International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Gahlot K et al. Int J Reprod Contracept Obstet Gynecol. 2016 Sept;5(9):3056-3059
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: http://dx.doi.org/10.18203/2320-1770.ijrcog20162984

Research Article

Pregnancy outcome in women with heart disease at a tertiary referral teaching center in Northern India

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Received: 07 July 2016
Accepted: 05 August 2016

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ABSTRACT

Background: Pregnancy causes a significant burden on cardiovascular system due to hemodynamic changes therefore a diseased heart may not be able to adjust with extra load resulting in heart failure and even maternal mortality.
Methods: A prospective study was done in 50 women with heart disease over a period of 12 months from 2010 to 2011 at G.S.V.M. Medical College, Kanpur. At the first antenatal visit baseline data is recorded included age, parity, gestational age, NYHA class, co-morbid conditions, prior cardiac events, cardiac lesion (if already diagnosed), prior surgery/interventions, cyanosis and medications. A thorough clinical examination and investigations were done.
Results: Maximum numbers of patients (56%) were in the age group 20-24 years. 52 % of patients were primigravida and 48 % of patients were multigravida. Maximum numbers of patients (76.67%) were in the lower socioeconomic group. Chronic rheumatic heart disease (84%) was the most common type of heart disease followed by congenital cardiac disease (14%). Heart disease if diagnosed preconceptionally or during earlier period of gestation both maternal (8.9%) and foetal complications (22.8%) are lesser as compared to patients in whom diagnosis was made late. There is also the significant difference with majority of the foetal complications in group IV (80%) (preterm birth, IUGR and perinatal mortality) as compared to group I (14.2%).
Conclusions: Maternal and perinatal outcome in women with heart disease depends mainly on the functional cardiac status during pregnancy, the risk being greater in NYHA III and IV. Our study shows that surgical intervention or medical management in pregnancy improves the functional class and also improves the maternal and fetal outcomes. Interventions can only be successfully done either before pregnancy or during 2nd trimester. When patients were diagnosed before pregnancy we have enough time for counseling and treatment. Counseling further increase the compliance and acceptance for medical and surgical interventions.

Keywords: Heart disease, Maternal mortality, Neonatal mortality, NYHA, Rheumatic heart disease, Congenital heart disease

INTRODUCTION

Pregnancy causes a significant burden on cardiovascular system due to hemodynamic changes therefore a diseased heart may not be able to adjust with extra load resulting in heart failure and even maternal mortality. Actual risk depends on the type and severity of the particular heart disease.

Cardiac disease complicates 1% to 4% of pregnancies. Despite of continuous advancement in treatment and management of cardio-vascular diseases, it accounts for one third of maternal mortality along with it increases the risk of adverse maternal and foetal outcome.[1]

With the availability of modern surgical facilities and advances in medical management (due to advanced equipment and better drugs) along with intensive

maternal and fetal monitoring the scenario has quite changed.

This study was done with the aim to assess the maternal and fetal outcomes in patients of heart disease with early diagnosis and timely surgical or medical intervention compared to patient with late diagnosis and no interventions.

METHODS

A prospective study was done in 50 women with heart disease over a period of 12 months from 2010 to 2011 at G.S.V.M. Medical College, Kanpur. At the first antenatal visit baseline data is recorded included age, parity, gestational age, NYHA class ,comorbid conditions, prior cardiac events, cardiac lesion(if already diagnosed), prior surgery/interventions, cyanosis and medications. A thorough clinical examination and investigations were done. 17 patients were diagnosed before pregnancy and 33 were diagnosed during pregnancy out of which 14 patients diagnosed during 1st and 2nd trimester while 14 patients diagnosed during 3rd trimester and remaining 5 were diagnosed during labour. No. of patients with RHD were 42 (84%) followed by congenital heart disease i.e. 7 (14 %), one patient was of dilated cardiomyopathy.

RESULTS

Table 1 describes the social and demographic characteristics of the patients with heart disease. Maximum numbers of patients (56%) were in the age group 20-24 years. 52 % of patients were primigravida and 48% of patients were multigravida.

Table 1: Sociodemographic profile of study group.

Age	No.	%
15 - 19	3	6
20 - 24	28	56
25 - 29	16	32
30 - 34	6	12
Parity		
Primigravida	26	52
Multigravida	24	48
Socioeconomic status		
High	3	6
Middle	10	10
Low	17	34

Maximum numbers of patients (76.67%) were in the lower socioeconomic group. Chronic rheumatic heart disease (84%) was the most common type of heart disease followed by congenital cardiac disease (14%). One patient was of dilated cardiomyopathy. Among rheumatic heart disease mitral valve involvement was the most common (Table 2).

