ORIGINAL ARTICLE

Maternal Heart Disease and Pregnancy Outcomes

Suman Puri, Aman Bharti*, Sandeep Puri*, Bishav Mohan,**

Vidushi Bindal, Sumati Verma***

Abstract

This study was conducted to assess the presence of various types of cardiac lesions in pregnant females admitted to a tertiary care hospital of Punjab. 97 women having pregnancy and heart disease were assessed for the various etiologies, cardiac lesions, maternal and perinatal outcomes. Rheumatic heart disease (RHD) with isolated mitral stenosis was the commonest acquired lesion while mitral valve prolapse was the predominant lesion among the congenital heart disease. In the miscellaneous group, cardiomyopathy was the leading cause. Multiple cardiac lesions were diagnosed in 36 women. Majority delivered by caesarean section and some had spontaneous vaginal delivery while few required induction of labour. 19 women had cardiac complications. There were three maternal deaths.This study concluded that rheumatic heart disease in pregnancy is still predominant though acquired cardiac lesions are rising. A careful observation and management during pregnancy can improve the maternal & fetal outcomes.

Key Words

Pregnancy, Heart Disease, Rheumatic Disease, Mitral Valve Disease

Introduction

Prevalence of heart disease in pregnancy is found to vary between 0.3-3.5% (1,2). Major hemodynamic alterations occur during pregnancy, labor, delivery and the postpartum period. These changes 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. Very few studies are available in India that have focused on heart disease in pregnancy and its outcome. We examined the frequency of pregnancy-related complications in Indian women with heart disease along with their outcome.

Material and Methods

This study was conducted in the Department of Obstetrics & Gynaecology at Dayanand Medical College & Hospital, Ludhiana. The study enrolled 97 women with heart disease which was previously known or diagnosed during the pregnancy. All pregnant women with any congenital or acquired cardiac lesions or those with cardiac arrhythmias referred to our hospital were included. A detailed proforma was predesigned to gather the essential information regarding heart disease in pregnancy. Baseline data recorded included age, parity, gestational age, prior cardiac events (for those who underwent cardiac intervention, only events after intervention were considered), cardiac lesions, prior surgical interventions, cyanosis (oxygen saturation <90%), use of cardiac medications, use of alcohol, thorough clinical examination including chest and cardiovascular auscultation, 12-lead ECG, and transthoracic echocardiographic assessment of left and right ventricular systolic function. The mode of delivery whether vaginal (with or without induction), use of instruments and the need for LSCS was duly recorded.

Results

A Total of 97 women where pregnancy was complicated by heart disease were included in the study. The prevalence of heart disease amongst all pregnancies

From the Department of Obs & Gynae, *Medicine, Cardiology & MBBS Intern***, DMCH, Ludhiana-141001, Punjab-India**

Correspondence to : Dr. Suman Puri, Associate Professor, Deptt. of Obst & Gynae Dayanand Medical College & Hospital, Ludhiana - 141001, Punjab

found in the hospital was 4.3%. Baseline characteristics of all pregnancies are shown in (*Table 1*). The principal cause of cardiac lesion was rheumatic heart disease (70.10%) while congenital heart disease was seen in 9% only. Only 22 (22%) women were in the age group of 30 years or above. In 47 (48%) cases, heart disease was diagnosed before pregnancy. For the remainder 50 (51.5%), diagnosis was made first in pregnancy in 43 (44%)and 7 (7%) in the post partum period.

Among the women who had rheumatic heart disease, mitral stenosis seen in 18 (19%) cases was the most common lesion (*Table 2*). Multiple cardiac lesions were present in 36 (37.11%) pregnancies. Among the women with congenital cardiac disease, mitral valve prolapse was the most common constituting 5 (5%) cases. In the miscellaneous group cardiomyopathy was the most common constituting 7 (7%) cases (*Table 2*).

Majority of the women delivered by cesarean section 37 (43%). 32 (37%) subjects had a normal vaginal delivery with spontaneous onset of labor and 7 (8%) required induction with intracervical PGE2. 8 (8%)delivered with aid of instruments. 9 (9%) pregnancy were aborted while 1 (1%) women underwent laparotomy (salpingectomy). There were 3(3%) maternal deaths (*Table 4*).

