



Original Research Article

A study of screening echocardiography in asymptomatic pregnant women

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ABSTRACT

Introduction: There is increased prevalence of heart disease in women of childbearing age. Heart disease is the leading cause of maternal mortality and morbidity in unbooked and in newly diagnosed heart disease complicating pregnancy. The signs and symptoms of pregnancy may confuse with the signs and symptoms of heart disease. The utility of echocardiography as an imaging technique has increased tremendously over the past decade. Echocardiogram is the gold standard and definite diagnostic tool in diagnosing heart disease. Our aim is to identify heart disease in an asymptomatic pregnant women with the use of screening echocardiography.

Materials and Methods: Three hundred pregnant women in all trimester of pregnancy were enrolled in this study. The study period is between October 2016 to January 2017 at Government Kilpauk medical college. Those with previous history of heart disease were excluded. Conventional M mode, 2D and Doppler echocardiography were performed for all patients.

Results: Out of 300 study population 65% (n-195), 23% (n-69) and 12% (n- 36) patients were in first, second and third trimester respectively. We found that 6.3% (n-19) of patients had either congenital or acquired heart disease. Among this, acquired heart disease burden is about 63% (n-12) and congenital heart disease is 37% (n-7). In congenital heart disease, Mitral valve prolapse 42.8% (n-3) atrial septal defect 28.5%(n-2), valvular pulmonary stenosis 14.2%(n-1) and coarctation of aorta 14.2% (n-1) were diagnosed. In acquired heart disease rheumatic heart disease found in all patients (100% (n-12). Among the Rheumatic etiology isolated stenotic lesion in 50% (n-6), isolated regurgitant lesion in 33.3% (n-4) and combined lesion in 16.6% (n-2) were identified in the study population.

Conclusion: Our study showed screening echocardiography will definitely helpful in identifying heart disease and reduce the mortality related to heart disease. This will justify the routine cardiac assessment even in the absence of cardiopulmonary symptoms.

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1. Introduction

Pregnancy may cause reversible changes in cardiovascular system.¹ Cardiovascular changes occur by sixth to eight week of gestation.² Heart disease affects approximately 0.2% to 4% of pregnant women.³ Profound changes in the circulatory system occur during pregnancy.⁴ These changes may compromise a limited cardiac reserve. Hence heart disease may be manifested for the first time during antenatal period.⁵ Conversely, pregnancy symptoms may mimic those

of cardiac disease. Maternal mortality in pregnant women with heart disease is about 1%, which is 100 times higher than women without heart disease.⁶ Most pregnant women with cardiac disease have a favourable fetal and maternal outcome except for Eisenmenger syndrome, obstructive pulmonary vascular disease and Marfan syndrome with aortopathy. However, they do remain at risk for other complications including heart failure, arrhythmia and stroke. Congenital heart disease comprises the majority in western countries followed by rheumatic heart disease.⁷ In developing countries like India, rheumatic heart disease outnumbers the congenital heart disease. Hence

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identification of heart disease in asymptomatic pregnant women is necessary. In this study congenital and acquired heart disease are identified by echocardiography. Because of its non invasive nature and lack of tetragenicity echocardiography helps the evaluation of pregnant women with no foetal or maternal risks.⁸ Knowledge of basic haemodynamic changes that occur throughout pregnancy and delivery is essential. The increase in blood volume may reach 70% compared with that in the pregestational condition. The reduction in peripheral resistance during pregnancy counterbalancing the increase in cardiac output on the volume loaded left ventricle in ventricular septal defect and patent ductus arteriosus or volume loaded right ventricle in atrial septal defect.⁹ Pregnancy and delivery is well tolerated in these conditions in the absence of pulmonary hypertension. When the shunt is large there is possibility of arrhythmias, progression of pulmonary hypertension and ventricular dysfunction occasionally. Possibility of paradoxical embolisation particularly in ASDs.

