

A Study of Heart Disease in Pregnancy and the Associated Complications

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Abstract

Introduction: Pregnancy associated with any medical illness becomes a challenge for an obstetrician. Cardiac disease is one such medical illness which complicates 0.1 – 4% of pregnancies. *Aims and objectives:* 1) To study incidence of heart disease associated with pregnancy at a Dr.V.M.G.H. Solapur. 2) To study the baseline characteristics of patients and associated complications of heart disease in pregnancy. *Materials and Method:* In the present cross sectional study all the cases of heart disease in pregnancy admitted in obstetrics and gynaecology department of Dr. V.M.G.H. Solapur during the study period were enrolled. All the selected patients underwent detailed antenatal evaluation. Detailed medical history along with routine obstetric history was elicited regarding duration of disease, medication. All these cases were analyzed with regard to their age, education, socioeconomic class, locality (urban or rural), parity, type of cardiac lesion, NYHA status. *Results:* Out of total 16362 deliveries; 39 pregnant patients were diagnosed with heart disease. Thus the incidence of heart disease in pregnant patients in the study was 0.24%. The mean age of patients, was 24.6 ± 5.2 years. 89.7% belonged to lower socioeconomic class. Rheumatic heart disease was the most common heart disease (74.4%) followed by Congenital heart disease was found in 20.5%. In 38.46% patients heart disease was diagnosed during the present pregnancy, whereas in 61.54% patients heart disease was diagnosed in previous pregnancy or before. Dyspnoea (61.5%) was the most common presenting complaint followed by palpitation (23.1%). 66.7% patients were from NYHA Class I, followed by 23.1% from NYHA Class II. Pulmonary hypertension was seen in 17.9% cases. Congestive heart failure was developed in 7.7% cases. Anaemia was noted in 10.3% cases, whereas Hypertensive disorders of pregnancy (12.8%), post-partum haemorrhage (5.1%), Oligohydramnios 2.6% (n = 1) were predominant obstetrical complications. *Conclusion:* Thus we conclude that the incidence of heart disease in pregnant patients in the study was 0.24%. Rheumatic heart disease was the predominant cause of heart disease in pregnancy and was seen mainly in the age group of 20-29 years of age among the lower socioeconomic class women. Dyspnoea and palpitations were the most common presenting symptoms with NYHA class I. Pulmonary hypertension and congestive heart failure were the common cardiac and non-cardiac hypertensive disorders of pregnancy and anaemia were common non cardiac complications.

Keywords: Pregnancy; Heart Disease; Symptoms; Complications.

Introduction

Pregnancy associated with any medical illness

becomes a challenge for an obstetrician. Cardiac disease is one such medical illness which complicates 0.1 – 4% pregnancies [1]. Cardiac disease is one of the predominant causes for nonobstetric maternal

mortality. In developed countries, maternal mortality attributable to cardiac disease is gradually increasing as compared to haemorrhage and hypertensive disorders. Also, cardiovascular disease significantly increases maternal morbidity leading to obstetrical intensive care unit admissions [1]. In western countries, maternal heart disease complicates 0.1 – 3% pregnancies, and is the third common cause of maternal death during pregnancy [1].

The etiology of cardiac disease varies among developed and developing countries. In the developed countries, majority of the cardiac disease cases among pregnant women are of congenital etiology, whereas in developing countries, majority cases have rheumatic heart disease [2,3]. In developed countries, this increase in cases of pregnant women with congenital cardiac disease can be due to early diagnosis, effective treatment, awareness and knowledge about congenital heart disease. In developing countries, where poverty, illiteracy, poor hygiene and lack of access to health facilities are present, the majority of cases are of rheumatic heart disease [3].

Pregnancy is associated with cardiovascular physiological changes that have an important bearing on the haemodynamics of the underlying heart disease. During pregnancy, cardiac output increases by 50% due to an increase in heart rate of 10% to 20% and an increase in blood volume of 30% to 50%, with increased flow to the kidneys, skin and uterus. In addition there is a substantial decrease in systemic vascular resistance which causes a decrease in blood pressure. During labour and delivery, cardiac output further increases, with an extra 25% due to an increase in preload caused by uterine contractions. In the puerperium (the postpartum period), preload rapidly increases because of the venous return of blood and the return of uterine blood to maternal circulation, and due to the relief of the inferior vena cava compression by the gravid uterus. Afterload increases due to the absence of the low-resistant vascular bed [3,4]. Women with underlying cardiac disease may not always deal with these changes, and ventricular dysfunction leads to cardiogenic heart failure [2,3,4].