Table 2: Distribution of patients according to type of lesion.

	No. of cases (N = 50)	%
MR	3	6
MS	28	56
MS + MR	16	32
MR + MS + AR	6	12
MR + MS + TR		
MS + AR + TR	26	52
ASD	24	48
VSD		
COA	3	6
DCM	10	10

MR - Mitral regurgitation; MS- Mitral stenosis; TR- Tricuspid regurgitation; AR- Aortic regurgitation; AS - Aortic stenosis; ASD - Atrial septal defect; VSD - Ventricular septal defect; COA - Coarctation of aorta; DCM - Dialated cardiomyopathy; This table shows that among valvular heart disease Mitral stenosis was the predominant lesion in most of the patients; MS + MR were the commonest valvular lesion found in the 40% of cases; Among congenital heart disease ASD was the most common lesion i.e. 30%.

Table 3: Distribution of patients according to time of diagnosis and maternal, fetal complications.

Time of diagnosis	Early diagnosis* (n - 31)		Late diagnosis** (n - 19)	
	No.	%	No.	%
Maternal				
Congestive heart failure	2	6.4	6	31.5
Arrhythmia	-		1	5
Mortality	1	3.5	4	21
Fetal				
Preterm	4	12.9	6	31.5
Small for gestational age	1	6.4	6	31.5
Perinatal mortality	2	3.5	3	14

*Early diagnosed group - patient diagnosed before pregnancy and during 1st and 2nd trimester; **Late diagnosed group - patient diagnosed during 3rd trimester or in labour.

Table 3 demonstrates that heart disease if diagnosed preconceptionally or during earlier period of gestation both maternal (8.9%) and foetal complications (22.8%) are lesser as compared to patients in whom diagnosis was made late i.e. 3rd trimester or during labour (maternal - 57%, foetal - 77 %). Table 4 shows that no maternal complications occurred in patients in whom surgical intervention in form of (valvotomy-15, valve replacement-3, ASD patch closure, cardioversion-1, PDA correction 1) were done and these patients tolerated pregnancy well. Out of these 21 patients with surgical interventions, 19 interventions were done before pregnancy and two were done during 2nd trimester. Group II included the compliant patients with medical intervention and complications were observed only in

form of congestive heart failure in 13.3% patients but with no maternal mortality. Group III included the noncompliant patients with medical intervention and complications were observed in form of congestive heart failure (18 %), arrhythmia (9%), and maternal mortality (9%). Group IV included the patients with no medical or surgical intervention and complications were maximum in form of congestive heart failure (40%), arrhythmia (10%), and maternal mortality (30 %).There is also the significant difference with majority of the foetal complications in group IV (80%) (preterm birth, IUGR and perinatal mortality) as compared to group I (14.2 %).

Table 4: Maternal and fetal outcome in patient with medical and surgical interventions.

	Group -1		Group - 2		Group - 3		Late diagnosis	
	No.	%	No.	%	No.	%	No.	%
Maternal								
Congestive heart failure	-		2	13.3	2	18	4	40
Arrhythmia	-		-		1	9	1	10
Mortality *	-		1	6.6	1	9	3	30
Fetal								
Preterm	2	14.2	2	13.3	3	27	3	30
Small for gestational age	-		2	13.3	3	27	3	30
Perinatal mortality	-		1	3.5	1	9	2	20

Group - 1 = Patients with surgical intervention; group - 2 = Patients with medical management and compliant; Group - 1 = Patients with medical management and non - compliant; Group - 1 = Patients newly diagnosed nearly at term or in labour; *Mortality in 5 patients - 4 = Due to congestive heart failure and 1 = arrhythmia.

Table 5: Materanal and fetal outcome in relation to NYHA class.

	NYHA -I		NYHA -II		NYHA -III		NYHA -IV	
	No.	%	No.	%	No.	%	No.	%
Maternal								
Congestive heart failure	-		2	5.7	3	18	3	50
Arrhythmia	-		-		1	9	1	16.6
Mortality	-		1	3.5	2	9	2	33.3
Fetal								
Preterm	1	20	5	17.8	2	27	2	33.3
Small for gestational age	-		4	14.2	3	27	1	16.6
Perinatal mortality	-		1	3.5	1	9	2	33.3

Table 5 describes the relationship between maternal and foetal complications including mortality according to NYHA class i.e. severity of the maternal heart disease. No maternal complications occurred in NYHA class I where as 50% of patients had congestive heart, failure in NYHA class IV. Maternal mortality (33%) was significantly increased in NYHA class IV. Foetal complications were found to be more in NYHA class IV (82%) as compared to class I (20%).

