Clinical Profile of Rheumatic Mitral Valvular Heart Disease in Pregnancy

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ABSTRACT

Background: Rheumatic heart disease is the most frequent acquired heart disease encountered in pregnant women. This study is conducted to study the clinical profile of rheumatic mitral valvular heart disease in pregnancy.

Method: It is an observational study done in tertiary care hospital in Miraj, Maharashtra, India in 50 Pregnant patients from October 2012 to October 2013 of either newly diagnosed or previously known case of rheumatic heart disease and are thoroughly examined and investigated with fresh ECG and 2D Echocardiography and subsequently followed up to assess the outcome in these patients.

Results: Observations are made with respect to their age distribution, symptoms, signs, gravida, socioeconomic status, complications, and maternal and fetal outcome.

Conclusion: 1. Maximum patients were in age group of 26-30 years pointing towards high incidence of rheumatic mitral valvular disease in 3rd decade of life. Most of the patients were primigravida. Brethlessness was most common symptom and most common sign was murmur. Maximum patients were in Kuppuswami's lower class of socioeconomic status. Most commonly encountered lesion is mitral stenosis. Congestive cardiac failure and atrial fibrillation are common complications in pregnant rheumatic mitral valvular heart disease.

2. Incidence of maternal complications like congestive cardiac failure, pulmonary thromboembolism was much less in operated group of patients than in non-operated group. This was found to be statistically significant. Also incidence of low birth weight, preterm delivary were also less in patients operated for rheumatic mitral valvular heart disease. Incidence of maternal and fetal complications was much less in operated group of patients and outcome in operated patients was better than non operated patients.

3. Statistically significant correlation was found in incidence of atrial fibrillation and size of left atrium.

4. 66% patients delivered by spontaneous vaginal delivery .66.66% babies had normal birth weight. Hence every patients of rheumatic mitral valvular heart disease should be given trial of normal labor.

5. Thromboembolism, stroke and congestive cardiac failure, acute pulmonary edema are common causes of maternal mortality in rheumatic mitral valvular heart disease. Fetal outcome depends on maternal tolerance of cardio vascular instability due to rheumatic mitral valvular heart disease.

INTRODUCTION:

In developing countries 75% maternal mortality are those resulting from direct obstetric causes and remaining are due to indirect causes like anemia, cardiac disease ,viral hepatitis etc. In indirect causes, heart disease remains important cause of maternal mortality.

Rheumatic heart disease is the most frequent acquired heart disease encountered in pregnant women. RHD is the main cause of valvular disease in young women and mitral stenosis is the most frequently encountered which is particularly important because it is the most poorly tolerated valvular heart disease in pregnancy[1].

This study is conducted to study the clinical profile of rheumatic mitral valvular heart disease in pregnancy.

AIMS AND OBJECTIVES:

- To study the signs and symptoms in patients with rheumatic mitral valvular heart disease in pregnancy.
- To study the complications of rheumatic mitral valvular heart disease in pregnancy.
- To study clinical features, ECG findings and Echocardiography in rheumatic mitral valvular heart disease in pregnancy.
- To study maternal and fetal morbidity and mortality in rheumatic mitral valvular heart disease in pregnancy.

MATERIAL AND METHODS:

The present study was conducted between October-2012 and October-2013 on 50 pregnant females with rheumatic mitral valvular heart disease in government medical college and hospital. Miraj, Maharashtra, India. Those patients

with either previously diagnosed or newly diagnosed rheumatic valvular heart disease were included in the study.

INCLUSION CRITERIA:

Diagnosed cases of rheumatic mitral valvular heart disease in pregnant female irrespective of gestational age and pregnant females of rheumatic mitral valvular heart disease who were previously operated or those who were operated during pregnancy.

EXCLUSION CRITERIA:

- Pregnant females with mitral valve disease due to non rheumatic cause.
- Pregnant females with Multivalvular heart disease.
- Pregnant females with Ischemic heart disease.
- Pregnant females with Peripartum cardiomyopathy.
- Pregnant females with congenital heart disease.
- Pregnant females with medical illnesses like Anemia, Thyroid disorder, Hypertension, Diabetes mellitus, Bronchial asthma.
- Chronic disabling medical illness like malignancy, chronic renal failure, chronic liver disease.
- Pregnant females with Eclampsia or Pre-eclampsia.