In the present study we studied the cases of pregnancy with heart disease and features of these cases along with various complications observed among them.

Aims and Objectives

1. To study incidence of heart disease associated with pregnancy at Dr.V.M.G.H. Solapur.

2. To study the baseline characteristics of patients and associated complications of heart disease in pregnancy.

Materials and Method

The present cross sectional study was at Dr.V.M.G.H. Solapur after obtaining the permission from the institutional ethics committee. The study was conducted for the duration of two years. All the cases of heart disease in pregnancy admitted in obstetrics and gynaecology department at Dr. V.M.G.H. Solapur during the period of October 2012 to September 2014 were enrolled in the study.

All the selected patients underwent detailed antenatal evaluation including ultrasonography (USG) and antenatal checkup. Detailed medical history along with routine obstetric history was elicited regarding duration of disease, medication i.e. penicillin prophylaxis, anticoagulant drug therapy or other cardiac surgery prior to pregnancy and any complication in previous pregnancy as given in proforma. Severity of lesion was evaluated with 2D-ECHO measuring valve area, pressure gradients across valve and pulmonary arterial and venous pressure gradient and left ventricular ejection fraction. We also evaluated all those cases which required any operative cardiac intervention in either this pregnancy. All these cases were analyzed with regard to their age, education, socioeconomic class, locality (urban or rural), parity, type of cardiac lesion, NYHA status.

Data was collected, compiled and analyzed using appropriate statistical test. Descriptive data was expressed as percentage, whereas continuous data was expressed as Mean \pm Standard Deviation.

Results

In the present study total deliveries conducted at Dr.V.M.G.H. Solapur were 16362. Out of them 39 pregnant patients were diagnosed with heart disease. Thus the incidence of heart disease in pregnant patients in the study was 0.24%.

It was seen that majority of the patients in the present study were in the age group of 20-24yrs (51.3%) followed by 25-29yrs (20.5%). The mean age of patients, was 24.6 ± 5.2 years. The youngest and oldest patients were 17 years and 38 years old respectively. Among the 39 patients, 64.1% (n = 25) had completed secondary education. 23.1% (n = 9) patients completed higher secondary education,

whereas 10.3% (n = 4) patients had studied up to primary education. There were 2.6% (n = 1) patients who completed graduation. 51.3% (n=20) patients were from rural area, whereas 48.7% (n = 19) patients were from urban area. According to Kuppusswamy Socioeconomic Status Scale, among the 39 patients, 89.7% (n = 35) belonged to lower socioeconomic class, whereas 7.7% (n = 3), and 2.6% (n = 1) belonged to upper lower- and middle- socioeconomic class, respectively.

It was observed that rheumatic heart disease was the most common heart disease (74.4%). Congenital heart disease was found in 20.5% (n = 8) patients whereas other lesions in 5.1% patients. In 38.46% (n=15) patients heart disease was diagnosed during the present pregnancy, whereas in 61.54% (n=24)

patients heart disease was diagnosed in previous pregnancy or before. Among known heart disease (n = 24) cases, 79.2% (n=19) were having rheumatic heart disease, and 20.8% (n=5) were having congenital heart disease.

Out of the 39 cases, 41.0% (n=16) were primigravida whereas remaining were multigravida. It was seen that most of the patients (87.2%) were admitted during the third trimester of pregnancy whereas 7.7% patients presented in second trimester and 5.1% in first trimester.

The most common presenting complaint was dyspnoea (61.5%) followed by palpitation (23.1%). Other presenting complaints were fatigue (5.1%), orthopnoea (5.1%), paroxysmal nocturnal dyspnoea (2.6%) and chest pain (2.6%).

