Original article

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Obstetric outcome in patients with rheumatic heart disease: experience of a tertiary hospital.

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Abstract

Background and Aims: Pregnancy in patients with rheumatic heart disease has always been challenging. Haemodynamic changes in pregnancy with diseased heart may cause adverse maternal and fetal outcome.
Methods: A prospective study was done in pregnant women with rheumatic heart disease over a period of 2 years from 2015 to 2016 at Tribhuwan University Teaching Hospital, Kathmandu. Baseline data collected at antenatal period were analyzed with obstetric outcomes.
Results: A total of 85 women were enrolled in this study. Sixty percent of the women were primigravida. Mitral stenosis was the commonest lesion (69.41%), followed by mitral regurgitation (25.88%) and aortic stenosis (4.71%). Cardiac events were noted in 32 patients out of which 11 developed pulmonary oedema and 6 had new onset of atrial fibrillation. Vaginal delivery (58.82%) was the commonest mode of delivery followed by cesarean section (24.7%). Eighty percent of women remained in NYHA functional class I and II, whereas 20% had deterioration of functional class. There were more maternal and fetal complications in women with NYHA III or IV in comparison to women with NYHA I or II. Low birth weight infants were found in 37.64% of cases. There was one maternal death in a lady with severe mitral stenosis with moderate mitral regurgitation due to congestive heart failure at 34 weeks of gestation. There were 8 fetal and 11 neonatal death
Conclusions: Functional cardiac status during pregnancy has a major impact on maternal and fetal outcome. Rheumatic heart disease diagnosed before pregnancy may improve the outcome.

Key words: Fetal; Maternal; Outcome; Pregnancy; Rheumatic Heart Disease.

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Introduction

Heart disease complicates 1% of all pregnancies[1-2]. Cardiac abnormalities are considered the leading non-obstetric cause of maternal morbidity and mortality[3]. Though rare in developed country, rheumatic heart disease is still predominant in developing countries and continues to be a major cause of maternal morbidity and mortality[1,4-5].

The hemodynamic changes of pregnancy can have a negative impact on maternal health, especially in women with preexisting cardiac disease as the diseased heart may not be able to adjust with extra load resulting in heart failure and even in mortality. Women with rheumatic heart disease, especially significant mitral stenosis tolerate pregnancy poorly[6]. Pregnancy counseling and management of women with heart disease is being increasingly recognized as important aspect of their overall cardiac care. Clear risk stratification influences therapeutic decisions during pregnancy as does counseling about future gestations.

Being a tertiary hospital, Tribhuvan University Teaching hospital receives a significant number of pregnant women with rheumatic heart lesions. A detail study of their obstetric outcome can lead to a multidisciplinary approach aiming to improve maternal and fetal outcome.

Methods:

This is a prospective observational study carried out at Tribhuvan University Teaching Hospital during January 2015 and December 2016. The study was designed as a prospective evaluation of pregnancy outcome in patients with rheumatic valvular heart disease.

After getting approval from institutional ethical committee, the study was carried out for a period of two years. During that study period, all pregnant women with rheumatic heart disease were screened. Those with associated other congenital heart diseases, who already underwent valve repair or replacement without residual valvular lesions, post-PTMC mitral valve orifice area of more than 1.5 cm^2 and those women who did not have antenatal visit were excluded from the study. Proper informed consent from each patient was taken before data collection at antenatal clinics. All patients with valvular heart lesions were enrolled at second trimester and were followed till delivery unless the patient had experienced a change in clinical status or undergone intervention. An obstetrician and a cardiologist examined the registered antenatal patients every two weeks up to 28 weeks and then weekly till delivery. Diuretics, Digoxin and Metoprolol were continued for their cardiac pathology and all other medicines were stopped. Admissions

prior to delivery for worsening cardiac status were recorded. Women with NYHA class III and IV were admitted irrespective of period of gestation and all other pregnant women at 36 weeks, irrespective of class for safe delivery. Pregnancy was allowed to continue till term in uncomplicated patients. Induction of labour was done only for obstetric indications.

Women in active stage of labour received prophylactic antibiotic (Ampicillin and Gentamycin) for the prevention of bacterial endocarditis. Patients received intermittent oxygen, kept in propped up position with ECG monitor. Epidural analgesia was used for pain relief. The second stage was cut short with use of either vacuum or outlet forceps. After the delivery patients received injection Lasix 20 mg iv in bolus and were kept in labour room for minimum period of 2 hours.

Their obstetric outcomes were recorded accordingly. Following maternal outcomes were sought for: 1) new onset of congestive heart failure, 2) new onset or exacerbation of arrhythmia, 3) worsening in NYHA functional class, 4) preterm delivery, 5) admission in CCU before or after delivery, 5) thromboembolism and 6) maternal death. Similarly, fetal outcomes were 1) prematurity (delivery before 37 weeks), 2) low birth weight, 3) intrauterine fetal death and 4) neonatal death.

