Original Research Article

Study of pregnancy outcome in women with congenital heart disease in a tertiary care centre

Pankaj Narayan Baravkar[1], Amitkumar Vishwasrao Bhalerao[2*]

{[1]Assistant Professor, Department of Obstetrics And Gynecology} {[2]Assistant Professor, Department of General Medicine}
B. K. L. Walawalkar Rural Medical College, Kasarwadi, At-Post Sawarda, Taluka Chiplun, District Ratnagiri, Pin 415606, Maharashtra, INDIA.
Email: drpankajbaravkar@gmail.com, dramitbhalerao@gmail.com

Abstract

Background: Prevalence of Congenital heart disease (CHD) in pregnancy has been found to be increasing due to early diagnosis in childhood accompanied with advances in pediatric cardiology and cardiac surgery. Present study was aimed to study pregnancy outcome in women with congenital heart disease in a tertiary care centre. **Material and Methods:** Present study was single-center, prospective, observational study, conducted in pregnant women, >28 weeks, already diagnosed or first tome diagnosed as case of congenital heart disease (CHD), delivered at our hospital. **Results:** During study period, 44 Pregnant women with congenital heart disease were studied. Majority were from < 25 years (56.82 %), primigravida (63.64 %), were diagnosed prior to pregnancy (65.91 %) and were NYHA Class I on admission (61.36 %). Majority were unoperated (68.18 %) as compared to surgically repaired (31.82 %) cases. Common lesions noted were atrial septal defect (25 %), patent ductus arteriosus (25 %), ventricular septal defect (15.91 %), pulmonary stenosis (13.64 %), tetralogy of Fallot (11.36 %). Gestational age wise majority women delivered at term (51.22 %) as compared to preterm (41.46 %) and post-term (7.32 %) deliveries. Spontaneous vaginal delivery (56.10 %) was common mode of delivery, other underwent Elective CS (29.27 %) and emergency CS (14.63 %). Maternal cardiac complications were pulmonary edema (29.55 %), cardiac failure (18.18 %), arrhythmia (13.64 %), while obstetric complications were preeclampsia (15.91 %), postpartum haemorrhage (9.09 %). 5 maternal deaths (11.36 %) were noted. Neonatal complications were preterm baby (38.64 %), respiratory distress (25 %), fetal growth restriction (6.82 %). total perinatal deaths were 5 (11.36 %), 3 were stillbirths (6.82 %) and 2 were neonatal deaths (4.55 %). **Conclusion:** Pregnant women with congenital heart disease had maternal and perinatal morbidity as well as mortality.

Keywords: Pregnant women, congenital heart disease, maternal mortality, perinatal morbidity

[*]**Address for Correspondence:**
Dr Amitkumar Vishwasrao Bhalerao, Assistant Professor, Department of General Medicine, B.K.L. Walawalkar Rural Medical College Kasarwadi, At-Post Sawarda, Taluka Chiplun, District Ratnagiri, Pin 415606, Maharashtra, INDIA
Email: dramitbhalerao@gmail.com

Received Date: 02/10/2021 Revised Date: 20/11/2021 Accepted Date: 17/12/2021

Access this article online

Quick Response Code:

Website: www.medpulse.in

DOI: https://doi.org/10.26611/101220311

INTRODUCTION

Prevalence of Congenital heart disease (CHD) in pregnancy has been found to be increasing due to early diagnosis in childhood accompanied with advances in pediatric cardiology and cardiac surgery. By virtue of its physiological changes in response to the increased metabolic demands, pregnancy in the context of cardiovascular diseases pronounces vulnerability to adverse cardiovascular events.[1] Etiology of CHD is multifactorial and a large collection of environmental and genetic causes have a role in its pathogenesis. Several previous reports suggest a changing pattern and incidence of congenital heart disease in different areas according to racial and ethnic factors.[2,3] Improvements in the non-invasive diagnostic modalities, coupled with extraordinary advances in the medical, surgical and interventional management of CHD patients, have led to improved survival with 85–97% of these patients expected to reach

How to cite this article: Pankaj Narayan Baravkar, Amitkumar Vishwasrao Bhalerao. Study of pregnancy outcome in women with congenital heart disease in a tertiary care centre. *MedPulse International Journal of Gynaecology.* December 2021; 20(3): 114-118. http://medpulse.in/Gynacology/index.php

beyond adolescence and childbearing.[4,5] Severe maternal and fetal complications associated with maternal cardiac disease include heart failure, arrhythmia, endocarditis, fetal death, neonatal death, low APGAR score, preterm birth, and small for gestational age.[6,7] Present study was aimed to study pregnancy outcome in women with congenital heart disease in a tertiary care centre.

