Original Article

Foetomaternal outcome of pregnancy with cardiac disease

Tayyiba Wasim[1], Wasim Amer[2], Ashraf Majrroh[3], Saqib Siddiq[4]

Department of Obstetrics and Gynaecology[1,4], Services Institute of Medical Sciences, Lahore, Department of Medicine[2], Department of Community Medicine[3], Allama Iqbal Medical College, Lahore.

Abstract

Introduction: To study the prevalence of cardiac disease in pregnancy and to assess the foetomaternal outcomes.

Methods: It was a 5 year descriptive study. All pregnant females with a known or newly diagnosed congenital or acquired cardiac lesion on echo cardiography were included in the study.

Results: There were 17,056 births during the study period, of whom 160 were cardiac patients giving a prevalence of 1%. Out of these 36% patients were diagnosed to have cardiac disease during current pregnancy. Acquired valvular heart lesions were found in 132 (82%) patients with mitral stenosis being the commonest (55%), others were congenital. Of the group, 43% patients were in class III & IV according to NYHA. Majority delivered vaginally and only 29% had c/section, 9% had therapeutic termination of pregnancy and 45% babies were low birth weight. Ten babies expired. Maternal mortality was low (3.8%), while 55(35%) had obstetric complications. Poor functional class (III & IV) was the key determinant of adverse foetomaternal outcome ($p<0.0001$).

Conclusion: The good results of this study can be attrihuted to the team efforts of between obstetricians, cardiologists and patients. Adverse foetomaternal outcome was related to poor functional class III and IV of NYHA (JPMA 58:175;2008).

Introduction

Improvement in health care services have allowed more frequent identification of pregnant women with congenital and acquired heart disease. Maternal heart disease comprises 0.2 to 3% of pregnancies and is responsible for 10 - 25% of maternal deaths.[1] Normal pregnancy and peripartum period is associated with considerable cardio circulatory changes. These changes may unmask underlying cardiac disease in normal women and increase morbidity and mortality in women with heart disease. It is now the second most common cause of death after psychiatric causes in UK.[2]

Child bearing women with cardiac disease present a unique challenge to the health care provider. The physiological adaptation of pregnancy predisposes cardiac patient to decompensate. Classic symptoms of heart disease mimic common symptoms of late pregnancy, i.e. palpitation and shortness of breath with exertion. Detail assessment of patient throughout pregnancy may lead to initial discovery of heart disease. If diagnosed early, and managed properly with multi disciplinary approach, collaboration of a team of trained obstetricians, cardiologist, anaesthetist, pediatrician and nurse, it results in successful outcome for mother and child in majority of cases.[3] The aims and objective of the study were to assess the prevalence of cardiac disease in pregnancy and foetomaternal outcome and to create awareness on importance of adequate cardiology diagnosis and obstetrical treatment.

Patients and Methods

It was a 5 year cross sectional descriptive study done from January 2002 to December 2006, at Gynae unit III of Services Institute of Medical Sciences, Lahore. All pregnant females with a known or newly diagnosed congenital or acquired cardiac lesion on echo cardiography were included in the study. Patients came from various sources. Majority of patients were referred from adjoining cardiology hospital or the medical wards, others were admitted from Gynae OPD or from the labour room. The patients either had a known history of underlying cardiac disease or were diagnosed denovo after presenting with clinical signs and symptoms of underlying cardiac disease. All such patients had an echocardiogram done and patients fulfilling the inclusion criteria were enrolled for the study after informed consent had been taken.

Detailed history, examination and investigations were done and recorded on the performa. Physician was involved simultaneously. Patients were graded into functional class I - IV, according to New York Heart Association classification (NYHA). Patients were categorized in a functional class according to S/S at initial presentation. Their class was not changed once they have improved after medical treatment. Patients were followed up throughout pregnancy and were admitted if needed. Therapeutic termination of pregnancy was done, after

discussion with physician, when nature and severity of lesion posed a risk to the life of the patient.

Patients were assessed for the mode of delivery; those without any contraindication were allowed spontaneous vaginal delivery (SVD) while others had a caesarean section (C/S). Induction of labour was done for obstetric reasons. Instrumental delivery was undertaken if maternal effort was poor. Fluid overload was avoided and so was ergometrine. Antibiotic prophylaxis was given to all patients.