Table 1: Incidence of heart disease in pregnant women

No. of Patients	No. of Deliveries	Incidence (Percent)
39	16362	0.24%

Table 2: Demographic features of study patients

Features	Frequency	Percent	
Age Groups (in years)	< 20	03	7.7
	20 - 24	20	51.3
	25 - 29	08	20.5
	30 - 34	05	12.8
	≥ 35	03	7.7
Educational Qualification	Primary	04	10.3
	Secondary	25	64.1
	Higher Secondary	09	23.1
	Graduate	01	2.6
Residence	Rural	20	51.3
	Urban	19	48.7
Socioeconomic class	Lower	35	89.7
	Upper Lower	03	7.7
	Middle	01	2.6
Total	39	100	

Table 3: Distribution according to various characteristics of patients

		Frequency	Percent
Type of Heart Disease	Rheumatic Heart Disease	29	74.4
	Congenital Heart Disease	08	20.5
	Other lesions	02	5.1
Heart disease in previous pregnancy	Diagnosed in previous pregnancy or before	24	61.5
	Diagnosed in current pregnancy	15	38.5
Gravida	Primigravida	16	41.0
	Gravida - 2	09	23.1
	Gravida - 3	12	30.8
	Gravida - 4	02	5.1
Trimester	I	02	5.1
	II	03	7.7
	III	34	87.2

Out of the 39 patients 66.7% (n=26) patients were from NYHA Class I, followed by 23.1% (n = 9) from NYHA Class II, 2.6% (n = 1) from NYHA Class III and 7.7% (n = 3) from NYHA Class IV. Depending upon NYHA functional class, patients were categorized into low risk and high risk group. Low risk group included NYHA Class I and Class II whereas high risk group included NYHA Class III and Class IV patients. There were 89.7% (n = 35) patients in low risk group and 10.3% (n = 4) patients in high risk group.

Among 39 pregnant patients with heart disease, pulmonary hypertension was seen in 17.9% (n=7) cases. Congestive heart failure was developed in 7.7% (n=3) cases. Atrial fibrillation was noted among 7.7% (n=3) cases and pericardial effusion in 2.6% (n = 1). Anaemia was noted in 10.3% (n = 4) cases, whereas Hemiparesis in 2.6% (n = 1) and respiratory infection in 2.6% (n=1). Hypertensive disorders of pregnancy (12.8%), post-partum haemorrhage (5.1%), Oligohydramnios 2.6% (n = 1) were predominant obstetrical complications.

Table 4: Distribution according to Presenting Complaints

		Frequency	Percent
Complaints	Dyspnoea	24	61.5
	Palpitation	09	23.1
	Fatigue	02	5.1
	Orthopnoea	02	5.1
	Paroxysmal Nocturnal Dyspnoea	01	2.6
	Chest Pain	01	2.6
NYHA Class	Class - I	26	66.7
	Class - II	09	23.1
	Class - III	01	2.6
	Class - IV	03	7.7

Table 5: Distribution according to Associated Complications

		Frequency	Percent
Cardiac	Pulmonary Hypertension	07	17.9
	Congestive Heart Failure	03	7.7
	Atrial Fibrillation	03	7.7
	Pericardial Effusion	01	2.6
Non-cardiac	Hypertensive Disorders of Pregnancy	05	12.8
	Anaemia	04	10.3
	Postpartum Haemorrhage	02	5.1
	Respiratory Infection	01	2.6
	Hemiparesis	01	2.6
	Oligohydramnios	01	2.6

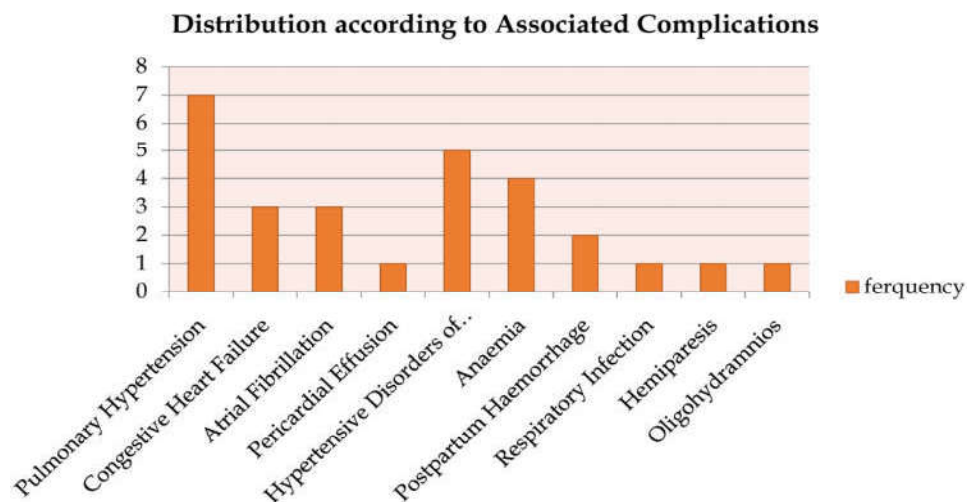


Chart 1:

