ORIGINAL ARTICLE

CLINICAL FINDINGS AND MATERNAL OUTCOME OF PREGNANT PATIENTS WITH VALVULAR HEART DISEASE

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Objectives: Pregnancy is associated with significant hemodynamic changes that may aggravate valvular heart disease and increase the risk of thrombo-embolic events. Valvular heart disease accounts for approximately a quarter of the cardiac diseases complicating pregnancy and is an important cause of maternal mortality, posing many challenges in management. In this study, we have evaluated the risk factors, clinical presentation, ECG, and X-ray findings in pregnant women with valvular disorder.

Methodology: This study was conducted in cardiology unit of Ghulam Muhammad Mahar Medical College (GMMMC), Sukkur in close association with gynecology department from January 2019 to December 2019. Thirty (30) pregnant women who were diagnoses with valvular disorder based on clinical presentation were enrolled in study after informed consent.

Results: In our study the most common valvular disorder identified was mitral regurgitation in 17 (56.6%), followed by mitral stenosis in 14 (46.6%) participants. Fourteen (46.6%) pregnant women had multiple valvular disorder. The most common clinical symptom was shortness of breath (93.6%), followed by palpitation (30%). In Chest X-ray, the most common finding was cardiomegaly in 20 (66.6%) pregnant women. In ECG, the most common finding was left ventricular enlargement (36.6%), Left Axis Deviation in 11 (36.6%) followed by left atrial enlargement (30%).

Conclusion: Valvular disorders are not uncommon in pregnant women in Pakistan. Women with risk factors should be identified and should have periodically screening of symptoms to diagnosis valvular heart disease during pregnancy at early stage. Cardiologists should be involved in the management of these patients.

Keywords: Valvular heart disease, pregnancy, outcome, Pakistan

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INTRODUCTION

In developing countries, valvular disease is almost exclusively the consequence of childhood rheumatic fever, although valvular dysfunction may also develop in some patients who have a prolapse of the mitral valve leaflets (Barlow's syndrome), or ventricular dilation due to elevated afterload or cardiomyopathy.[1] Pregnancy is associated with significant hemodynamic changes that may aggravate valvular heart disease and increase the risk of thrombo-embolic events. Valvular heart disease accounts for approximately a quarter of the cardiac diseases complicating pregnancy and is an important cause of maternal mortality, posing many challenges in management.[2]

Pregnancy in women with valvular heart disease is associated with remarkable unfavorable effect on maternal and fetal outcome, which are related to severity of disease.[3] The incidence of preterm birth, and small for gestational age newborn was 11.69% and 13.36% respectively. There was one (1.67%) maternal death.[3] Mechanical prosthetic valves pose unique challenges in management of the pregnant patient given the requirement for anticoagulation. Given the complexity of valvular heart disease in pregnancy, women with congenital and acquired heart disease should be managed with a multidisciplinary approach before and throughout pregnancy.[4-6]

Data related to risk factors and diagnostic findings in pregnant women with valvular disorder in Pakistan is limited. In this study, we have evaluated the risk factors, clinical presentation, ECG, and X-ray findings in pregnant women with valvular disorder.

METHODOLOGY

This cross-sectional study was conducted in cardiology unit of Ghulam Muhammad Mahar Medical College (GMMMC), Sukkur in close association with gynecology department from January 2019 to December 2019. Thirty (30)

pregnant women were enrolled in study after informed consent. Inclusion criteria included participants who were diagnosed with valvular disorder based on clinical presentation. Exclusion criteria included patients presenting with symptoms of preeclampsia, eclampsia or HELPP syndrome. Ethical approval was taken from Ghulam Muhammad Mahar Medical College.

After enrolment, participant age, gestational age, parity and gravida was noted in self-structure questionnaire. Participants were asked history about socioeconomic status, previous history of rheumatic fever, history of C-section and smoking etc. Participants with household income of less than 50,000 PKR monthly were classified as participants with poor socio-economic background Diagnostic test such as X-rays, ECGs and Echocardiography was done and their findings were noted.

Statistical analysis was done using Statistical Package of Social Sciences (SPSS) v. 21.0 (IBM Corporation, Armonk, New York, United States). Continuous variables were presented as means and standard deviations (SDs) while categorical variables were presented as percentages and frequencies.

RESULTS

Results

The mean age of participants was 28 ± 6 years. The mean gestational age at the time of enrollment in study was 21 ± 8 weeks. 18 (60%) participants belonged to poor socio-economic status. 14 (46.6%) participants were primigravida. History of Atrial fibrillation was present in 05 (16.6%) pregnant women (15%).

Table 1: Participants Characteristics

Characteristics	Frequency (Percentage)
Mean Age (in years)	28 ± 6
Mean gestational age(in weeks)	21 ± 8
Socio-economic status	
Poor	18 (60%)
Middle Class	12 (40%)
Gravida	
Primigravida (Less than 3)	14 (46.6%)
Multigravida (4 or above)	16 (53.3%)
Other Characteristics	
History of Atrial Fibrillation	05 (16.6%)
Diagnosis of Hypertension	04 (13.3%)
History of Rheumatic Fever	02 (6.6%)
BMI greater than 30 kg/m^2	01 (3.3%)
Smoker	01 (3.3%)

The most common clinical symptom was shortness of breath (93.6%), followed by palpitation (30%). (Table 2).