Patients undergoing SVD were given pethidine analgesia, and delivery was conducted in the presence of a pediatrician and an anaesthetist. Patients were kept in ICU for 24 hours post delivery and were discharged later in liaison with the physician. Foetal outcome was recorded in terms of APGAR score at 5 minutes, low birth weight (<2.5kg), prematurity (<37 weeks) and foetal cardiac lesions on echo. Only obstetric maternal outcome was studied in terms of termination of pregnancy, anaesthetic complications, postpartum haemorrhage, and maternal death.

All the data was later analyzed on SPSS version 10. Percentages were used for cardiac disease in pregnancy and 95% CI was used. Chi-square test was applied to compare the pregnancy and foetal outcome with severity of functional class.

Results

There were 17,056 births in the five year study period. A total of 160 cardiac patients were delivered giving a prevalence of 1%. Majority of patients were young age, 102 patients were less than 30 years of age. 55 were primigravida and 65% were diagnosed with cardiac lesions during pregnancy. Seventy five patients were para 2-4 and rest had more than 4 babies. Thirty six percent patients were diagnosed to have cardiac lesions for the first time during pregnancy.

Acquired valvular heart defects were found in 132 (82%) patients with mitral stenosis being the commonest lesion (55%). Other acquired lesions included multiple valve disease 23%, cardiomyopathy 10% and patient with valve replacement 12%. Congenital lesions were 28 with septal defects in 16 patients, 5 patients had patent ductus arteriosus, 2 mitral valve prolapse, 1 Fallot's Tetrology, 2 Eisenmenger Syndrome, 1 single ventricle and 1 had coarctation of aorta.

Seventy (43%) patients were in III and IV functional class and were controlled on multiple drugs. Majority 88(55%) of the patients had vaginal delivery, 29% had caesarean section due to some obstetrical complications, 15(9%) had therapeutic termination of pregnancy, where

Table 1. Foetal outcome of pregnancy with cardiac disease (N=143).

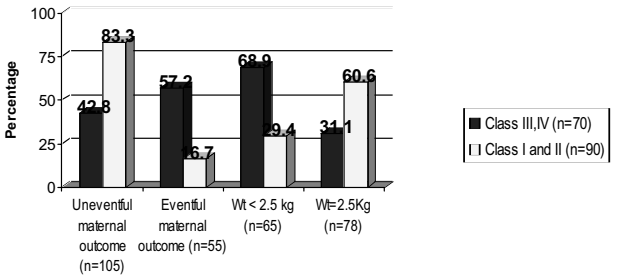
Fetal complications	Frequency	Percentage	95% CI limits
Low APGAR <7	15	10.5	6.2 - 16.9
Low birth weight	65	45.6	37.0 - 53.9
Pre-maturity	20	14.0	8.9 - 21.0
Foetal cardiac lesions	5	3.5	1.2 - 8.3
Foetal death (IUGR + Foetal distress)	10	7.0	3.6 - 12.8

Note: Percentage of each complication is calculated out of 143 denominator42

Table 2. Obstetric complications of pregnancy with cardiac disease (N=160).

Obstetric complications	Frequency	Percentage	95% CI limits
Termination of pregnancy	15	9.4	5.5 - 15.2
Anaesthetic complications	20	12.5	7.9 - 18.8
Postpartum haemorrhage	14	8.8	5.0 - 14.5
Maternal deaths	6	3.8	1.5 - 8.3
No complication	105	65.6	57.6 - 72.8

Note: Percentage of each complication is calculated out of 160 denominator.



Chi-square =28.6	Chi-square =21.75
df = 1	df = 1
pvalue=0.0001(P<0.05)	pvalue=0.0001(P<0.05)

Figure 1. Comparison of Functional Class with obstetrical maternal outcome and low birth weight.

severity of cardiac disease posed threat to the life of the woman.

Regarding foetomaternal outcomes, 45% babies were low birth weight and 5 babies had cardiac lesions (Table 1). Fifty five mothers had obstetrics complications and only six mothers expired in the 5 year study period (Table 2).