Discussion

Heart disease in pregnancy is a very complex and vast subject. Its different aspects are tackled by different workers of the world with great interest. The present study was conducted in the department of obstetric and gynaecology with the aim to study the incidence of heart disease associated with pregnancy at a tertiary care centre. And also to study the baseline characteristics of patients and associated complications of heart disease in pregnancy.

During the study period total 16362 deliveries were conducted at the study institute. Out of them 39 pregnant patients were diagnosed with heart disease. Thus the incidence of heart disease in pregnant patients in the study was 0.24%. Incidence in present study was comparable with incidence reported by Ashwini et al [5] (0.40%), Shrinivas et al [6] (0.50%), Nagamani et al [7] (1.20%), Asghar et al [8] (0.90%) and Bangal et al [9] (1.30%).

The mean age of patients, was 24.6 ± 5.2 years. In the present study the youngest and the oldest patient were 17 years and 38 years respectively. However, maximum patients were in age group of 20–29 years., Ashwini et al [5], Shrinivas et al [6] and Konar et al [10] reported range of age-wise incidence between 20–30 years which was comparable with the present study. 64.1% patients had completed their secondary education whereas 23.1% had completed higher secondary education. 51.3% (n=20) patients were from rural area, whereas 48.7% (n = 19) patients were from urban area. Kuppuswamy Socioeconomic Status Scale was used for assessing the Socioeconomic Class of the study patients. It was seen that 89.74% of the cases belonged to lower socioeconomic class, 7.69% of the cases were from upper lower class and 2.69% cases from middle class. Bangal et al [9] also reported 91% of the pregnant patients with heart disease from lower socioeconomic class. In the present study of pregnant heart disease cases, 51% cases were from rural areas as compared to 49% of the cases from urban area. Bagade et al [11] reported 100% pregnant patient with heart disease from rural population.

In the present study of pregnant heart disease cases, 74.4% cases had rheumatic heart disease, 20.5% cases had congenital heart disease, and 5.13% cases had other cardiac lesions. The results of the present study are comparable to that of Ashwini et al [5], Shrinivas et al [6], Asgar et al [8], Bangal et al [9], Bagade et al [11] and Nayak et al [12]. Rheumatic heart disease is still predominant cause of heart disease in the country. Among the 39 cases, 38.46%

(n=15) cases were diagnosed to have heart disease for the first time during present pregnancy while remaining 61.54% (n=24) cases were known heart disease cases. Among known heart disease (n = 24) cases, 79.2% (n=19) were having rheumatic heart disease, and 20.8% (n=5) were having congenital heart disease.

In the present study, 41% cases were primigravida, gravida-3 cases were 30.8%, gravida-2 cases were 23.1% and gravida-4 patients were 5.1%. Results of the present study are comparable to the studies reported by Ashwini et al [5], Shrinivas et al [6] and Konar et al [10]. It was seen that most of the patients (87.2%) were admitted during the third trimester of pregnancy whereas 7.7% patients presented in second trimester and 5.1% in first trimester.

Dyspnoea on exertion was main presenting symptom and was seen in 61.5% of the pregnant heart disease cases. Palpitation (23.1%) was next most frequent symptom and was followed by orthopnoea and fatigue. These findings were comparable to the results given by Nayak et al [12]. In their study of 30 patients, dyspnoea was observed in 66.7% cases, cough observed in 33.3% cases, pedal oedema seen in 26.7% cases, cyanosis among 10% cases, and palpitation among 33.3% cases. Bagde et al [11] also reported findings similar to the present study. They reported 44% cases presenting with dyspnoea, 10.4% cases with pedal edema, and 10.4% cases with cough.