1.1. Ischaemic heart disease

Myocardial infarction is very rare in pregnancy. But there is increasing trend because of older maternal age. Cardiac biomarkers like high sensitive troponins are the investigation of choice because they are not affected by pregnancy. Thrombolysis is not preferred because of fear of haemorrhage. Primary PCI may be the better option.

1.2. Cardiomyopathy

1.2.1. Dilated cardiomyopathy

Pregnancy is poorly tolerated in patients with dilated cardiomyopathy. Approximate risk of maternal death is 7% in patient with New York Heart Association (NYHA) functional class III or IV. Other adverse risks factors include ejection fraction <20%, systemic hypotension, atrial fibrillation, mitral regurgitation, and right ventricular failure. Proper counseling should be given against pregnancy in such patient. Cardiac failure should be managed as in the non-pregnant patient, but angiotensin converting enzyme (ACE) inhibitors should be avoided since they are associated with renal agenesis. Hence identification of Heart disease by echo screening is reasonable one.

2. Materials and Methods

This is a prospective study with duration of 4 months. A total of 300 pregnant patients who referred for cardiac evaluation to department of cardiology, Government Kilpauk Medical College were enrolled in this study. The study period is from October 2016 to January 2017. These patients were grouped according to the trimester of pregnancy. Most of the patients in our study were in the first trimester. Those with known heart disease were excluded

from this study. Detailed history and clinical examination were done in all the patients before echocardiographic evaluation. Electrocardiogram was taken for all the patients.

Echocardiogram was done in all patients using Phillips Echo machine. M mode, 2D, Doppler and colour flow mapping was done by standard methods. Careful examination was done to rule out any congenital or acquired heart disease.

3. Results and Statistical analysis

Among the study population, 62% (n-186) patients were primigravida, 28.6% (n-86), 8.3% (n- 25) were in second and third pregnancy and 7.6% (n-23) patients were above third pregnancy.

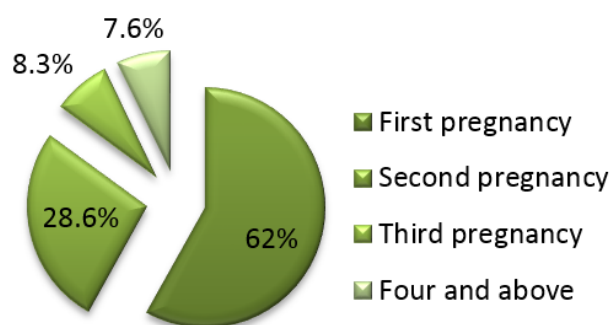


Fig. 1: Distribution of study population in various gestations

Among 300 patients, 65% (n-195) patients were in first trimester. 23% (n-69) and 12% (n- 36) pregnant women were in second and third trimester respectively. Most of our study populations were in first trimester.

Out of this 300, 6.3% (n-19) patients identified to have heart disease of either congenital or acquired. Out of this 19 congenital heart disease 37% (n-7) patients had congenital heart disease and 63% (n-12) patients had acquired heart disease. In our screening acquired heart disease out number the congenital heart disease.

Among the congenital heart disease, Mitral valve prolapse 42.8% (n-3) is the most common one followed by Atrial septal defect 28.5% (n-2).

Rheumatic heart disease is the most common acquired heart disease in our study

Rheumatic heart disease is the major burden of heart disease in our study contributing about 42% followed by atrial septal defect and mitral valve prolapse 21% respectively.