Discussion

In our study prevalence of cardiac disease was found to be 1%. Similar prevalence has been reported worldwide.[1-4] Despite advent and wide use of antibiotics, post rheumatic valvular heart disease remains the most common cardiac problem universally, especially so in the developing countries.[5-7] Similarly, mitral stenosis was the

commonest lesion in this study, as reported from most regions of the world.[6] Mitral stenosis is the most common, potentially lethal heart condition in pregnancy. Maternal risks are increased with severe mitral stenosis (mitral area<1cm). The presence of aortic valve stenosis simultaneously is associated with increased maternal morbidity and adverse foetal outcomes.[7] It is therefore advisable to correct the lesion before pregnancy.

Those patients with a treated cardiac valvular lesion with a prosthetic valve pose special problems at the time of delivery. They are at increased risk to develop complications like thrombosis, endocarditis, structure failure and foetal embryopathy with oral anticoagulation.[8,9] In our study 20 patients presented with valve replacement. Out of these, 5 had haemorrhagic complications due to anticoagulation and one patient expired. Percutaneous mitral balloon valvotomy has emerged as treatment of choice for severe rheumatic mitral stenosis and should be offered to eligible patients.[10]

Cardiomyopathy is a rare and potentially lethal cardiac complication of late pregnancy and early postpartum period, exact etiology still remains unknown.[11] It is characterized by development of congestive cardiac failure and left ventricular systolic dysfunction.[12] Ten cases of pregnant peripartum cardiomyopathy patients were seen in five years. Vigorous heart failure treatment with diuretics, B blockers was given. Majority responded well to treatment, and only one patient died. Patients should be adequately counseled regarding the importance of proper treatment and its chances of recurring in subsequent pregnancies.[13]

In the developed countries successful paediatric surgery of congenital heart diseases, and low incidence of rheumatic disease, has resulted in increase number of such patients reaching into reproductive age group.[14,15] In UK congenital heart lesions comprise 70-80% of cardiac patients in pregnancy, such is not the case in the developing countries and same was the case with our study, with congenital cardiac lesion accounting for only 17% patients. ASD, VSD and PDA were the commonly encountered congenital cardiac lesions, similar to other studies.[16,17] Two patients of Eisenmenger Syndrome were also seen in our study. Maternal morbidity and mortality in such patients reaches up to 50-60%.[18] Both patients had to undergo termination of pregnancy and one patient expired.

Poor functional class III - IV (NYHA), in addition to severity of lesion, is a significant risk factor for both mother and child. Mothers in class I and II had an uneventful delivery ($p<0.0001$) as compared to class III and IV. Early presentation of such patients can help improve the outcome.[19] In our study, 45% of babies born to patients in class III and IV had low birth weight. This was significantly worse than babies born to mothers in class I and II. Low birth weight in class III and IV can be attributed to maternal causes like, treatment with beta blockers, cyanosis and early induction of delivery.

Other foetal outcomes included 5 (3.5%) foetuses born with structural cardiac defects. In general population the incidence of cardiac defects is 0.8%. It is increased to 3 - 50% in babies born to women with cardiac defects.[20] Detail foetal cardiac scan at 20-22 weeks is recommended in cardiac patients with congenital lesion by trained specialists.[21] Fifteen babies had birth asphyxia and required nursery admission, out of these 10 expired mainly due to prematurity, Intrauterine growth retardation and foetal distress.

As regards other obstetrical maternal outcomes, anaesthetic complications were seen in (12%) patients, mostly during emergency caesarean section due to lack of senior anaesthetic team. Fourteen patients had PPH due to uterine atony and perineal tears following instrumental delivery. Maternal mortality was extremely low (3.8%) as compared to other studies.[1,2] This could be due to early referral, team effort and close liaison between obstetricians and physicians.

