International Journal of Clinical Obstetrics and Gynaecology

ISSN (P): 2522-6614
ISSN (E): 2522-6622

www.gynaecologyjournal.com
2020; 4(1): 101-104
Received: 16-11-2019
Accepted: 20-12-2019

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Maternal and fetal outcomes in rheumatic heart disease in pregnancy

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DOI: https://doi.org/10.33545/gynae.2020.v4.i1b.449

Abstract
Cardiac disorders complicate approximately 1-3% of pregnancies. Because more women with heart disease are reaching childbearing age due to improved medical and surgical care, and desire children, the incidence and prevalence of cardiovascular disease in pregnancy is increasing. Rheumatic heart disease (RHD) continues to be a major cause of cardiac illness in developing countries.

Methods: A retrospective study was conducted at RL Jalappa Hospital from January 2015 to December 2018. Total 90 women were identified as having a cardiac disorder. The women underwent clinical examination, ECG and echocardiography. Out of the 90 women, 54 women were identified with rheumatic heart disease. Their antenatal course, labor and delivery details, postnatal course and complications were systematically recorded. The immediate perinatal outcome was also documented. Statistical analysis was done using the SPSS software.

Results: In this study of 54 pregnant women with RHD.

- The incidence of heart disease was 0.96% for all deliveries during our study period.
- The incidence of RHD was 60%
- 65.1% of women gave a history of rheumatic fever
- The most common valvular lesion was mitral stenosis.
- There were more preterm births and low birth weight babies in the not-operated group.
- Women with mechanical valves had good maternal and fetal outcomes.

Conclusion: The incidence of heart disease was found to be 0.96%. Rheumatic heart disease constituted for 60% of heart disease in pregnancy. Mitral stenosis has been found to be the dominant lesion in RHD. Pregnant women with mitral stenosis still are at relatively high risk of experiencing maternal complications. Early interventional treatment (balloon mitral valvulotomy or surgery) prior to conception has been recommended to patients with severe mitral stenosis who wish to get pregnant.

Keywords: Rheumatic heart disease, pregnancy, cardiac disease, mitral stenosis

Introduction

Cardiac disorders complicate approximately 1-3% of pregnancies [1]. Because more women with heart disease are reaching childbearing age due to improved medical and surgical care, and desire children, the incidence and prevalence of cardiovascular disease in pregnancy is increasing. Rheumatic heart disease (RHD) continues to be a major cause of cardiac illness in developing countries.

A multicentric epidemiologic study, published in 1996 by the Indian Council of Medical Research gave the national average of RHD prevalence as 6 per thousand in the age group of 5-16years [2] In India, the rheumatic heart disease contributes to approximately 69% of cardiac disorders seen in pregnancy [3] In many cases, the heart disease is diagnosed only at the time of pregnancy, as it is the first contact of the woman with a health care facility. The maternal mortality rate in women with cardiac disease is as high as 7%, and morbidity rate higher than 30% during pregnancy [4].

The purpose of this study was to analyze the antepartum, intrapartum and postpartum course of women with rheumatic heart disease; and study the factors affecting the maternal and perinatal outcomes.

Materials and Methods

A retrospective study was conducted at R L JALAPPA Hospital, which is a tertiary care rural hospital in south India.

Patient records from January 2015 to December 2018 were retrieved from the Medical records department. 90 women were identified as having a cardiac disorder. The women underwent clinical examination, ECG and echocardiography. Out of the 90 women, 54 women were identified with rheumatic heart disease. Baseline characteristics of the women, such as the age, parity, NYHA class at booking, gestational age at first visit, history of cardiac complications before pregnancy, cardiac medications and anticoagulation, prior history of cardiac surgery/interventions and nature of the cardiac lesion were noted. Their antenatal course, labor and delivery details, postnatal course and complications were systematically recorded. The immediate perinatal outcome was also documented. Statistical analysis was done using the SPSS software.