All pregnant females attending ante natal clinics and admitted for obstetric causes were screened and subjected for relevent investigations.

Those patients fulfilling the following criteria were screened.

Symptoms

Severe or progressive dyspnea
Progressive orthopnea
Paroxysmal nocturnal dyspnea
Syncope on exertion
Hemoptysis
Chest pain related to effort or emotion

Signs

- Cyanosis
- Clubbing
- Persistent neck vein distension
- Systolic murmur of grade >3/6
- Diastolic murmur
- Cardiomegaly
- Sustained arrhythmias
- Persistent split second heart sound
- Pulmonary hypertension

Patients with following finding were considered for ECG and 2D ECHO:

- a diastolic pre systolic or continuous murmur
- unequivocal cardiac enlargement
- loud harsh systolic murmur associated with thrill
- severe arrhythmias

Findings on electrocardiogram (ECG)

P mitrale in Left atrial enlargement
Right Ventricular Hypertrophy
Atrial fibrillation

Right QRS axis deviation

Left axis deviation
ST segment and T wave changes
Small Q wave and inverted P wave in lead 3
Increased R wave amplitude in lead v2
Frequent sinus tachycardia

Patients were thoroughly examined with symptomatology, signs and complications. General and systemic cardiovascular examination was done.

Every patient was screened with routine laboratory investigations, complete hemogram, Thyroid function test and Blood cultures when indicated and patients were divided according to socioeconomic class using Kuppuswami scale.

Echocardiography –

2D Echocardiography of patients was done and were diagnosed of rheumatic mitral valve disease. Those patients who were previously diagnosed with mitral rheumatic heart disease were also screened for fresh valvular involvement and complications.

Three methods of echocardiography were used to diagnose and assess the severity of mitral valve involvement.

2-Dimensional echocardiography (2-D Echo)
M-mode echocardiography (M-mode Echo)
Colour doppler echocardiography

2-D echo, M-mode echo and colour Doppler echocardiography are sensitive and specific for the diagnosis of mitral stenosis, for assessing the chamber enlargement, valve pathology, valve movement, size of mitral valve orifice, ruling out clot or thrombus in left atrium and conditions which mimic mitral stenosis.

Mitral valve area	Severity of mitral stenosis
1.5-2.5cm2	Mild MS
1.0-1.5cm2	Moderate MS
< 1cm2	Severe MS

Patients were classified according to socioeconomic status with the help of Kuppuswami scale[2].

Education	Score	
Professional or Honours	7	
Graduate or Post-Graduate	6	
Intermediate or Post-High-School Diploma	5	
High School Certificate	4	
Middle School Certificate	3	
Primary School or Literate	2	
Illiterate	1	
Occupation	**Score**	
Profession	10	
Semi-Profession	6	
Clerical, Shop-owner, Farmer	5	
Skilled worker	4	
Semi-skilled worker	3	
Unskilled worker	2	
Unemployed	1	
Family Income Per Month (in Rs)*	**Score**	
≥2000	12	
1000 – 1999	10	
750 – 999	6	
500 – 749	4	
300 – 499	3	
101 – 299	2	
≤100	1	
Total Score	**Socioeconomic Class**	
26 – 29	Upper (I)	
16 – 25	Middle	Upper Middle (II)
11 – 15		Lower Middle (III)
5 – 10	Lower	Upper Lower (IV)
< 5		Lower (V)

Routine obstetric screening with ultrasound abdomen was done and obstetric complications were handled by obstetricians.

Patients were put on Penicillin prophylaxis and were treated as and when required. Patients with complications like congestive cardiac failure and acute pulmonary edema were treated with diuretics, etc. Those with atrial fibrillation and supraventricular tachyarrhythmias were treated with digoxin, Beta blockers, calcium channel blockers.

All patients were followed up till the delivery and similarly perinatal outcome was studied.

OBSERVATIONS AND RESULTS:
Table 1: Age distribution in this study.