Data were recorded and analyzed using statistical tool SPSS version 20.

Results:

The incidence of heart disease was 0.94% for all 10960 deliveries during our study period. Among 103 pregnant women with structural cardiac abnormalities, only 85 patients met the inclusion criteria and enrolled in the study. Their mean age was 27.34 years (range: 17- 39 years) and majority were privigravida (60%).

Rheumatic mitral pathology was the prevailing pathology in those women (Table 1).

Table 1: Types of Rheumatic valvular pathology in pregnant women.

S/n	Cardiac pathology	Number of patients	Percentage
1	Mitral stenosis (less than 1.5 cm^2)	50	58.82
2	Post PTMC residual significant mitral stenosis	9	10.59
3	Mitral regurgitation with or without mitral stenosis	22	25.88
4	Aortic stenosis	4	4.71
	Total	85	100

PTMC: *Percutaneous Transseptal Mitral Commissurotomy*

Despite of prior PTMC, 9 women had symptomatic mitral stenosis with mitral valve area of less than 1.5 cm^2. Tricuspid regurgitation was found in 23 women, among whom 3 women had moderate (2 women) and severe (1 woman) pulmonary hypertension. Majority of women remained in NYHA class I or II throughout the pregnancy (Chart I). Twelve women were admitted to the hospital prior to the delivery for the management of congestive heart failure.

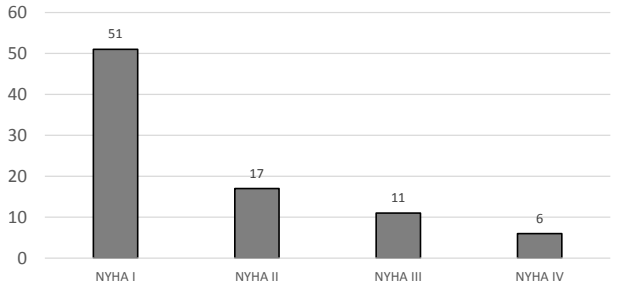

Chart I: *NYHA functional status of the pregnant women throughout pregnancy.*

Atrial fibrillation was present in 16 women with mitral stenosis and all but one was multigravida. Among them 5 were in NYHA class II, 6 were in NYHA class III and 5 were in NYHA class IV. Among them 19 (22.35%) had preterm labour. Fifty women had normal vaginal deliveries followed by caesarian section in 21 women. There were 8 intrauterine fetal deaths. All 11 neonatal deaths were due to prematurity. The details of obstetric parameters were illustrated in table 2.

Table 2: Obstetric outcomes in women with rheumatic heart disease.

S/n	Obstetric parameters	Number
1	Mean Gestational age at labour (weeks)	37.22
2	Number of women in Preterm labour	19 (22.35 %)
3	Vaginal delivery	50 (58.82 %)
4	Cesarean section	21 (24.7 %)
5	Vacuum delivery	10 (11.76 %)
6	Forceps delivery	4 (4.7%)
7	Birth weight (Kg)	
	< 2 kg	13
	2- <2.5 kg	21
	2.5- 3 kg	26
	>3 kg	25
8	Low birth weight babies	34 (40%)
9	Intrauterine fetal death	8 (9.4%)
10	Still birth	0 (0%)
11	Apgar at 5 min	9/10
		< 8/10
12	Neonatal death	11 (12.94 %)
13	Prematurity	19 (22.35%)

Pregnancy-induced hypertension (PIH) was the most common non-cardiac maternal complication (12.94%) whereas congestive heart failure (CCF) with pulmonary oedema was the commonest cardiac complication (12.94%). Details of maternal complications are given in Table 3. There was one maternal death at 34 weeks of pregnancy due to congestive cardiac failure with pulmonary oedema. She was in NYHA functional class IV and had severe mitral stenosis (MVA= 0.7 cm2) with severe tricuspid regurgitation and severe pulmonary hypertension.

Table 3: Non-cardiac and cardiac complications in pregnant women with rheumatic heart disease.

S/n	Complications	Number of women (%)
Non-cardiac complications		
1	Anaemia	6 (7.05%)
2	Pregnancy induced hypertension	11 (12.94%)
3	Abruption of placenta	0 (0%)
4	Post-partum haemorrhage (PPH)	6 (7.05%)
Cardiac complications		
5	CCF	11 (12.94%)
6	Paroxysmal atrial fibrillation	6 (7.05%)
7	CCU admission after delivery	19 (22.35%)
8	Maternal death	1 (1.17%)

There was more cases of maternal as well as fetal complications in women with higher NYHA functional classes. The details are given in table 4.

Table 4: Maternal and fetal outcome in relation to NYHA functional class in pregnant women with rheumatic heart disease.