4. Discussion

Heart disease is one of the major cause of maternal mortality.¹⁰ The Cardiac Disease in Pregnancy (CARPREG) Risk Score can be calculated to estimate a woman's cardiac risk

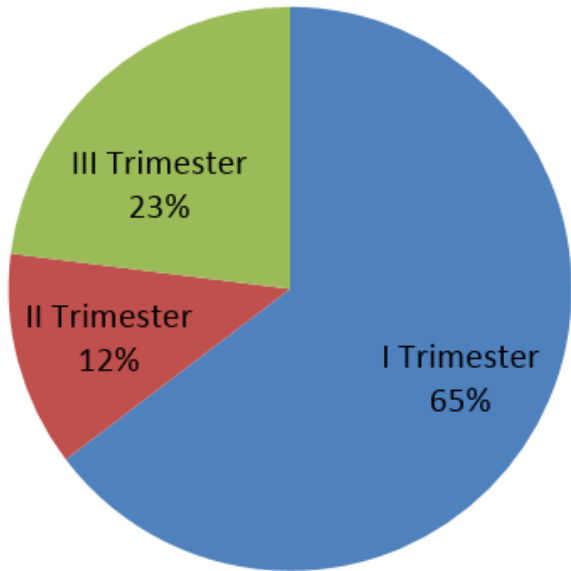


Fig. 2: Distribution of study population in various trimesters of pregnancy

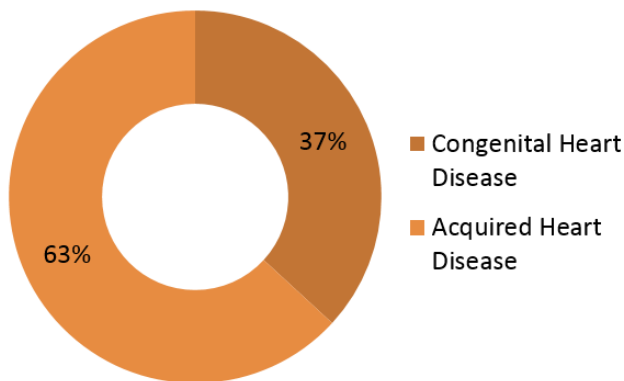


Fig. 3: Percentage of congenital and acquired heart disease in our study

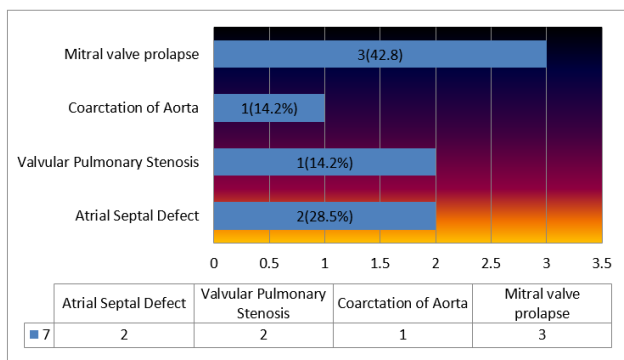


Fig. 4: Number and percentage of congenital heart disease distribution

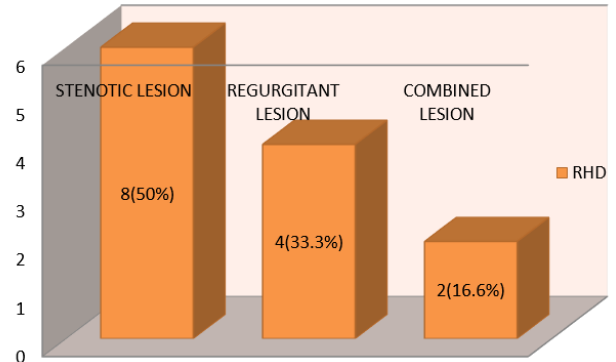


Fig. 5: Distribution of acquired heart disease

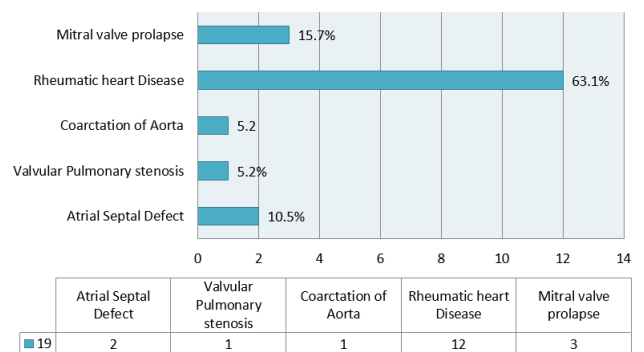


Fig. 6: Overall distribution of heart disease in study population

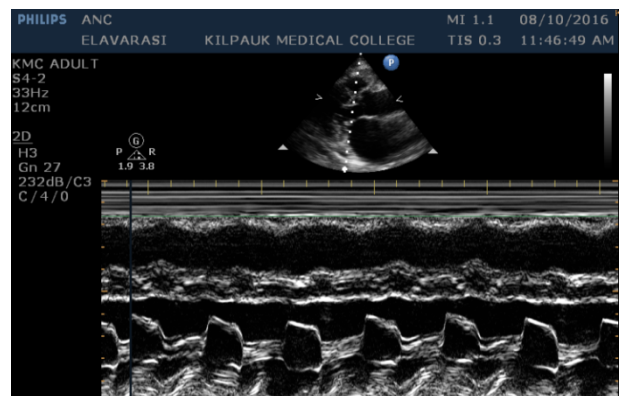


Fig. 7: Rheumatic mitral stenosis(M mode)

during pregnancy. Marfan syndrome with dilated aortic root (> 4 cm), severe pulmonary hypertension (PVR > 6 Wood units), moderate to severe left ventricular outflow tract obstruction ≥ 30 mmhg and left ventricular ejection fraction < 30% are contraindications for pregnancy.¹¹ Among the deaths due to heart disease those who diagnosed to have heart disease at first time during pregnancy contribute the majority. Screening echocardiogram during early pregnancy may help in planning for percutaneous intervention like balloon mitral and pulmonary valvuloplasty during second

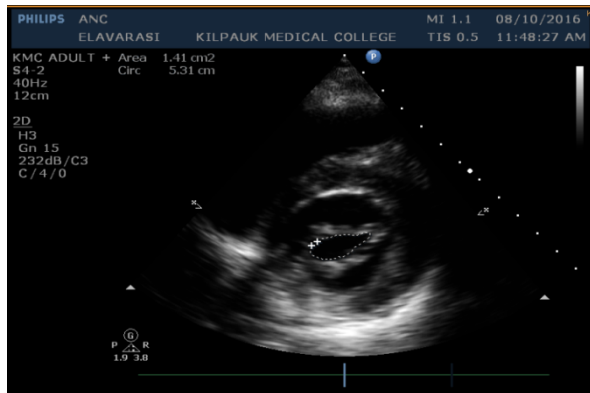


Fig. 8: MVOA 1.41 cm² (Planimetry)

trimester for critical mitral and pulmonary stenotic lesions. It also helps in adequate control of heart rate which will prevent the sudden development of acute pulmonary edema. Expectant management of complications and planning for caesarean section will reduce the burden of obstetrician. Identifying heart disease by screening echocardiogram will definitely reduce the maternal mortality and morbidity. There will be improved perinatal outcome. Optimal medical therapy in heart disease patients may not only improve the symptoms and also downgrading of the symptoms.

5. Conclusion

Identification of heart disease helps us for making necessary arrangements for the delivery and follow up during postpartum period. Ideally baseline evaluation of cardiac function and heart disease before conception will provide an opportunity for the relevant counseling. Physiological changes that occur during pregnancy may precipitate decompensation in those with previously well tolerated lesions. The care of pregnant patients with heart disease requires special attention to diagnosis, treatment and continuous follow-up. Conducting a systematic, accurate and realistic risk assessment for potential maternal and foetal complications and anticipated adverse outcomes, both during pregnancy and postpartum is vital to the success and safety of the pregnancy. Hence it advisable to subject all pregnant women to echocardiographic examination at least one time during pregnancy. Currently there is no study

available in this context. Further long term studies are needed in this regard.

6. Source of funding

None.

7. Conflict of interest

None.

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