Sr. no.	Age group	No. of patients	Percetnage
1	≤20 yrs.	2	4%
2	21-25 yrs.	14	28%
3	26-30 yrs.	28	56%
4	31-35 yrs.	3	6%
5	≥35 yrs.	3	6%
total		50	100%

The mean age in our study was 26.88. years. Maximum patients were in the age group of 26-30 years.
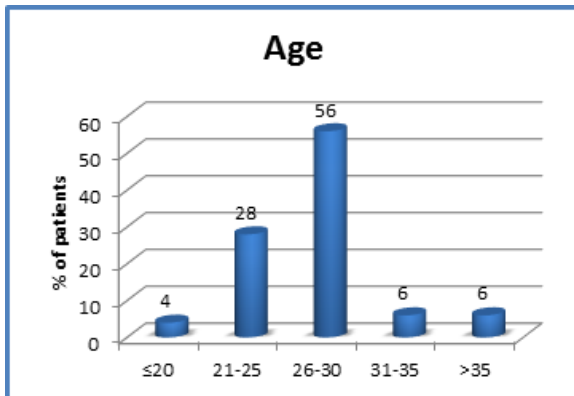
Chart 1.

Table 2:
Distribution of patients according to gravida of gestation.

Sr no	Gravida	No of patients	Percentage(%)
1	Primigravida	23	46
2	2nd gravida	14	28
3	3rd gravida	10	20
4	Multigravida	03	6
Total		100	100

Maximum patients in this study were primigravida and Least number of patients were multi gravida.
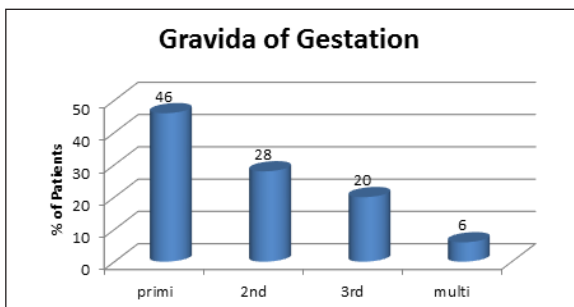
Chart 2.

Table 3: Distribution of symptoms in patients.

Symptoms	No.of patients	Percentage (%)
Breathlessness	26	52
Palpitations	24	48
Cough	16	32
Chest pain	15	30
Hemoptysis	06	12
Syncope	02	04
Asymptomatic	02	04

Most common symptom at presentation was breathlessness (52%) followed by palpitations (48%).
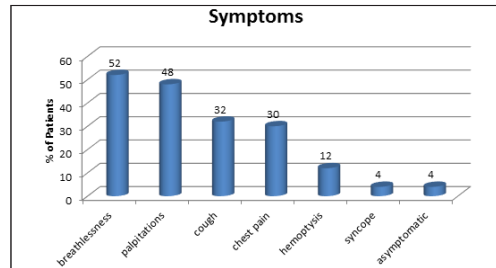
Chart 3.

Table 4: Distribution of Signs in study group.

Signs	No. of patients	Percentage (%)
Murmur	44	88
Tachycardia	32	64
Arrhythmia	20	40
Bilateral crepts	19	38
Increased JVP	19	38
Pedal edema	17	34

Most common sign in the patients was Murmur (88%) followed by tachycardia (64%) and arrhythmia (40%).
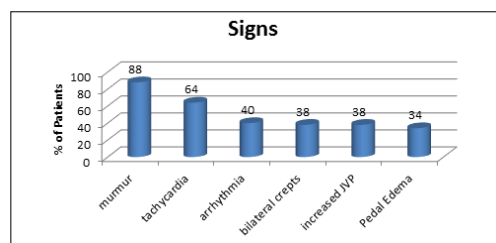
Chart 4.

Table 5: Socio economic status of patients.

Kuppuswami socio-economic class	No of patients	Percentage (%)
Upper class	2	4
Middle class	14	28
Lower class	34	68

Maximum patients were in lower socioeconomic class (68%).

