ORIGINAL ARTICLE

Foetomaternal Outcome in Pregnant Women with Heart Disease

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ABSTRACT

Background: The presence of heart disease in the pregnant women does appear to increase the risk of obstetric complication. After delivery, the heart rate normalizes within first 10 days; by 3 months post-delivery, cardiac output, stroke volume, and systemic vascular resistance return to the pre-pregnancy state. It is important to realize that even in normal pregnant women; some effective physiologic changes are imposed by pregnancy upon the cardiovascular system.
Aim: To determine the maternal and foetal outcome in pregnant women with heart disease presenting in a tertiary care hospital.
Study design: Descriptive case series
Setting: This study was carried out in the Department of Obstetrics and Gynaecology, Sir Ganga Ram Hospital, Lahore.
Duration of study: From 01-06-2014 to 31-05-2015
Results: In our study, prevalence of pregnant women with heart disease was found to be about 1.07% and out of 150 cases, 51(34%) were between 18-25 years of age and 99(66%) were between 26-35 years of age, mean±sd was calculated as 27.13±4.654 years, frequency of maternal complications was calculated as 12(8%) having Arrhythmias and 36(24%) had pulmonary oedema. Frequency of foetal complications was calculated as 14(9.33%) having miscarriage, 27(18%) had preterm delivery and 43(28.7%) had LBW/ IUGR. This study showed that duration of disease is a significant risk factor for NYHA class, it is concluded that duration of disease is strongly associated with NYHA classification with P=0.001 at 5% level of significance. Association of NYHA class with foetomaternal outcome has also been studied and it was observed that NYHA class is strongly associated with foetomaternal outcome variables i.e., arrhythmias, pulmonary oedema, miscarriage and IUGR with P values 0.001, 0.0001, 0.010 and 0.006 respectively.
Conclusion: It was concluded that pulmonary oedema followed by arrythmias are the most common maternal complications while intrauterine growth restriction, preterm delivery and miscarriages common foetal complications in pregnant women with heart disease. However, it is recommended that every patient who present with heart disease, should be sorted out for maternal and foetal complications. It is also required that every setup should have their surveillance in order to know the frequency of the problem.
Keywords: Pregnant women, heart disease, maternal and fetal outcome, frequency.

INTRODUCTION

Maternal heart disease comprises 0.2-3% of pregnancies[1]. Rheumatic valvular disease comprises 56–89% of all cardiovascular diseases in pregnancy in developing countries[2]. Although maternal cardiac disease affects and complicates few pregnancies, even then it is a significant cause of maternal and Fetal morbidity and mortality.[3] Maternal morbidity and mortality is underestimated most of the time because of inconsistent data and by changing disease classification[4]. Incidence of acquired heart disease is continuously increasing because of several cardiovascular risk factors like obesity, hypertension and diabetes[2].

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As the pregnancy advances workload on heart increases[5] physiological cardiovascular changes in pregnancy includes the increase in heart rate, cardiac output, arterial compliance, and extracellular fluid volume and decrease in blood pressure (BP) and total peripheral resistance, which in the presence of underlying maternal cardiac disease may lead to decompensation and intrauterine Fetal compromise[3]. Women with significant cardiac disease are not able to meet the increased physiological demands of pregnancy[3]. Cardiovascular changes in normal pregnancy may unmask underlying cardiac disease and increase morbidity and mortality in women with heart disease[1]. With increasing gestation, preexisting cardiovascular disease gets worse due to these physiological adaptations. These can present serious therapeutic challenge in the management[3] especially during labour and delivery so continuous Foetomaternal monitoring is required[6].

Maternal cardiac disease has adverse effects on pregnancy outcome.[6] Maternal morbidity strongly correlates with maternal New York Heart Association (NYHA) classification.[7] Pregnancy in women with NYHA class III/ IV is associated with adverse Foetomaternal outcome[8,10].

Accurate assessment of individual maternal risk in pregnant women with heart disease is of fundamental importance for optimal care[5]. Multidisciplinary approach, collaboration of a team of trained obstetrician, cardiologist, anaesthetist, pediatrician and nurse should be adopted in the management of cardiac patient to achieve good obstetric and foetal outcome in pregnant women with heart disease[1,9,10].

The aim and objective of this study is to determine the Foetomaternal outcome in pregnant women with heart disease. In Pakistan limited data is currently available about pregnancy outcome with heart disease and further research work is needed.

As studies have been conducted on this subject but there are still discrepancies in the results of different studies where less number of cardiac patients have been included and this study helped to sort out these discrepancies.

MATERIALS AND METHODS

This descriptive case series was carried out in department of Obstetrics and Gynaecology, Sir Ganga Ram Hospital, Lahore from: 01-06-2014 to 31-05-2015. It is estimated as 150 pregnant women with 95% confidence level with 5% margin of error taking an expected percentage of arrhythmias in 10.86% of pregnant women having cardiac disease. Sample technique non probability purposive sampling. Pregnant women between 5 to 42 weeks of gestation with known heart disease of NYHA class I, II, III and IV disease (on Echocardiography) were included in the study.