MATERIAL AND METHODS

Present study was single-center, prospective, observational study, conducted in Department of Obstetrics And Gynecology at B. K. L. Walawalkar Rural Medical College, Kasarwadi, India. Study duration was of 2 years. Study was approved by institutional ethical committee.

Inclusion criteria: Pregnant women, >28 weeks, already diagnosed or first tome diagnosed as case of Congenital heart disease (CHD), delivered at our hospital, willing to participate in study.

Exclusion criteria: Pregnant women with rheumatic heart disease, hypertensive heart disease, ischemic heart disease and peripartum cardiomyopathy. Pregnant women, not willing to participate in study.

Study was explained and consent was taken for participation. All participants underwent history taking (age, gestational age, type of congenital heart disease, time of diagnosis, already operated or not, definite corrective surgery or palliative surgery, previous cardiological evaluation and treatment), clinical examination, complete cardiological evaluation by cardiologist (clinical examination, electrocardiogram (ECG) and 2 D echo study), necessary hematological (CBC, PT/INR, LFT, RFT) and radiological investigations (chest X-ray, obstetric ultrasound).

Decision of any intervention, induction of labour, mode of delivery was taken by senior obstetrician in consultation with cardiologist. During course of pregnancy cardiac events like decline in NYHA functional class, pulmonary oedema, arrhythmia, stroke and cardiac arrest or sudden cardiac death, obstetric events like preeclampsia, postpartum haemorrhage, puerperal venous thromboembolism and neonatal events like preterm delivery, respiratory distress syndrome, foetal or neonatal death were noted. Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Statistical analysis was done using descriptive statistics.

RESULTS

During study period, 44 Pregnant women with Congenital heart disease were studied. Majority were from < 25 years (56.82 %), primigravida (63.64 %), were diagnosed prior to pregnancy (65.91 %) and were NYHA Class I on admission (61.36 %).

Table 1: Baseline characteristics

Characteristics	Number of cases (n=44)	Percentage
Age (Years)		
<25	25	56.82%
26-30	14	31.82%
31-35	4	9.09%
>35	1	2.27%
Gravida		0.00%
G1	28	63.64%
G2	13	29.55%
≥ G3	3	6.82%
Time of diagnosis		0.00%
Before pregnancy	29	65.91%
After pregnancy	15	34.09%
NYHA Class on admission		0.00%
I	27	61.36%
II	10	22.73%
III	4	9.09%
IV	3	6.82%

In present study among 44 cases, majority were unoperated (68.18 %) as compared to surgically repaired (31.82 %) cases. Common lesions noted were atrial septal defect (25 %), patent ductus arteriosus (25 %), ventricular septal defect (15.91 %), pulmonary stenosis (13.64 %), tetralogy of Fallot (11.36 %), congenitally corrected transposition of great arteries (4.55 %), double outlet right ventricle (2.27 %) and Ebstein's anomaly (2.27 %).

Table 2: Distribution of congenital heart disease

Congenital lesion	Surgically repaired (%)	Unoperated (%)	Total
Atrial septal defect	4 (9.09 %)	7 (15.91 %)	11 (25 %)
Patent ductus arteriosus	3 (6.82 %)	8 (18.18 %)	11 (25 %)
Ventricular septal defect	2 (4.55 %)	5 (11.36 %)	7 (15.91 %)
Pulmonary stenosis	4 (9.09 %)	2 (4.55 %)	6 (13.64 %)
Tetralogy of Fallot	1 (2.27 %)	4 (9.09 %)	5 (11.36 %)
Congenitally corrected transposition of great Arteries	2 (4.55 %)	0	2 (4.55 %)
Double outlet right ventricle	0	1 (2.27 %)	1 (2.27 %)
Ebstein anomaly	0	1 (2.27 %)	1 (2.27 %)
Total	**14 (31.82 %)**	**30 (68.18 %)**	**44**

In present study, 3 pregnant women died antenatally. Gestational age wise majority women delivered at term (51.22 %) as compared to preterm (41.46 %) and post-term (7.32 %) deliveries. Spontaneous vaginal delivery (56.10 %) was common mode of delivery, other underwent Elective CS (29.27 %) and emergency CS (14.63 %). Majority neonates were shifted with mother (58.54 %) while 34.15 % required NICU admission and 3 stillbirths (7.32 %) were noted.