Chart 5.
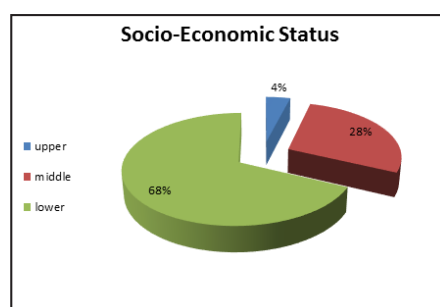
Table 6:
Distribution of valvular lesions in this study

Valvular lesion	No of patients	Percentage (%)
Pure MS	31	62
MS + Mod MR	12	24
Pure MR	7	14
Total	50	100

In this study, maximum patients had pure mitral stenosis i.e. 62% followed by Mitral stenosis with mitral regurgitation i.e. 24%. Only 14% patients had pure Mitral regurgitation.
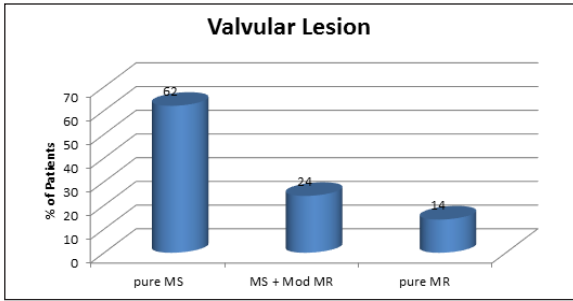
Chart 6.

Table7:
Distribution of CCF and pulmonary edema according to Trimester of pregnancy.

Trimester of pregnancy	No of patients in CCF and pulmonary edema.	Percentage (%)
1st TM	0	0
2nd TM	02	10.5
3rd TM	15	79
Intrapartum	2	10.5
Total	19	100

CCF and pulmonary edema was found in maximum patients of third trimester (79%)

Chart 7.

Table 8:
Distribution of complications during pregnancy and labour in study group.

Complication	No of patients	Percentage (%)
Congestive cardiac failure	17	34
Atrial fibrillation	14	28
Acute pulmonary edema	2	4
Left atrial thrombus	1	2
Infective endocarditis	1	2
Thromboembolism	1	2

CCF (34%) followed by atrial fibrillation (28%) were common complications in the study group.

Chart 8.

Table 9: Maternal and perinatal outcome in operated and non operated patients.

	Non operated		Operated		Chi 2 test, p value
	No. of patients (36)	Percentage (%)	No. of patients (14)	Percentage (%)	
CCF and Pul. Edema	18	50	1	7.1	Chi square test=7.85 p=0.005
NYHA grade III – IV	14	38.88	1	7.1	Chi square test=4.837 p=0.028
Low birth weight	12	33.33	2	14.28	Chi square test=1.814 p=0.178
Atrial fibrillation	13	36.11	1	7.1	Chi square test=4.196 p=0.041
Preterm delivery	8	22.22	2	14.28	Chi square test=0.397 p=0.529
Maternal death	2	5.55	0	0	NA

Statistical test applied to study complications between operated and non operated groups. CCF, acute pulmonary edema, NYHA grades and AF were better in operated than non operated. And found statistically significant. Incidence of complications was more in non operated group as compared to operated group.
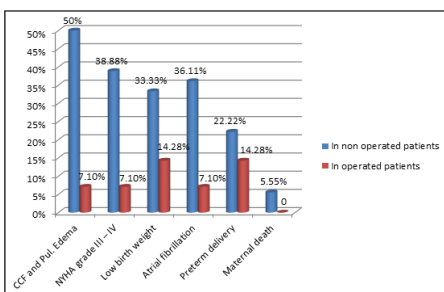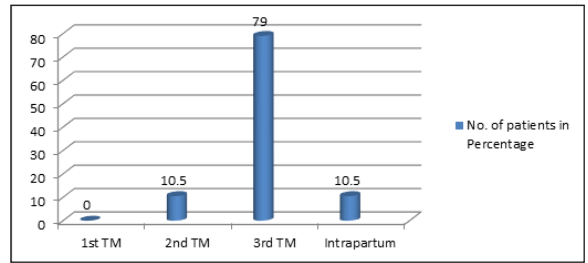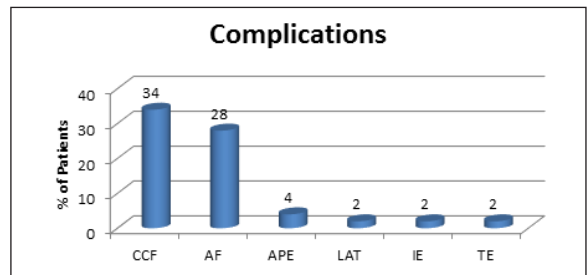
Chart 9.