The most common valvular disorder that was identified was mitral regurgitation in 17 (56.6%), followed by mitral stenosis in 14 (46.6%) participants (Table 3).

Five participants (16.6%) each had spontaneous vaginal delivery and C-section. Four (13.3%) participants expired. Three (10.0%) had miscarriage and three (10.0%) were discharged (Table 4).

Table 2: Sign and Symptoms

Symptoms/Findings	Frequency (Percentage)
Clinical Symptoms	
Shortness of breath	28 (93.6%)
Palpitation	09 (30%)
Hemoptysis	04 (13.3%)
Edema feet	04 (13.3%)
Orthopnea	04 (13.3%)
Chest Pain	03 (10%)
Cough	02 (6.6%)
Ascites	02 (6.6%)
Chest X-ray Findings	
Cardiomegaly	20 (66.6%)
Pulmonary Congestion	09 (30%)
No Findings	06 (20%)
Left Atrial Enlargement	01 (3.33%)
Electrocardiogram (ECG) Findings	
Left Ventricular Enlargement	11 (36.6%)
Left Axis Deviation	11 (36.6%)
Left Atrial Enlargement	09 (30%)
P-Pulmonale	09 (30%)
Left Ventricular Hypertrophy	04 (13.3%)
Pulmonary Congestion	02 (6.6%)
No Findings	01 (3.3%)

Table 3: Diagnosis based on Echocardiography

Valvular Disorder	Frequency (Percentage)
Mitral Regurgitation	17 (56.6%)
Mitral Stenosis	14 (46.6%)
Tricuspid Regurgitation	06 (20%)
Aortic Stenosis	03 (10%)

Table 4: Outcome of hospitalization

Outcome	Frequency (Percentage)
Spontaneous Vaginal Delivery (SVD)	05 (16.6%)
Discharged	03(10.0%)
Miscarriage	03 (10.0%)
C-Section	05 (16.6%)
Discharge on Request	04 (13.3%)
Expired	04 (13.3%)
Referral to Advance Cardiology Centers	03 (10%)
Left against Medical Advice	03 (10%)

DISCUSSION

Significant hemodynamic changes occur during pregnancy, which can lead to decompensation in the setting of severe valvular disease. Cardiac output increases by 30-50% due to increased stroke volume and, to a lesser extent, increased heart rate later in pregnancy.

Cardiac output rises early in pregnancy and plateaus between the second and third trimesters.[7-9] Additionally, systemic vascular resistance decreases by the end of the second trimester and then slowly begins to increase until term.[10] Pregnancy is accompanied by physiologic anemia due to greater expansion in plasma volume than in red blood cell mass.[11] Together, these changes lead to increased flow, and thus increased gradients, across pre-existing valvular lesions.[12]

In this study, the mean gestational age at the time of presentation was 21 ± 8 weeks. This is late presentation compared to other studies, where most women present by 1st trimester.[1] This delay in presentation may be due to lack of antenatal visits in first trimester, particularly in women belonging to poor socio-economic background. Valvular heart disease is present in 80% of patients with heart disease during pregnancy in developing countries, with rheumatic fever as the most common etiology.[13] However, in this study rheumatic fever was present in only two (02) participants out of thirty participants.

Stenotic lesions that limit the ability to increase cardiac output may not be well tolerated during pregnancy and delivery. Regurgitant lesions are generally better tolerated, especially if the underlying cardiac function is normal.[14] In our study, most common valvular lesion was mitral regurgitation. The effects of rheumatic mitral regurgitation are usually ameliorated in early pregnancy by the dominant physiological change, peripheral vasodilatation. The increased plasma volume is offset by the reduction in systemic vascular resistance and consequently, the extent of the regurgitation diminishes.1 Second most common valvular lesion in our study was mitral stenosis. Mitral stenosis is poorly tolerated in pregnancy, and it is the leading cardiac cause of maternal mortality in the developing world.[15] Poor fetal outcomes including fetal growth restriction, low birth weight and preterm birth increase with increasing severity of MS.[16,17]

It is important to identify the patients at risk of valvular lesion. Early in pregnancy to reduce complications associated with valvular disease. The American College of Cardiology/American Heart Association adult congenital heart disease guidelines, valvular heart disease guidelines, and European Society of Cardiology guidelines all endorse preconception counseling and discussion of contraception as the duty of the cardiologist.[18-20] Individual counseling by experts, advice on contraception, and ultimately close follow- up between the patient and a multidisciplinary care team, which includes a cardiologist and obstetrician, can potentially impact the lives of both mother and baby

To the best of our knowledge, this is first study on valvular lesion in pregnant women in Pakistan in this decade. However, there were various limitations as well. First, since the sample size was taken from one institute, it was less diverse and small. Second, since it was a cross-sectional study hence fetal outcome was not noted.

CONCLUSION

Valvular heart disease in pregnancy is an increasingly common cause of adverse complications for both mother and baby, with medical and surgical advances allowing for many patients with VHD to survive to childbearing age. We recommend both preconception counseling and anticoagulation strategy as outlined here, as well as early referral to cardiologist with expertise in the management of cardiac disease and pregnancy for these complex patients.

AUTHORS' CONTRIBUTION

RS: Concept and design, data acquisition, interpretation, drafting, final approval, and agree to be accountable for all aspects of the work. SS, NLR, KA, AQB, FS: Data acquisition, interpretation, drafting, final approval and agree to be accountable for all aspects of the work.

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