Table 3: Termination of pregnancy

Characteristic	Number of cases (n=41)	Percentage
Gestational age		
Preterm	17	41.46%
Term	21	51.22%
Post term	3	7.32%
Mode of delivery		
Spontaneous vaginal delivery	23	56.10%
Elective CS	12	29.27%
Emergency CS	6	14.63%
Fetal outcome		
Stillbirth	3	7.32%
Required NICU admission	14	34.15%
With mother	24	58.54%

In present study, maternal cardiac complications were pulmonary edema (29.55 %), cardiac failure (18.18 %), arrhythmia (13.64 %), while obstetric complications were preeclampsia (15.91 %), postpartum haemorrhage (9.09 %). 5 maternal deaths (11.36 %) were noted. Neonatal complications were preterm baby (38.64 %), respiratory distress (25 %), fetal growth restriction (6.82 %). total perinatal deaths were 5 (11.36 %), 3 were stillbirths (6.82 %) and 2 were neonatal deaths (4.55 %).

Table 4: Cardiac, obstetrics and neonatal outcomes

Complications	Number of cases (n=44)	Percentage
Maternal cardiac complications		
Pulmonary edema	13	29.55%
Cardiac Failure	8	18.18%
Sustained arrhythmia	6	13.64%
Cerebrovascular accident	2	4.55%
Maternal death	5	11.36%
Obstetric complications		
Preeclampsia	7	15.91%
Postpartum haemorrhage	4	9.09%
Neonatal complications		
Preterm baby	14	38.64%
Respiratory distress	11	25.00%
Fetal growth restriction	3	6.82%
Intrauterine foetal death	3	6.82%
Neonatal death	2	4.55%

DISCUSSION

Pregnancy and the peripartum period are associated with important cardio circulatory changes that can lead to marked clinical deterioration in the women with heart disease.[8] Maternal outcome is determined by the nature of the cardiac disease, surgical repair, myocardial dysfunction, history of arrhythmias and prior cardiac events.[9] In the context of both uncorrected congenital heart defects and corrected cardiac lesions, the specific risk of arrhythmia, stroke, and maternal death appears to be increased.[10] Prior systematic reviews have identified a dose-dependent relationship between severity of cardiac disease and maternal cardiac complications including heart failure, hypertensive syndromes, premature delivery rate, and delivery of a small for gestational age (SGA) infant.[11] Adhikari L *et al.*,[12] studied 74 pregnant women having congenital heart disease (CHD), prevalence of CHD was 0.14%. Most of the patients had atrial septal defect (ASD) (35%). Normal delivery was in 18 patients and most of these were ASD and pulmonary stenosis. Common complications were arrhythmia (41%), pulmonary oedema (8 patients). 7 patients expired during labour and puerperium. Regarding fetal outcome 58% pregnancy had intrauterine growth restriction, 67% had preterm birth and 8% had neonatal death. Liu Y *et al.*,[13] studied 1,040 women with CHD (5.35% all deliveries). Compared to women without CHD, these women had longer hospital stays (7.83 ± 4.65 vs. 4.93 ± 3.26 days) and a higher death rate (1.92 vs. 0.02%). They also had a greater risk of comorbidities, including pre-term delivery, heart failure and arrhythmia. Pulmonary hypertension, New York Heart Association functional class IIIIV, and no congenital heart disease surgery prior to pregnancy were associated with adverse events such as cesarean section, pre-term delivery, and heart failure. The fetuses of mothers with CHD were more likely to be born pre-term and have low birth weight. Eleven infants (1.82%) born to mothers with CHD and four infants (0.64%) born to mothers without CHD were diagnosed with CHD. Women with CHD generally increase maternal and infant risk during pregnancy and the perinatal period. Pulmonary hypertension, decrease in cardiac function, and no previous CHD surgery increase the risk in women with CHD. Hrycyk J *et al.*,[14] studied 116 patients with CHD and compared with 348 women without CHD. Caesarean section was performed in 46.6% of pregnancies with CHD (33.6% without CHD, P = 0.012). Primary Caesarean section increases with severity of CHD (P = 0.036), 33.3% of women with CHD had primary planned Caesarean section due to cardiac reasons. Induction of labor was performed in 45.7% of attempted vaginal deliveries in women with CHD (27.9% without CHD, P = 0.001). Lower mean birth weight (P = 0.004) and Small for Gestational Age (SGA) (P < 0.001) were more common in women with CHD. One CHD patient suffered from postpartum hemorrhage.

Following factors influence outcome of pregnant women or their babies,

1. The degree of pulmonary hypertension (PH);
2. New York Heart Association (NYHA) functional class;
3. whether or not an individual previously underwent CHD surgery; and
4. the severity of CHD.