Early recognition, close follow up can improve maternal tolerance to cardiovascular burden imposed by pregnancy and promote foetal growth and neonate survival. There is continuous need to counsel, refer and appropriately manage women with pre-existing heart disease. Attention must be paid to detailed examination to diagnose cardiac disease which develops denovo during pregnancy. In our study 63% of patients were already diagnosed cardiac patients but 36% patients were diagnosed during the present pregnancy. According to Gei et al, 15-25 % of cardiac anomalies are first diagnosed in pregnancy. This is because these patients have the first contact with health care providers in pregnancy.[22]

Recommendation

An improvement in modern techniques of monitoring, better understanding of pathophysiology of cardiac disease and multi disciplinary care can lead to substantial improvement in the outcome of pregnant cardiac patients. Every effort should made to create awareness regarding pre pregnancy counseling, so that associated foetal and maternal morbidity can be reduced.

References

1. Dobbenga - Rhodes YA, Preive AM. Assesment and evaluation of women with cardiac disease during pregnancy. J perinat Neonatal Nurs 2006; 20: 295-302.

2. Lewis G, Drife J. Why mothers die 2000 - 2002. The sixth report of confidential enquiries into maternal and Child Health. London: RCOG press, 2004.
3. Trinidad D, Cox RA. Heart diseases during pregnancy. P R Health Sci J 2006; 25: 259 -65.
4. Davies GA, Herbert WN. Assessment and Management of cardiac disease in pregnancy. J obstet Gynaecol Can 2007; 29: 331 - 6.
5. Mazhar SB, Gul-e-Irum. Feto maternal outcome in pregnancy with cardiac disease. J Coll Physicians Surg Pak 2005; 15: 476-80.
6. Tornos P. Valvular heart disease in women. Rev Esp Cardiol, 2006; 59: 832- 6.
7. Malhotra M, Sharma JB, Tripathi R, Arora P, Arora R. Maternal and fetal outcome in valvular heart disease. Int J Gynaecol Obstet 2004; 84: 11 - 6.
8. Strömer H, Franzen D, De Haan F. Management of patients with prosthetic heart valves. Herz 2006; 31: 455 - 68.
9. Plesinac SD, DarkoPV, Pilic IZ, Babovic IR. Anticoaugulation therapy: during pregnancy of patients with artificial heart valves:fetomaternal outcome. Arch Gynecol Obstet. 2006; 274: 141-45.
10. Fawzy ME. Percutaneous mitral balloon valvotomy. Catheter cardiovasc interv 2007; 69: 313 - 21.
11. Rodriguez - Gonzalez MA, Medina - Ruiz A. Peripartum cardiomyopathy. PR Health Sci J 2006; 25: 267 - 71.
12. Ahmad R. Peripartum cardiomyopathy. J Coll Physicians Surg Pak 1999; 99: 230-33.
13. Sliwa K, Fett J, Elkayam U. Peripartum cardiomyopathy. Lancet 2006; 368: 687-93.
14. Kafka H, Johnson MR, Gatzoulis MA. The Team approach to pregnancy and congenital heart disease. Cardiol Clin 2006; 24: 587 - 605.
15. Borghi A, Ciuffreda M, Quattrociocchi M, Preda L. The grown-up congenital cardiac patient. J Cardiovasc Med (Hagerstown) 2007; 8: 78-82.
16. Gatzoulis MA, Swasn L, Thierren J, Pantley GA. Adult Congenital Heart Disease: a practical guide. Oxford:BMJ publishing, Blackwell, 2005.
17. Siu SC, Colman JM. Congenital heart disease and pregnancy. Heart 2001; 85:710-15.
18. Makaryus AN, Forouzesh A, Johnson M. Pregnancy in the patient with Eisenmenger's syndrome. Mt Sinai J Med 2006; 73: 1033-6.
19. Witcher PM, Harvey CJ. Modifying labor routines for the woman with cardiac disease: J Perinat Neonatal Nurs 2006; 20: 303-10.
20. Uebing A, Steer PJ, Yentis SM, Gatzoulis MA. Pregnancy and congenital heart disease. BMJ 2006; 332: 401-6.
21. Nikkila A, Bjorkhem G, Kallen B. Prenatal diagnosis of congenital heart defects - a population based study. Acta Paeadatr 2007; 96: 49-52.
22. Gei AF, Hankins GD. Cardiac disease and pregnancy. Obstet Gynecol Clin North Am 2001; 28: 465-512.