Table 10: Left atrium size (LA) on echocardiography and its association with atrial fibrillation (AF).

Left atrial size	No of patients	Patients in AF	Chi square test=4.64
≤ 45 mm	19	2	p=0.031
> 45 mm	31	12	

Mean LA size was 46.78 mm.
Patients with LA size > 45 mm were more prone for atrial fibrillation.
Chi square test was applied to study statistical significance between LA size and AF
Chi square test=4.64
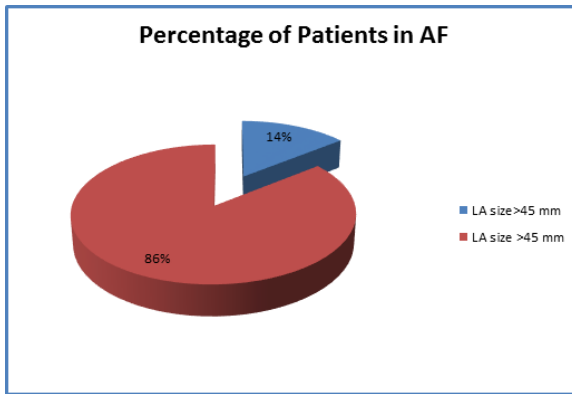p=0.031   i.e <0.05. Hence statistically significant.

Chart 10

Percentage of Patients in AF

- LA size >45 mm — 14%
- LA size >45 mm — 86%

Table 11: Mode of delivery in this study.

Mode of delivery	No of patients	Percentage (%)
Spontaneous vaginal	33	66
Forceps	11	22
LSCS	4	8
Abortion	2	4
	50	100

Most of the patients in this study were delivered by spontaneous vaginal delivery (66%).
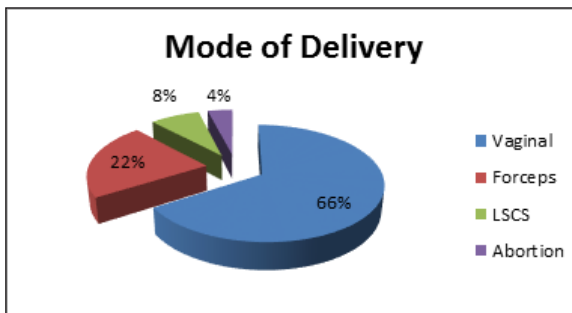
Chart 11.

Mode of Delivery

- Vaginal — 66%
- Forceps — 22%
- LSCS — 8%
- Abortion — 4%

Table 13: Distribution of fetal outcome in this study.

	No. of baby	Out of patients	Percent-age (%)
Normal weight (≥ 2.5kg) baby	32	48	66..66
Low birth weight (<2.5kg) baby	16	48	33.33
Full term (37-42 weeks.)	34	48	70.83
Pre term (< 37 weeks.)	10	48	20.83
Post term (> 42 weeks.)	4	48	8.33
Abortion (MTP or spontaneous abortion)	2	50	4
Died.	2	50	4

Out of 48 live births, 32 were of normal birth weight (66.66%).Low birth weight in 33.33%

Out of 48 pregnant patients who reached third trimester, 70.83%were delivered at full term and pre term were 20.83%