Eight (8%) patients had history of cardiac surgery. 3 (3%) women underwent mitral valvotomy. Four (4%) patients had previously undergone mitral valve replacement (mechanical valve) and 1 (1%) patient had aortic valve replacement (*Table 2*). All of them had received anticoagulants (heparin or warfarin) during their pregnancy. These patients had received low molecular weight heparin (LMWH) for the first three months followed by oral anticoagulants and then LMWH was started again in eight month.

Majority of the women, 49 (57%), in this study, were primigravida (*Table 1*).81 (86%) live births were recorded in these women. No baby had congenital heart disease. There were 13 (14%) still births. 57 (70%) babies born weighed more than 2kg (*Table 5*). The major complications that were encountered during the management of these 97 women are shown in the *table 3*. The predominant problem observed in these subjects was heart failure in 6 (6%) women followed by myocarditis and left ventricular failure in 2 and pulmonary thromboembolism in 4.Varied other comorbidities observed included sepsis 9 (10%) and shock 5(6%). There were three maternal deaths in this study. They suffered from the complications of cardiac failure, sepsis and shock.

Discussion

Heart disease during pregnancy encompasses a wide spectrum of disorders. Blood volume and cardiac output rise during normal pregnancy and reach a peak during late second trimester and may lead to cardiac decompensation. Our study aimed at the assessment of maternal & neonatal complications associated in women with heart disease in pregnancy. 97 women with pregnancy and having an underlying cardiac disease (preexisting or newly detected) were included in the study.

Various studies have estimated that 0.3 to 3.5% of all pregnancies are complicated by heart disease. The prevalence of 4.3% in our institution, being a tertiary referral centre, may not reflect the actual prevalence of this medical disorder in pregnancy.

Rheumatic heart disease (RHD) continues to be the predominant cardiac lesion in pregnancy. In our study RHD was 7 times more common than congenital heart disease (*Table 2*) and mitral stenosis was the predominant

Table 1. Baseline Characteristics

Age (Yrs)	**86/97 (89%) (Antenatal)** **11/97(11%) (Post Natal)**
<20	2/97 (2%)
20-25	36/97(37%)
26-30	37/97(38%)
31-35	14/97(14%)
>35	8/97(8%)
Gravida	
G_1	49/86(57%)
G_2	14/86(16%)
G_3	17/86(20%)
G_4	5/86(6%)
$>G_4$	1/86(1%)
Time of Diagnosis	
Before pregnancy	47(48%)
Antenatal - 1 Trimester	10(10%)
II Trimester	16(16%)
III Trimester	17(18%)
Post natal	7(7%)

Table 2. Cardiac Lesions

Rheumatic	68/97(70..10%)
Single Valve Lesion	26
MS	18(19%)
MR	5(5%)
TR	3(3%)
Multiple Valve Lesions	36
MR+TR	5(5%)
MS+MR	5(5%)
MS+TR	2(2%)
MR+AR	2(2%)
AR+TR	1(1%)
MS+AR	1(1%)
MS+MR+AR	8(8%)
MS+TR+AF	1(1%)
MS+MR+PAH	2(2%)
TR+MR+PAH	2(2%)
MS+MR+TR	4(4%)
MR+TR+AR	3(3%)
Congenital	9
ASD	2(2%)
PDA	2(2%)
MVP	5(5%)
Miscellaneous	18
Global hypokinesia	7(7%)
Cardiomyopathy	7(7%)
PAH	2(2%)
CAD	2(2%)
Prior Cardiac Surgery	8
Mitral valvotomy	3(3%)
Mitral valve replacement	4(5%)
Aortic valve replacement	1(1%)

MS - Mitral Stenosis, MR - Mitral Regurgitation, PAH - Pulmonary Artery Hypertension, AS - Aortic Stenosis, AF - Atrial Fibrrilation, ASD - Atrial Septal Defect, PDA - Patent Ductus Arteriosus, TR - Tricuspid Regurgitation, AR - Aortic Regurgitation, MVP - Mitral Valve Prolpase, CAD - Coronary Artery Disease