Exclusion Criteria

- Patients with shortness of breath caused by diseases other than heart disease
- Severe Anemia (Hb<8.0g/dl)
- Bronchial asthma (on history and clinical examination)
- Restrictive lung disease (spirometry)

Data collection: All the pregnant women presenting in department of Obstetrics and Gynaecology SGRH, Lahore through emergency department fulfilling inclusion and exclusion criteria were selected. Personal information of the patients was used for study purpose after informed consent. Thorough evaluation of these patients was done regarding age, parity, functional class by NYHA classification, laboratory workup, obstetrical ultrasound, ECG and echocardiogram. Obstetrical ultrasound and echocardiogram was done at enrolment and repeated thereafter on subsequent visits whenever needed. Doppler ultrasound and growth scans were done in case of intrauterine growth restriction. Treatment of patients was provided by adopting multidisciplinary approach by cardiologist, physicians, obstetrician and anesthetist. All pregnant women with heart disease underwent risk stratification by the multidisciplinary team to determine the frequency and content of antenatal care. During this period, these women were observed for maternal morbidity (cardiac and obstetric complications) and Foetal outcome (like miscarriage, preterm and IUGR). All this information was entered in predesigned proforma.

Data analysis: Data was entered and analyzed according to SPSS version 20 computer based programme for data analysis. All quantitative variables like age, duration of pregnancy and birth weight/IUGR were discussed in mean±SD form. All qualitative variables like maternal complications including arrythmias, pulmonary oedema and Foetal outcome including miscarriage, preterm and IUGR/ LBW were discussed in frequency or percentage form. Data was stratified for duration of disease and NYHA class. Chi-square test was used post-stratification with P value $\leq$0.05 considered as significant.

RESULTS

A total of 150 cases fulfilling the inclusion/exclusion criteria were enrolled to determine the maternal and Foetal outcome in pregnant women with heart disease presenting in a tertiary care hospital. In our study prevalence of heart disease in pregnant women was found to be about 1.07%. Age distribution of the patients was done which shows that 51(34%) were between 18-25 years of age and 99(66%) were between 26-35 years of age, mean$\pm$sd was calculated as 27.13±4.654 years (Table 1). Mean gestational age of the patients was calculated as 31.11±4.93 weeks (Table 2). Mean birth weight of the patients was calculated as 2.96±0.87kgs (Table 3). Frequency of maternal complications was calculated as 12(8%) having Arrythmias and 36(24%) had pulmonary oedema (Table 4). Frequency of foetal complications was calculated as 14(9.33%) having miscarriage, 27(18%) had preterm delivery and 43(28.7%) had intrauterine growth restriction (Table 5). This study showed that duration of disease is a significant risk factor for NYHA class, and duration of disease is strongly associated with NYHA classification with P=0.001 at 5% level of significance.

In this study it was observed that NYHA class is associated with foetomaternal outcome variables i.e., arrhythmias, pulmonary oedema, miscarriage and IUGR with P values 0.001, 0.0001, 0.010 and 0.006 respectively. While preterm foetal outcome variable is not statistically associated with NYHA class at P value <0.05 but clinically it seems to be associated with NYHA class severity as more proportion of patents in class III and class IV had preterm delivery.

Table 1: Age distribution

Age (years)	n	%age
18-25	51	34
26-35	99	66
mean±sd	27.13±4.654	

Table 2: Mean gestational age of the patients (150)

	Mean	sd
Gestational age	31.11	4.93

Table 3: Mean birth weight (n=150)

	Mean	sd
Mean birth weight	31.11	4.93

Table 4: Maternal complications (n=150)

Complications	n	%age
Arrythmias	12	8
Pulmonary oedema	36	24

Table 5: Foetal outcome (n=150)

Foetal outcome	n	%age
Miscarriage	14	9.33
Preterm delivery	27	18
IUGR/LBW	43	28.7

Table 6:Distribution of NYHA classification (n=150)

Classification	n	%age
Class I	34	22.7
Class II	71	19.3
Class III	29	19.3
Class IV	16	10.7

Table 7: Duration of disease of study participants

Mean	Min.	Max.	SD
3.28	0.2	9	2.25

Table 8: Association of NYHA class with foetomaternal outcome

Foetomaternal outcome		Class I (n=34)	Class II (n=71)	Class III (n=29)	Class IV (n=16)	P value
Arrhythmias (n=12)	Yes	1(2.9%)	2(2.8%)	3(10.3%)	**6(37.5%)**	0.001*
	No	33(97.1%)	69(97.2%)	26(89.7%)	**10(62.5%)**	
Pulmonary oedema (n=36)	Yes	5(14.7%)	10(14.1%)	9(31%)	**12(75%)**	0.0001*
	No	29(85.3%)	61(85.9%)	20(69%)	**4(25%)**	
Miscarriage (n=14)	Yes	3(8.8%)	2(2.8%)	4(13.8%)	**5(31.3%)**	0.010*
	No	31(91.2%)	69(97.2%)	25(86.2%)	**11(68.8%)**	
Preterm N=27)	Yes	6(17.6%)	9(12.7%)	7(24.1%)	**5(31.3%)**	0.260$^{N.S}$
	No	28(82.4%)	62(87.3%)	22(75.9%)	**11(68.8%)**	
IUGR (n=43)	Yes	4(11.8%)	18(25.4%)	14(48.3%)	**7(43.8%)**	0.006*
	No	30(88.2%)	53(74.6%)	15(51.7%)	**9(56.3%)**	