Out of 50 pregnancies, abortions in 2 patient i.e. 4% and fetal deaths occurred in 2 patients i.e. 4%
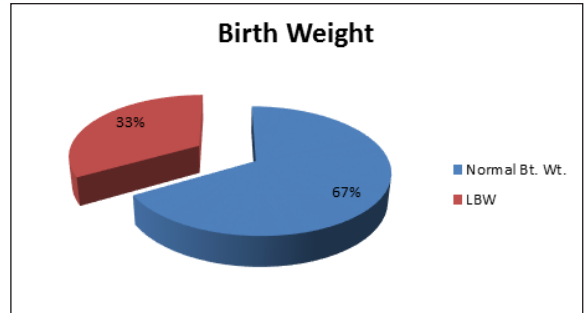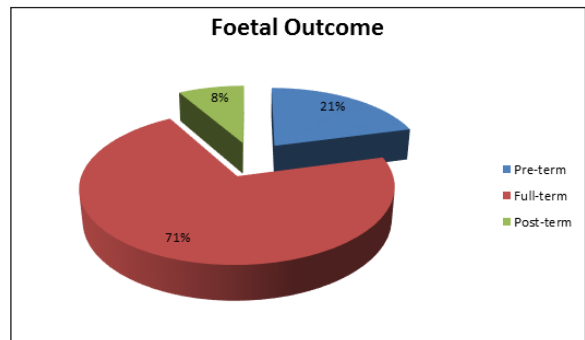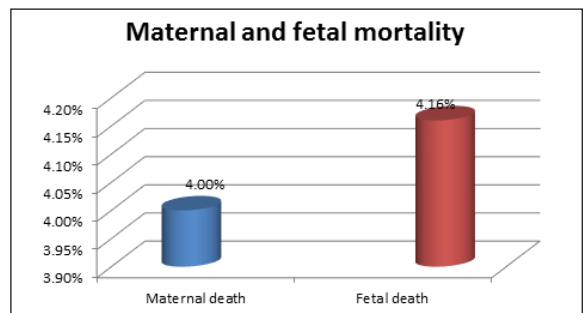
Chart 12(A).

Birth Weight

- Normal Bt. Wt. — 67%
- LBW — 33%

Chart 12(B).

Foetal Outcome

- Pre-term — 21%
- Full-term — 71%
- Post-term — 8%

Table 13: Maternal and Fetal mortality.

	No of deaths	Out of patients	Percentage (%)
Maternal mortality	2	50	4.0
Fetal mortality	2	48	4.16

Maternal mortality was 4% and fetal mortality was 4.16%.

Chart 13.

Maternal and fetal mortality

Maternal death — 4.00%
Fetal death — 4.16%

DISCUSSION

Age distribution in this study.

Maximum patients i.e 28 out of 50 were in the age group of 26-30 yrs.

Mean age of patients was 26.88.

Sawhney H, Aggarwal N, Suri V, Vasishta K et al[3] in a study at P.G.I Chandigarh found mean age of 25.27+3.79 in their study on pregnant rheumatic heart disease.

Distribution of patients according to gravida of gestation.

Maximum number i.e 23 out of 50 patients were primigravida i.e. 46% followed by 28% second gravida, 20% were of third gravida and 6% in multigravida.

In a study by Devabhaktuni Pratibha, Devineni Kiranmai, Vemuri Usha Rani in 2003[4] 40% patients were primigravida.

3) and 4) Symptoms and signs in study group.
Breathlessness was the most common symptom at presentation seen in 26 patients i.e.52% followed by palpitations in 24 patients i.e. 48%.

Most of cases were diagnosed by presence of murmur on auscultation. 44 patients i.e.88% presented with characteristic murmur on auscultation.

Tachycardia was present in 32 patients i.e. 64% followed by arrhythmia in 20 patients i.e. 40%. Vidyadher B Bangal, Rashmi K Singh, Kunaal K Shinde[5] 2001 found most common symptom of RHD in patient was breathlessness in 57%.

Augustad KM,Martyshova K,Martyshova S et al.[6]found breathlessness was most common symptom in mitral stenosis in pregnancy and it was 98.9%followed by palpitations in 35.4

5) Distribution Of Patients According To Socio Economic Class.
In this study maximum no. of patients i.e 74% were in lower socioeconomic class and 28% and 4% in middle and lower class respectively.

Vidyadher B Bangal, Rashmi K Singh, Kunaal K Shinde 2001[5] found 91% of patients belonged to lower socio economic class. Pandurang Rao et al[7] study found 74% of patients belonged to lower socioeconomic class and 26% were in middle class.