Table 3. Maternal Outcome-Complicated 56 (58%), Uncomplicated 41(42)%

Maternal Complications	**56/97(58%)**
Obstetric Events	**31**
Threatened abortion	5(5%)
Antepartum eclampsia	6(6%)
Postpartum eclampsia	1(1%)
Antepartum haemorrhage	4(4%)
Postpartum haemorrhage	5(5%)
Ruptured ectopic	1(1%)
Anemia	3(3%)
Preclampsia	6(6%)
Miscellaneous	**25**
Epilepsy	1(1%)
ARF*	3(3%)
ARF*+Septicemia+Myocarditis	2(2%)
ARF*+Shock+Sepsis	4(4%)
Urinary Tract Infection	1(1%)
Pulmonary Thromboembolism	4(4%)
Heart failure	6(6%)
Sepsis +Myocarditis+Left Ventricular Failure	2(2%)
ARF*+DIC**+Postpartum Cardiomyopathy	1(1%)
Deep Vein Thrombosis	1(1%)

Table 4. Maternal Outcome

Total Pregnancy	**97**
Lower Segment Cesarian Section	**37/97(38%)**
Vaginal Delivery	**39**
Spontaneous Labour	32/97(33%)
Induced Labour	7/97(7%)
Instrumental Delivery	**8**
Ventouse	1/97(1%)
Outlet forceps	7/97(7%)
Termination of Pregnancy	**10**
Septic Abortion	1/97(1%)
Inevitable Abortion	6/97(6%)
Medical Termination of Pregnancy	2/97(2%)
Laparotomy (Salpingectomy)	1/97(1%)
Maternal death	**3/97(3%)**

Table 5. Neonatal Outcome

Live	**81/94(86%)**
Still birth	**13/94(14%)**
Weight	
<1.5 Kg	5(6%)
1.51-2 Kg	19(23%)
2.01-2.5 Kg	23(28%)
2.51-3 Kg	24(30%)
3.01-3.5 Kg	8(10%)
>3.5 Kg	2(2%)

valvular lesion. These observations are similar to other Indian studies (3,4). However, the incidence of RHD in developed countries has been greatly reduced by widespread use of antibiotics effective against the streptocccal infections. Our study indirectly indicates inadequate treatment of streptococcal infections in childhood and adolescence. Echocardiography was done routinely in our patients. 36 patients (37%) in our study suffered multiple cardiac lesions. Echocardiography was helpful for early and accurate evaluation of cardiac lesions.

Most women with cardiac disease would deliver spontaneously. Induction of labour should be considered with due caution in well selected cases to minimise the risk of neonatal or maternal complications. In our study the majority of the patients had to undergo a LSCS. This could possibly be related to the severity of the disease in our patients (*Table 4*).

In this study, 7 patients underwent mitral valve surgery. Three underwent mitral valvotomy and four underwent mitral valve replcement during pregnancy (*Table 2*).

Mortality in pregnant females with cardiac disease is mainly due to cardiac failure and shock. Three females in our series died and the cause of mortality was due to cardiac failure, sepsis and shock.

Perinatal outcomes are usually seen in the form of preterm birth and low birth weight babies. The severity of symptoms during pregnancy is a better indicator of perinatal outcome than the duration and type of heart disease. In our series 21 babies were born who weighted less than 2 Kg and more than 2 Kg in 57 (*Table 5*). There were total of 97 women, out of which 94 delivered 81 live babies and 13 were still birth. There were three maternal deaths. The clinical evaluation of all live births did not show any evidence of congenital heart disease although the risk of such inheritance is quoted to be 3 to 5%.

Despite the potential for significant maternal morbidity, in most patients with cardiac disease, a satisfactory outcome can be expected with careful antenatal, intrapartum and postpartum management (5-6).

Pre-pregnancy diagnosis, counseling, appropriate referral, routine ante-natal supervision and delivery at an equipped centre improve the pregnancy outcome for both the mother and the baby. Cardiac failure is a serious complication and often leads to maternal death. We therefore stress the need to monitor cardiac patients for early detection and management of heart failure throughout the course of pregnancy, labor and puerperium.

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