Poorly controlled preexisting cardiovascular ailments, such as pregnancy-related cardiomyopathy and hypertension, are among the conditions that contribute to high maternal mortality in low- and middle-income countries. Hospitalization is recommended from cardiologists and obstetricians, as it allows for better care, particularly prenatal counseling, planned birth, and postpartum care based on a multidisciplinary approach, including the collaboration of obstetricians and cardiologists.[15] Cardiac lesions and pregnancy both may affect each other adversely. Joint care of obstetrician, cardiologist and anesthetist, avoidance of complications that add to the burden on the heart and compliance of the patient and her family to regular follow up will go a long way in ensuring a safe outcome for mother and fetus.

CONCLUSION

Pregnant women with congenital heart disease had maternal and perinatal morbidity as well as mortality. These women should be under multidisciplinary team supervision during preconception and antenatal period to improve feto-maternal outcomes.

REFERENCES

1. Avila WS, Rossi EG, Ramires JAF, et al. Pregnancy in patients with heart disease: experience with 1000 cases. Clin Cardiol 2003;26(3):135-42.
2. K. Rajyalakshmi, B. Srinivas. A cross sectional study of congenital heart disease and outcomes of pregnancy in high risk pregnant mothers presenting to rajiv gandhi institute of medical sciences, srikakulam. International Journal of Contemporary Medical Research 2016;3(9):2538-2540.
3. Bagher Nikyar1 et al. Prevalence and Pattern of Congenital Heart Disease among Neonates in Gorgan, Northern Iran (2007-2008). Iran J Pediatr. 2011;21:307-12.
4. Khairy P, Ionescu-Ittu R, Mackie AS, Abrahamowicz M, Pilote L, Marelli AJ. Changing mortality in congenital heart disease. J Am Coll Cardiol 2010 Sep 28;56(14):1149–57.
5. Mandalenakis Z, Giang KW, Eriksson P, Liden H, Synnergren M, Wåhlander H, et al. Survival in children with congenital heart disease: have we reached a peak at 97%? J Am Heart Assoc 2020 Nov 17;9(22):e017704.

6. Henriquez DD, Roos-Hesselink JW, Schalij MJ, Klautz RJ, Helmerhorst FM, de Groot CJ. Treatment of valvular heart disease during pregnancy for improving maternal and neonatal outcome. the Cochrane Database of Systematic Reviews. 2011; CD008128.
7. Regitz-Zagrosek V, Seeland U, Geibel-Zehender A, Gohlke-Bärwolf C, Kruck I, Schaefer C. Cardiovascular diseases in pregnancy. Deutsches Arzteblatt International. 2011; 108: 267–273.
8. Puri S, Bharti A, Puri S, Mohan B, Bindal V, Verma S. Maternal heart disease and pregnancy outcomes. JK Sci 2013;15:7-10.
9. Joshi G, Joshi SC, Jha SK, Singh Y, Joshi A. Maternal heart disease and pregnancy outcome: Findings from a retrospective cohort in a tertiary care government hospital in Haldwani, Nainital. Nig J Cardiol 2015;12:120-3.
10. Roos-Hesselink JW, Ruys TPE, Stine JI, Thilen U, , et al., ROPAC Investigators. Outcome of pregnancy in patients with structural or ischaemic heart disease: results of a registry of the European Society of Cardiology. Eur Heart J. 2013;34:657–665.
11. Drenthen W, Pieper PG, Roos-Hesselink JW, van Lottum WA, Voors AA, Mulder BJM, van Dijk APJ, Vliegen HW, Yap SC, Moons P, et al. Outcome of pregnancy in women with congenital heart disease. A literature review. J Am Coll Cardiol. 2007;49:2303–2311.
12. Adhikari L, Sarkar S, Das A, Sannigrahi P, Chawdhary P. Pregnancy outcome in women with congenital heart disease in a tertiary care centre. The New Indian Journal of OBGYN. 2018; 5(1): 38-42.
13. Liu Y, Li Y, Zhang J, Zhao W, Bao Z,Ma X, et al. (2022) Pregnancy Complications and Outcomes Among Women With Congenital Heart Disease in Beijing, China. Front. Cardiovasc. Med. 8:765004.
14. Hrycyk J, Kaemmerer H, Nagdyman N, Hamann M, Schneider K, Kuschel B (2016) Mode of Delivery and Pregnancy Outcome in Women with Congenital Heart Disease. PLoS ONE 11(12): e0167820.
15. Ayad SW, Hassanein MM, Mohamed EA, Gohar AM. Maternal and Fetal Outcomes in Pregnant Women with a Prosthetic Mechanical Heart Valve. Clinical Medicine Insights. Cardiology. 2016; 10: 11–17.

Source of Support: None Declared
Conflict of Interest: None Declared