	NYHA-I n= 51 (60%)	NYHA-II n=17 (20%)	NYHA-III n=11 (12.94%)	NYHA-IV n=6 (7.06%)
Maternal				
CHF	-	-	7 (63.64%)	4 (36.36%)
Arrhythmia*	-	3 (17.64%)	8 (72.7%)	5 (83%)
Paroxysmal AF	-	-	2 (33.3%)	4 (66.7%)
Mortality	-	-	-	1 (100%)
Fetal				
Preterm delivery	-	6 (31.58%)	8 (42.11%)	5 (26.32%)
Low birth weight babies	3 (8.82%)	14 (41.18%)	11 (32.35%)	6 (17.65%)
IUFD	---		5 (62.5%)	3 (37.5%)

**Arrhythmia: Except paroxysmal atrial fibrillation and permanent atrial fibrillation with controlled ventricular rate, all other types of arrhythmia, like atrial fibrillation with fast ventricular rate, supraventricular tachycardia and ventricular tachycardia were included in this entity*

Discussion:

The prevalence of rheumatic heart disease in pregnant women is found to be similar in developing countries and among rheumatic heart disease, mitral stenosis was the commonest finding during pregnancy[1-2,7-9]. Although a significant number of patients with rheumatic heart disease had serious valve lesions they showed favourable characteristics to prognosis of gestation, such as young age, sinus rhythm, normal myocardial function, better NYHA functional class (I or II). Besides medical treatment, even surgically corrected valvular lesions with PTMC tolerated pregnancy well without any significant mortality and morbidity in terms of both mother and fetus.

Though with prior pre-conceptional counseling along with frequent antenatal and cardiac visit, need of drug improvement or change in management, admission in hospital if required, increasing awareness among patients and their family, at present pregnancy is not contraindicated in most of the cases of rheumatic heart pathologies. Obstetricians are taking all preventive measures for a safe motherhood but despite of improved care still patients arrive late in pregnancy for obstetric care often in third trimester with even noncompliance of drugs which were being taken prior to pregnancy or may be the continuation of drugs like enalapril, metoprolol which may be the reason that IUGR and fetal death was found to be high in our study. The deterioration of functional class and the maternal mortality (1.17%) and other complications like new onset paroxysmal atrial fibrillation (7.05%), other arrhythmias (18.82%) and CCF (12.94%) were found more in functional class III and IV, though there were less women in those functional classes. Similar results have been found in studies done by various authors[1-2,7-8].

NYHA functional class I and II has always been found to be the indicator of good pregnancy outcome. There was no maternal and only one low birth weight as fetal complication in women with NYHA functional class I category, which was found in other study too[10]. The functional class has a direct relation on both maternal and fetal outcome. In our study, 20.4% of women were in NYHA functional class III and IV compared to 22.3% in a series by Sawhney H et al[1]. Congestive heart failure (CCF) was seen in 11 women (12.94%) as compared to 20% and 38% in different series from developing countries[11-12]. Maternal mortality (1.17%) in our study was due to CCF with pulmonary oedema and this finding was similar to the study by Sawhney H et al1. Overall cardiac complication rate in our study (38.82%) is higher in comparison to 13% reported by Siu SC et al[9]. This may be due to late arrival of patients without any antenatal care from far remote areas along with noncompliance of drugs due to low socioeconomic status and education.

Cardiac arrhythmias without structural lesions usually present favourable maternal and fetal outcomes. In our study arrhythmias were treated with verapamil and/or propranolol and were not associated with any adverse fetal and maternal outcomes as observed in other study[13]. Maternal cardiac complications during pregnancy were arrhythmias and congestive heart failure. Their occurrence and frequencies were similar to other studies[1,4,14].

An increased incidence of low birth weight babies have been reported in patients with heart disease in pregnancy[7,15]. In our study low birth weight (37.64%), prematurity (22.35%) and fetal death (10.5%) were all found to be increased in patients with valvular lesions in comparison to normal population; which may be due to placental insufficiency, hypoxia, drugs used like beta blockers, diuretics, and digitalis. Overall neonatal complications were found to be increased in patients with heart disease which has been supported by various authors[15].

Conclusion:

Rheumatic heart disease in pregnancy is a high risk condition and has a major impact on pregnancy outcome. Functional cardiac status during pregnancy has a major impact on maternal and fetal outcome. Rheumatic heart disease diagnosed before pregnancy may improve the outcome. Proper evaluation of maternal prognosis prior to conception and adequate follow up during pregnancy are both fundamental measures for obtaining a satisfactory outcome in these patients.

Limitations:

Due to small number of pregnant women with rheumatic heart disease, we could not show the statistical differences in the maternal as well as in the fetal outcome in relation to the severity of cardiac condition. Non-uniformity of rheumatic lesions and vast differences in severity and symptoms must be another limiting factor for this study.

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