Results

In this study of 54 pregnant women with RHD:

- The incidence of heart disease was 0.96% for all deliveries during our study period.
- The incidence of RHD was 60%
- 65.1% of women gave a h\o rheumatic fever
- The most common valvular lesion was mitral stenosis.
- There were more preterm births and low birth weight babies in the not-operated group.
- Women with mechanical valves had good maternal and fetal outcomes.

Table 1: Incidence of Heart Disease

Total no of Deliveries	Heart Disease	Incidence
9375	90	0.96%

Table 2: Incidence of Rheumatic Heart Disease

Heart Disease	Patients with RHD	Percentage
90	54	60%

Table 3: Rheumatic Fever and RHD

Patients with RHD	H\O Rheumatic Fever	Percentage
54	35	65.1%

Table 4: Operated vs Non-Operated RHD

Rheumatic Heart Disease	No of Patients	Percentage
operated	19	34.9%
Not Operated	35	65.1%
Total	54	100%

Table 5: Type of Surgery for Mitral Valve Lesions

Rheumatic Heart Disease	Operated	Percentage
Closed Mitral Commissurotomy	15	78.7%
Balloon Mitral Valvuloplasty	1	5.4%
Mitral Valve Replacement	2	10.5%
Open Mitral Valvotomy	1	5.4%

Table 6: Type of Lesion

Type of Lesion	Number	Percentage
Mitral Stenosis	25	46.3%
Mitral Regurgitation	11	20.3%
Combined Mitral Valve Lesions	9	16.7%
Multivalvular Lesions	9	16.7%

Table 7: Age

Age	Number	Percentage
< =20 Yrs	2	3.7
21-24 Yrs	32	59.3
25-28 Yrs	15	27.7
>= 30 Yrs	5	9.3

Table 8: Severity

Severity (Echo)	Number	Percentage (%)
Mild	3	5.6
Moderate	25	46.3
Severe	26	48.1

Table 9: NYHA classification

NYHA Classification	Number	Percentage (%)
I	2	3.7
II	42	77.8
III	7	12.9
IV	3	5.6

Table 10: Pregnancy outcome

Pregnancy Outcome	Number of Patients	Percentage (%)
Normal labor	32	59.3
Outlet Forceps	11	20.3
LSCS	9	16.7
Spontaneous Abortions	2	3.7

Table 11: Maternal Complication in RHD

Complications	Operated		Not operated	
	No	percentage	No	percentage
Preterm	1	1.8	6	11.1
PIH	1	1.8	2	3.7
CCF	1	1.8	4	7.4
Arrhythmia	0	0	0	0
Embolism	0	0	1	1.8
Fever	0	0	3	5.5
Anemia	2	3.7	6	11.1

Table 12: Birth Weight in RHD Operated vs Non-Operated.

Birth weight	Operated		Not operated		Total	
	No	percentage	No	percentage	No	percentage
<= 1	0	0	0	0	0	0
1-1.4	0	0	2	3.7	2	3.7
1.5-2	1	1.8	8	14.8	9	16.6
2.1-2.4	4	7.4	7	12.9	11	20.3
>=2.5	14	25.9	15	27.8	29	53.7

Table 13: Low Birth Weight in Operated vs Not Operated RHD

	operated	Not operated
No of births	18	32
Wt <2.5kg	6	17
Percentage	33.3	53.1

Table 14: Preterm Births in Operated vs Non-Operated RHD.

	operated	Non operated
No of births	18	32
Preterm	1	6
Percentage	5.5	18.7

Table 15: Perinatal Complication in RHD Operated vs Non-Operated

Complications	Operated	Not operated
IUD	0	1
Still birth	1	0
Sepsis	0	2
Hyperbilirubinemia	0	1
Birth Asphyxia	1	2
RDS	0	3

Table 16: Perinatal Mortality in RHD Operated vs Not Operated

	operated	Not operated
No of Births	18	32
Perinatal death	1	4
percentage	5.5	12.5

Table 17: Maternal Mortality in RHD.

	No of Patients	No of Deaths
No of Patients	54	3
Percentage	100	5.5%

Discussion

The incidence of heart disease was found to be 0.96%. This is comparable with other similar studies.

