- Inform the patient about prenatal diagnosis, not only of heart defects but also about associated problems such as genetic issues;
- Consider giving multivitamins to the patients three months before pregnancy and during the first three months after—these have been proven to lower the incidence of fetal heart defect in the general population [15].
- Detect risk factors for main obstetric complications (pre-eclampsia, early preterm delivery, fetal death in utero).

Antibiotic prophylaxis? For normal vaginal delivery it is not recommended by the American Heart Association [16].

CONCLUSION

During pregnancy

Clinical assessment associated with regular comparative echocardiograms is wise for all patients, but follow up requires an individual approach for each patient, especially in the presence of impaired right ventricular function. Fetal heart scanning is traditionally offered at 18 weeks. Fetal growth, especially in cyanotic women, has to be carefully monitored.

Questions from obstetricians should be addressed.

Can the patient have;

- Tocolysis by β stimulation or calcium channel inhibitors? Yes, but this may result in hypotension
- Steroids (at high doses) for pulmonary maturation in case of premature labour to avoid fetal pulmonary distress? Yes, but they can induce volume expansion
- Elective induced labour with oxytocic or prostaglandin? Yes, but there is a risk of bradycardia, hypertension, myocardial ischaemia, and vasospasm
- Spinal anaesthesia? Yes, but since volume expanding solutions will be given, the risk of cardiac failure should be compared to the benefit of analgesia which will minimise haemodynamic changes during labour
- Antibiotic prophylaxis? For normal vaginal delivery it is not recommended by the American Heart Association. Although well documented cases of endocarditis are uncommon, they can be very severe and we use prophylaxis (ampicillin) at the start of the labour and up to 48 hours

Women who have survived congenital heart disease into adulthood often have a strong desire to become pregnant. Optimum care of these potentially complicated pregnancies can only be achieved by a combined approach by cardiologists and obstetricians in specialist centres with an understanding of the obstetric and cardiac complications that can arise.

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REFERENCES

1. Whittemore, R., Hobbins, J. C., & Engle, M. A. (1982). Pregnancy and its outcome in women with and without surgical treatment of congenital heart disease. *The American journal of cardiology*, 50(3), 641-651.
2. Vaska, P. L. (1997). Cardiac Surgery in Special Populations, Part 2: Women, Pregnant Patients, and Jehovah's Witnesses. *AACN Advanced Critical Care*, 8(1), 59-66.
3. Weiss, B. M., von Segesser, L. K., Alon, E., Seifert, B., & Turina, M. I. (1998). Outcome of cardiovascular surgery and pregnancy: a systematic review of the period 1984-1996. *American journal of obstetrics and gynecology*, 179(6), 1643-1653.
4. Glantz, J. C., Pomerantz, R. M., Cunningham, M. J., & Woods, J. J. (1993). Percutaneous balloon valvuloplasty for severe mitral stenosis during pregnancy: a review of therapeutic options. *Obstetrical & gynecological survey*, 48(7), 503-508.
5. Banning, A. P., Pearson, J. F., & Hall, R. J. (1993). Role of balloon dilatation of the aortic valve in pregnant patients with severe aortic stenosis. *Heart*, 70(6), 544-545.
6. McIvor, R. A. (1991). Percutaneous balloon aortic valvuloplasty during pregnancy. *International journal of cardiology*, 32(1), 1-3.
7. Warnes, C. A., Williams, R. G., Bashore, T. M., Child, J. S., Connolly, H. M., Dearani, J. A., ... & Hunt, S. A. (2008). ACC/AHA 2008 guidelines for the management of adults with congenital heart disease: a report of the American college of cardiology/American heart association task force on practice guidelines (writing committee to develop guidelines on the management of adults with congenital heart disease) developed in collaboration with the American society of echocardiography, heart rhythm society, international society for adult congenital heart disease, society for cardiovascular angiography and interventions, and *Journal of the American College of Cardiology*, 52(23), e143-e263.
8. Perloff, J. K. (1998). *Congenital Heart Disease in Adults*, 2nd edn. Philadelphia: WB Saunders.
9. Bonanno, C., & Gaddipati, S. (2008). Mechanisms of hemostasis at cesarean delivery. *Clinics in perinatology*, 35(3), 531-547.
10. Elkayam, U., Ostrzega, E., Shotan, A., & Mehra, A. (1995). Cardiovascular problems in pregnant women with the Marfan syndrome. *Annals of internal medicine*, 123(2), 117-122.
11. Hiratzka, L. F., Bakris, G. L., Beckman, J. A., Bersin, R. M., Carr, V. F., Casey, D. E., ... & Kouchoukos, N. T. (2010). 2010 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/SIR/ST S/SVM guidelines for the diagnosis and management of patients with thoracic aortic disease. *Journal of the American College of Cardiology*, 55(14), e27-e129.
12. Siu, S. C., Sermer, M., Colman, J. M., Alvarez, A. N., Mercier, L. A., Morton, B. C., ... & Taylor, D. A. (2001). Prospective multicenter study of

- pregnancy outcomes in women with heart disease. *Circulation*, 104(5), 515-521.
13. Habib, G., Hoen, B., Tornos, P., Thuny, F., Prendergast, B., ... & Lekakis, J. (2009). Guidelines on the prevention, diagnosis, and treatment of infective endocarditis (new version 2009) The Task Force on the Prevention, Diagnosis, and Treatment of Infective Endocarditis of the European Society of Cardiology (ESC). *European heart journal*, 30(19), 2369-2413.
 14. Warnes, C. A., Williams, R. G., Bashore, T. M., Child, J. S., Connolly, H. M., Dearani, J. A., ... & Hunt, S. A. (2008). ACC/AHA 2008 guidelines for the management of adults with congenital heart disease: a report of the American college of cardiology/American heart association task force on practice guidelines (writing committee to develop guidelines on the management of adults with congenital heart disease) developed in collaboration with the american society of echocardiography, heart rhythm society, international society for adult congenital heart disease, society for cardiovascular angiography and interventions, and *Journal of the American College of Cardiology*, 52(23), e143-e263.
 15. Feldkamp, M., Jones, K. L., Ornoy, A., Pastuszak, A., Rosenbasser, S., Schick, B., & Bar, J. (1997). Postmarketing surveillance for angiotensin-converting enzyme inhibitor use during the first trimester of pregnancy-United States, Canada, and Israel, 1987-1995. *Journal of the American Medical Association*, 277(15), 1193.
 16. Dajani, A. S., Taubert, K. A., Wilson, W., Bolger, A. F., Bayer, A., Ferrieri, P., ... & Hutto, C. (1997). Prevention of bacterial endocarditis: recommendations by the American Heart Association. *Clinical infectious diseases*, 25(6), 1448-1458.