DISCUSSION

At our centre during a period of 12 months the prevalence of heart disease was 1.13 % which was in correlation with the study done by Asghar F et al (0.98%).[2] Rheumatic heart disease is still the most common heart disease in our country followed by congenital heart disease Bhatla N et al.[3] The ratio of rheumatic heart disease to congenital heart disease in our study was 4:1. Mitral stenosis (MS) was the predominant lesion in many studies Hameed A et al, Sawhney H et al, Asghar F et al being 69.6%, 89.2% and 42% respectively.[1,2,4] In our study also MS was predominant in 50.6 % of the cases. Early detection, evaluation and prevention of precipitating factors are important in reducing complications.

The functional class has a direct bearing on both the maternal and foetal outcome. 34% of the women in our study were in NYHA class III and IV compared to 22.3% in a series by Sawhney H et al.[4] Congestive cardiac failure was seen in 8 women (16%) as compared to 38% in the series by Hameed A et al and 20% in the study by Asghar F et al, arrhythmia was seen in 4% of cases, maternal mortality 10%, of which occurred in NYHA class III and IV ,this was in correspondence with Sawhney H et al who reported a maternal mortality rate of 2%, of which occurred in NYHA class III and IV. Overall cardiac complication rate in our study was 15.62% which is very similar to 13% reported by Siu SC et al.[1,2,4,5]

In our study 85.4 % of the women had vaginal delivery as compared to 86%, 91.42%, and 92% in other studies Hameed A et al, Sawhney H et al, Asghar F et al.[1,2,4] Caesarean section (14.6 %) was done mainly for obstetric indications. Forceps and ventouse assisted deliveries were performed in 16.2 % patients. Any form of cardiac surgery during pregnancy is avoided untill unless the cases are refractory to all type of medical treatment. Percutaneous balloon mitral valvotomy is less invasive and is safe and effective during pregnancy. Maternal complications were significantly reduced (18% versus 60%) in patient with medical or surgical interventions as compared to patients with noncompliant or diagnosed late in pregnancy this was in correspondence with study reported by Nercolini et al and Arnoni et al.[6,7] All the women improved by at least one functional class by surgical intervention, compared to 82% in the Chandigarh study Sawhney H et al.[4] Elkayam et al has concluded that, PBMV should be done in severe symptomatic women with MS who do not respond to medical therapy.[8]

Preterm labour was seen in 20% in our study. The corresponding incidence in other studies was 14% Asghar F et al, 12% Sawhney H et al and 23% Hameed A et al.[1,2,4] In our study, small for gestational age was seen in 16% compared to 18.2% Sawhney H et al and 21% Hameed A et al in others.[1,4] There was a significant difference in the perinatal outcome between NYHA class I, II and III, IV in our study. The perinatal mortality rate in our series was 3.5 % in class I and II compared to 14% in class III and IV. The perinatal mortality in study done by Sawhney et al was 2% in NYHA class I and II and 8% in class III and IV. Foetal complications (22.8 % versus 77%) were significantly reduced in patient with medical or surgical interventions as compared to patients who were noncompliant or diagnosed late in pregnancy this was in accordance with Pratibha et al.[1,4,9]

CONCLUSION

Maternal and perinatal outcome in women with heart disease depends mainly on the functional cardiac status during pregnancy, the risk being greater in NYHA III and IV. Our study shows that surgical intervention or medical management in pregnancy improves the functional class and also improves the maternal and fetal outcomes. In view of the high risk of low birth weight, preterm delivery, intrauterine growth restriction, IUD and still birth, antenatal foetal surveillance becomes mandatory and should be offered to these women with heart disease. Management of valvular heart disease during pregnancy is challenging. A thorough knowledge of the expected natural history of the disease during pregnancy and of the possible treatment options is required for clinical decision making. Surgical interventions can only be successfully done either before pregnancy or during 2nd trimester. When patients were diagnosed before pregnancy we have enough time for counselling and treatment. Counseling further increase the compliance and acceptance for medical and surgical interventions which results in optimal outcome of the pregnancy for the mother and the baby.

ACKNOWLEDGEMENTS

Authors would like to thank Dr. Sikha Pandey, Dr. Nidhi Mishra, Dr. Sheela Jain and Dr. Sona Singh as consultant in Department of Obstetrics And Gynaecology, B.M.C., Sagar to guide in preparing this menucript. Authors also acknowledge Mr. Indal Singh for his assistance in statistical work.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Gahlot K, Singh PP, Pandey K. Pregnancy outcome in women with heart disease at a tertiary referral teaching center in Northern India. Int J Reprod Contracept Obstet Gynecol 2016;5:3056-9.