Table 18: Indents of heart Decease

Mudaliar and Menon, 2005	0.97%
Williams, 2005	1%
Present study	0.96%

About 54 women with rheumatic heart disease were included in this study. Rheumatic heart disease constituted for 60% of heart disease in pregnancy. A study by Batla N *et al.* in 2003 showed 88% incidence of RHD.

Table 19: Rheumatic heart decease

Batla N 2003	88%
Present study	60%

Rheumatic Fever and RHD

In our study 65.1% of patients with RHD gave a h\o prior rheumatic fever. This is comparable to 60% incidence quoted in CMDT 2007.

Table 20: Rheumatic fever

CMDT 2007	60%
Present study	65.1%

Type of Lesion

Mitral stenosis has been found to be the dominant lesion in RHD. Sawhney *et al.* showed that mitral stenosis was the most predominant lesion (89.2%) in 486 patients. Batla *et al*. in 2003 had a 34.2% incidence of mitral stenosis in pregnancy. In our study involving 54 patients, mitral stenosis was the predominant lesion (46.3%).

Table 21: Mitral stenosis

Study	Dominant Mitral Stenosis (%)
Shawney *et al*. 2003	89.2%
Batla *et al*. 2003	34.2%
Present study	46.3%

Table 22: Severity and Functional Class

Reference	Nyha I and II (%)	Nyha III and IV (%)
Shawney *et al.* 2003	77.4	22.6
Batla *et al.* 2003	84.5	15.5
Present study	81.5	18.5

From the above references it is clear that most patients belonged to NHYA I and II. However, in our study eighteen (35.4%) of patients had severe valvular anatomical disease, but only ten (18.5%) belonged to NYHA class III and IV. Hence anatomical severity did not correlate with functional class

Table 23: Preterm

Shawney *et al*. 2003 (9)	12%
Present study	12.9%

The incidence of preterm labour was comparible in both studies. However, in our study we found a significant association ($P< 0.05$) in incidence of preterm babies in the not-operated (18.7%) vs operated group (5.5%).

Table 24: Fetal Complications

Batla *et al.* 2003 (7)	20.28%
Present study	20.5%

The incidence of fetal complications is comparable in both studies. We found a significant association ($P< 0.05$) in the incidence of low birth weight babies in the operated (53.1%) vs not-operated (33.3%) group in our study.

Table 25: Perinatal Mortality

Reference	Perinatal Mortality
Deepak Lahiri *et al*. 1995 [10]	5.4%
Present study	8.5%

Table 26: Maternal Mortality

Shawney *et al.* 2003	2.05%
Silversides CK *et al*. 2003 [11]	5-7%
Present study	5.5%

The maternal mortality is comparable in both studies. There were totally 3 maternal deaths.

According to this study, pregnant women with mitral stenosis still are at relatively high risk of experiencing maternal complications. The results shown are consistent with those reported by other studies.

The association of the pre pregnancy functional class with the risk of maternal events raises attention to the possibility of reducing these complications in pregnant women with mitral stenosis by means of early interventions aimed at improving their functional class.

The mitral valve area was also strongly significantly associated with the risk of maternal events. If the mitral valve area was the only determining risk factor for events in these patients, the correction of high-degree stenosis should correspond to a pronounced reduction of the occurrence of maternal complications during pregnancy and puerperium.

Based on this assumption and with the purpose of reducing the gestational risks, interventional treatment (balloon mitral valvulotomy or surgery) prior to conception has been recommended to patients with severe mitral stenosis who wish

to get pregnant. However, like in the present study, usually women with mitral stenosis are referred for cardiological follow-up only after diagnosing pregnancy.

Taking these facts and the low incidence of complications observed when the balloon mitral valvuloplasty is done during pregnancy this procedure should be seriously considered for all types of valve area, independently of their functional class, particularly if we take into account that acute lung edema can be the first clinical manifestation of mitral stenosis during pregnancy.

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