In the present study, 66.7% cases were NYHA class I, 23.1% cases were of NYHA Class II, 2.6% cases were NYHA class III and 7.6% cases were NYHA class IV. The findings of present study are comparable to that with Ashwini et al [5], Nagmani et al [7], Konar et al [10], Bagade et al [11], Nayak et al [12] and Chinchwade et al [13]. Depending upon NYHA functional class, patients were categorized into low risk and high risk group. Low risk group included NYHA Class I and Class II whereas high risk group included NYHA Class III and Class IV patients. There were 89.7% (n = 35) patients in low risk group and 10.3% (n = 4) patients in high risk group.

Among 39 pregnant patients with heart disease, pulmonary hypertension was seen in 17.9% (n=7) cases. Congestive heart failure was developed in 7.7% (n=3) cases. Atrial fibrillation was noted among 7.7% (n=3) cases and pericardial effusion in 2.6% (n = 1). Anaemia was noted in 10.3% (n = 4) cases, whereas. Hemiparesis in 2.6% (n = 1) and respiratory infection in 2.6% (n=1). Associated complications seen in present study are comparable to the results reported by Shrinivas et al [6].

Conclusion

Thus we conclude that the incidence of heart disease in pregnant patients in the study was 0.24%. Rheumatic heart disease was the predominant cause of heart disease in pregnancy and was seen mainly in the age group of 20-29 years of age among the lower socioeconomic class women. Dyspnoea and palpitations were the most common presenting symptoms with NYHA class I. Pulmonary hypertension and congestive heart failure were the common cardiac and non-cardiac hypertensive disorders of pregnancy and anaemia were common non cardiac complications.

References

1. Cunningham F, Leveno K, Bloom S, Hauth J, Rouse D and Spong C ed., Cardiovascular disease. In: William's Obstetrics, 23rd Ed. New York: McGraw Hill, 2010.p.958-82.
2. Pieper PG. Pre-pregnancy risk assessment and counselling of the cardiac patient. *Neth Heart J*. 2011; 19:477-481.
3. Henriquez DDCA, Roos-Hesselink JW, Schalij MJ, Klautz RJM, Helmerhorst FM, de Groot CJM. Treatment of valvular heart disease during pregnancy for improving maternal and neonatal outcome. *Cochrane Database of Systematic Reviews* 2011, Issue 5. Art. No.: CD008128. DOI: 10.1002/14651858.CD008128.pub2.
4. Anandaraja S, Kothari SS, Bahl V. Management of Valvular Heart Disease during Pregnancy. *Indian Heart Journal*. 2005;57:108-109.
5. Ashwini M, Gayatri Devi J. Maternal and fetal outcome in cardiac disease complicating pregnancy at a tertiary care centre in a rural area. *International Journal of Biomedical Research*. 2014;5(3):200-203.
6. Srinivas K, Sahana Rao, Radhika. A Clinical Study of Case Profile, Maternal and Fetal Outcome in Pregnancy with Cardiac Disease. *Journal of Evidence Based Medicine and Healthcare*. 2014 (July);1(5): 291-296.
7. Nagamani G, Bhavani K, Vani Isukapalli, Lagudu S. Heart Disease in Pregnancy Prospective Study from Southern India. *International Journal of Current Medical and Applied Sciences*. 2015 (March);6(1): 8-12.
8. Asghar F, Kokab H. Evaluation and outcome of pregnancy complicated by heart disease. *J Pak Med Assoc*. 2005 (Oct);55(10): 416-419.
9. Bangal VB, Singh RK, Shinde KK. Clinical study of heart disease complicating pregnancy. *IOSR Journal of Pharmacy*. 2012 (Jul-Aug);2(4):25-28.
10. Konar H, Chaudhuri S. Pregnancy complicated by maternal heart disease: A review of 281 women. *J Obstet Gynaecol India*. 2012 (May-June);62(3): 301 - 306.
11. Bagde ND, Bagde MN, Varma P, Shivkumar, Tayade S. Clinical profile and obstetric outcome in pregnancies complicated by heart disease: a five year Indian rural experience. *Int J Reprod Contracept Obstet Gynecol*. 2013 Mar;2(1):52-57.
12. Nayak R, Patil S, Laddad M. Pregnancy with heart disease - fetomaternal outcome. *International Journal of Recent Trends in Science and Technology* June 2014; 11(2):169-172.
13. Chinchawade VB, Daver RG, Lewis P. Maternal outcome in heart disease in pregnancy. *Research and Reviews: Journal of Medical and Health Sciences*. 2014 (July-Sept);3(3):61-66.