Jonathan R Carapetis[8],found rheumatic fever and rheumatic heart disease are common in lower socioeconomic groups.

6) Distribution of type of mitral valvular lesions in patients.
Mitral stenosis is the most common lesion in this study 31 patients have isolated mitral stenosis, patients having pure mitral regurgitation was 7 and 12 patients have mixed lesion.

Sawhney H, Aggarwal N, Suri V, Vasishta K   et al.[3]study P.G.I Chandigarh found 304 patients had single valve involvement and mitral stenosis was the most common lesion in 89.2%

7) Distribution of pregnant patients and CCF as per trimester of pregnancy.
In this study 79% patients developed congestive cardiac failure in 3 rd trimester .2 patients developed congestive cardiac failure in intraprtum period.

Vidyadher B Bangal, Rashmi K Singh, Kunaal K Shinde[5] found congestive cardiac failure was most commonly between 28 to 36 weeks of pregnancy i.e. in third trimester.

Our study result is in accordance with Vidyadher et al[5] study.

08) Distribution of complications in the study group.
In this study of 50 patients of rheumatic mitral valvular heart disease , most common complication was congestive cardiac failure in 17 patients i.e 34%. Atrial fibrillation was the next most common complication in 14 patients i.e. 28%. Infective endocarditis was present in 2% and LA thrombus was present in 2%.

Akinwusi P O,Peter JO,Oyedeji AT et al[9] in their study from 2003-2011 found congestive cardiac failure was present in 90.9% of patients , atrial fibrillation was found in 27.3% of patient. Infective endocarditis was present in 27.3% of patients .and thrombo embolism was present In 18.2% of patients

09) Maternal and perinatal outcome in operated and non operated patients.
In this study no. of patients operated for mitral valve lesion were 14 and 36 were non operated.

Patients in NYHA grade III and IV were 7.1%in operated and 38.88%

in non operated group respectively. Patients developing atrial fibrillation were 7.1%in operated group and 36.11% in non operated group.Congestive cardiac failure and pulmonary edema was seen in 7.1% in operated group and 50% in non operated group.

Preterm births and low birth weight babies were 14.28% respectively in operated group and 22.22% in non operated group. Maternal deaths were 0% in operated group and 5.55% in non operated group. 2 mothers died in non operated group due to acute pulmonary edema and thromboembolism.

Thus, outcome was significantly better in operated group than non operated group.

Bhatla N,Lal S,Behera G,kriplani A et al[10] study found maternal and fetal outcome was better in operated patients. Majority of patients (97.4%) remained in NYHA class I and II.

10) Left atrium size (LA) on echocardiography and its association with atrial fibrillation (AF).
In this study by echocardiography, 19 (38%) patients were having LA diameter less than 45 mm. Out of them 2 (10.5%) developed atrial fibrillation .And 31(62%) patients were having LA diameter more than 45mm, 12 (38.7%) out of them developed atrial fibrillation.

Mean LA size 46.78 mm.

Ewy GA ,Ulfers L, Hager WD et al[11] found mean atrial diameter in atrial fibrillation in patients of rheumatic heart disease was 47±8 mm. Fayad G, Le tourneau T , Modine T et al study[12] found mean atrial size was 41±14mm in patients with rheumatic atrial fibrillation.

Hence, LA size is a strong predictor of atrial fibrillation in rheumatic heart disease, similar to above studies.And statistically significance correlation between LA size and AF was found.

11) Mode of delivery in this study.
Out of 50 patients, 66% patients had spontaneous vaginal delivery and 22% had forceps assisted delivery. 8% patients had LSCS and 4% had abortion.

Vidyadher B Bangal, Rashmi K Singh, Kunaal K Shinde[5] found spontaneous vaginal delivery in 62.8% patients and forceps assisted delivery in 20% patients in rheumatic mitral heart disease.

Devabhaktuni Pratibha, Devineni kiranmai vemuri usha rani[4] in 2003-2007 found 73.5% had vaginal delivery ;of them

58% patient had spontaneous delivery,26.5% patients had LSCS delivery.

12) Distribution of fetal outcome in this study.