DISCUSSION

The presence of heart disease in the pregnant women does appear to increase the risk of obstetric complication. After delivery, the heart rate normalizes within first 10 days and by 3 months post-delivery, cardiac output, stroke volume and systemic vascular resistance return to the pre-pregnancy state. It is important to realize that even in normal pregnant women, some striking physiologic changes are imposed by pregnancy upon the cardiovascular system. Maternal morbidity and mortality is underestimated most of the time because of inconsistent data and by changing disease classification.

As studies have been conducted on this subject but there are still discrepancies in the results of different studies where less number of cardiac patients have been included while the current study may be helpful to sort out these discrepancies.

In our study about 14,000 pregnant women delivered, out of which 151 were cardiac patients and prevalence of heart disease in pregnant women was found to be about 1.07% which is consistent with cardiac disease prevalence noted in other studies[1].

In our study, out of 150 cases, 51(34%) were between 18-25 years of age and 99(66%) were between 26-35 years of age, mean±sd was calculated as 27.13±4.654 years, frequency of maternal complications was calcualted as 12(8%) having arrhythmias and 36(24%) had pulmonary oedema. Frequency of foetal complications was calculated as 14(9.33%) having miscarriage, 27(18%) had preterm delivery and 43(28.7%) had low birth weight.

We found similar findings in a study conducted on outcome of pregnancy in women with cardiac disease at services hospital, Lahore showing that out of 46 cardiac patients 19.56% developed pulmonary oedema, 10.86% had arrhythmias[10] but the sample size of the study was only 46 cases, our larger sample size authenticating the above findings.

Another study recorded foetal complications observed were, an increase incidence of intrauterine growth restriction 36.9%, preterm delivery 16.6%,

intrauterine death 4.3% and neonatal death 4.3%,[10] our findings regarding preterm delivery and intrauterine growth restriction are consistent with the above study.

Another study conducted at Allied hospital, Faisalabad included 74 cardiac patients. Out of these 10.8% patients had spontaneous miscarriage, 18.9% had preterm delivery and 76% normal foetal outcome noticed[9]. These findings are also in agreement with the findings in this study.

Thanaji Raprapa Tetal conducted a study[11] to identify pregnancy complications of women with heart disease recorded that the most common obstetric complication was intrauterine growth restriction in agreement with the current study.

This study showed that duration of disease is a significant risk factor for NYHA class, it is concluded that duration of disease is strongly associated with NYHA classification with P=0.001 at 5% level of significance. Functional class and severity of lesion worsens with increasing duration of disease (Table 8).

In this study chi-square test was applied to test the association of NYHA class with foetomaternal outcome and it was observed that NYHA class is strongly associated with foetomaternal outcome variables i.e., arrhythmias, pulmonary oedema, miscarriage and IUGR with P values 0.001, 0.0001, 0.010 and 0.006 respectively. While preterm foetal outcome variable is not statistically associated with NYHA class at P value $\leq$ 0.05 but clinically it seems to be associated with NYHA class severity as more proportion of patents in class III and class IV had preterm delivery. A study conducted at Services institute of medical sciences, Lahore showed that Poor functional class (III and IV) is associated with more adverse foetomaternal outcome compared to class I and II, which is consistent with the findings in our study. With early recognition of such patients most of foetomaternal complications can be prevented.

Early diagnosis followed by close follow up of cardiac patients would be helpful for them to cope with cardiovascular burden imposed by pregnancy. There is continuous need to diagnose, counsel, refer and accordingly manage women appropriately with cardiac disease. Special attention must be paid to the detailed physical examination to diagnose heart disease which develops during pregnancy. An improvement in monitoring techniques and multidisciplinary team involvement can lead to substantial improvement in foetomaternal outcome in pregnant women with heart disease.

In summary, the findings of our study may be used as a guideline in our setup which is also in agreement with two local studies conducted at Lahore and Faisalabad respectively; however, we are of the view that every setup should evaluate the frequency of maternal and fetal outcome in pregnant women with heart disease.

CONCLUSION

Pulmonary oedema followed by arrythmias IS the most common maternal complications while intrauterine growth restriction, preterm delivery and miscarriages are common fetal complications in pregnant women with heart disease. However, it is recommended that every patient who present with heart disease, should be sorted out for maternal and fetal complications. It is also required that every setup should have their surveillance in order to know the frequency of the problem.

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