In this study out of 48 live births (excluding 2 abortions) 66.66.% patient delivered baby of weight more than 2.5 kg and 33.33% baby having birth weight of less than 2.5 kg.

Out of 48 delivery (excluding 2 abortion). 70.83% deliveries were full term, 20.83% deliveries were preterm i.e less than 37 weeks and 8.33% deliveries were post term i.e more than 42 wks. 2 abortion (4%) out of 50 pregnancy 1 MTP and 1 spontaneous abortion occurred at 16 and 18 weeks respectively. 2 (4%) fetal losses are due to maternal deaths at 30 and 32 weeks .

Vidyadher B Bangal, Rashmi K Singh, Kunaal K Shinde[5] found 40% patient delivered baby of more than 2.5 kg and 60% were low birth weight.

Devabhaktuni Pratibha ,Devineni Kiranmai Vemuri Usha Rani[4] found Low birth weight in 37.43% patients and preterm deliveries in 10% and neonatal deaths were 1.9%.

Asghar F, Kokab H[13] study found 42.55% Low birth weight and 14%were preterm deliveries.

13) Maternal and Fetal mortality.

In this study maternal mortality was 4% i.e. 2 out of 50 pregnant mothers and fetal mortality rate was 4.16%. 2 mother succumed at 30 and 32 weeks of gestation respectively.

one mother died of cardioembolic stroke with AF and LA thrombus at 30 wks. Second death occurred due to congestive cardiac failure at 32 weeks of gestation.

Maternal mortality rate (MMR) = 4% (2 out of 50patients) 2 fetal deaths occurred at 30 and 32 wks. Fetal mortality rate = 4.16%.

Vidyadher B Bangal, Rashmi k singh kunaal k shinde[5] found no maternal mortality in their study. fetal mortality was 4%.

Devabhaktuni Pratibha ,Devineni kiranmai vemuri usha rani[4] found maternal mortality .9% and perinatal mortality rate was 6.4% Asghar F, Kokab H[13] study found maternal mortality was 2% and neonatal mortality was 2% Doshi HU, Oza HV, Tekani H, Modi K[14] in prospective study found 2.7% maternal deaths . Sawhney H, Aggarwal N, Suri V, Vasishta K et al[3] study found 2% maternal deaths and 2% neonatal deaths.

In this study, clinical profile of rheumatic mitral valvular heart disease in pregnancy was studied. After going through observations and discussion of 50 patients, following conclusions can be drawn:

- Maximum patients were in age group of 26-30 years followed by 20-25 years .This points towards high incidence of rheumatic mitral valvular disease in 3rd decade of life.
- Most of the patients were primigravida.
- Brethlessness was most common symptom at presentation followed by cough and chest pain.
- Most common sign was murmur followed by tachycardia and arrhythmia.
- Maximum patients were in Kuppuswami's lower class of socioeconomic status. Hence rheumatic mitral heart disease is common in lower socio economic strata of society.
- Amongst the rheumatic mitral valvular lesions in pregnant patients most commonly encountered lesion is mitral stenosis.
- Out of 19 patients who went into congestive cardiac failure 17 patients were in 3rd trimester .It can be derived that pregnant patients frequently get decompensated in 3rd trimester.
- Congestive cardiac failure and atrial fibrillation are common complications in pregnant rheumatic mitral valvular heart disease.
- Incidence of maternal complications like congestive cardiac failure, pulmonary thromboembolism was much less in operated group of patients than in non-operated group. This was found to be statistically significant.
- Incidence of low birth weight, preterm delivary were also less in patients operated for rheumatic mitral valvular heart disease. Incidence of maternal and fetal complications was much less in operated group of patients and outcome in operated patients was better than non operated patients.
- Statistically correlation was found in incidence of atrial fibrillation and size of left atrium.
- 66% patients delivered by spontaneous vaginal delivery .66.66% babies had normal birth weight. Hence every patients of rheumatic mitral valvular heart disease should be given trial of normal labor.
- Thromboembolism, stroke and congestive cardiac failure, acute pulmonary edema are common causes of maternal mortality in rheumatic mitral valvular heart disease. Fetal outcome depends on maternal tolerance of cardio vascular instability due to rheumatic mitral valvular heart disease.

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