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

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ABSTRACT

Introduction: CHD is one of the most frequently detected congenital malformations. They are responsible for about half of the deaths caused by lethal malformations during postnatal age. Study evaluated the type of CHD and detection rate of CHD in our high risk population and assess the outcomes.

Material and Methods: A cross sectional study was done among high risk pregnant women attending Rajiv Gandhi Institute of Medical sciences, Srikakulam from October 2014 to September 2015 with the help of a predesigned, pretested proforma and ultrasound or TIFFA scanning. Statistical analysis: Data entry was done in Microsoft Excel and analyzed by SPSS package 17. Chi-square test was used to analyze the association.

Results: On fetal echocardiography in 308 indicated pregnant females 76% showed normal study and 24% are diagnosed as having CHD. There is statistically significant association of CHD with indication for foetal echocardiography, $p<0.05$. Of all CHD – VSD is the commonest abnormality accounting for 10.7%. Of the detected CHD by echocardiography the outcome was live births (85.62%), still births (0.94%), IUD (0.94%), termination of pregnancy (2.3%), 11.2% there is no follow up.

Conclusion: Congenital heart disease noted on a preliminary obstetric sonogram is an important indication for foetal echocardiography. Multidisciplinary approach is needed to the parental counselling and perinatal management planning.

Keywords: Congenital Heart Disease, Outcomes of Pregnancy in High Risk Pregnant

INTRODUCTION

Congenital heart diseases show an incidence of about 4-13 per 1000 live births[1] thus representing one of the most frequently detected congenital malformations. They are responsible for about half of the deaths caused by lethal malformations during postnatal age. Over the past decade, due to improved obstetric screening the prevalence of prenatally diagnosed congenital heart disease (CHD) has risen. For severe forms of CHD such as hypoplastic left heart syndrome (HLHS), prenatal detection rates reported to be 37 % in the late 1990s, reached 75–77 % by 2005–2008.[2]

Etiology of CHD is multifactorial and a large collection of environmental and genetic causes have a role in its pathogenesis.[3] Several previous reports suggest a changing pattern and incidence of congenital heart disease in different areas[4,5] according to racial and ethnic factors.[6,7] Knowledge of the epidemiology of congenital heart disease will help to identify the causes of cardiac dysmorphogenesis and afford opportunities to prevent them.[8]

The use of ultrasonography has revolutionized prenatal care, and a high number of major fetal malformations are now detected prior to birth. Heart is one of few organs which show

improvement in neonatal morbidity and mortality when defects are prenatally detected. Study was done to evaluate the type of CHD and detection rate of CHD in our high risk population referred to our tertiary centre and assess the outcomes in terms of Live births, Still births, Intra uterine deaths (IUD), Termination of pregnancies (TOP).

MATERIAL AND METHODS

Study area and population: This cross sectional study was conducted for the period of October 2014 to September 2015 in Rajiv Gandhi Institute of Medical sciences, Srikakulam. It included pregnant women attending out-patient department of OBG and referral indicated pregnant women attending scan centres.

Sample size: 308 pregnant women data were collected during the given study period by convenience sampling.

Inclusion Criteria

1. Maternal indications: Type 1 diabetes, gestational diabetes mellitus, CHD in 1st degree relatives, polyhydramnios, auto immune diseases, epilepsy, mother with CHD.
2. Foetal indications: sibling with congenital anomalies, monochorionic twins, increased nuchal translucency, foetal infections (rubella), IUGR in mid trimester.
3. Indications for foetal echocardiography by antenatal scan: Chamber asymmetry, altered cardiac axis, altered position of fetal heart, enlarged foetal heart, arrhythmias, abnormal cardiac findings in antenatal sonography.
4. Women who were willing to participate in the study.

Exclusion Criteria

1. Women with pregnancy without above stated risk factors.
2. Women who were not willing to participate in the study.

Data collection methods: Women detailed history regarding name, age, address, occupation, height, pre pregnancy weight, BMI, last menstrual period, gestational age at diagnosis in weeks, obstetric formula, socio-economic status and antenatal ultrasound in second and third trimesters or TIFFA scan (targeted imaging for fetal anomalies)were taken. Outcomes

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like - live birth, IUD, still births, termination of pregnancy, or no follow up are assessed by hospital records.

Informed consent was taken from all the study participants. Institutional Ethical Committee clearance was taken prior to the study.

STATISTICAL ANALYSIS

Categorical measurements are presented in number (%). To study the association of congenital heart disease with other variables chi-square test was used. Probability value less than 5% was considered statistically significant (P value=<0.05). The data was statistical analyzed using SPSS package 17.

RESULTS

Majority of the indications in this study showing congenital heart disease on fetal echocardiography were cardiac abnormality in ultrasound (33.2%), siblings with CHD (13.65), gestational diabetes (2.4%). There was statistically significant association between indications and CHD (P value <0.05;figure-1).

On fetal echocardiography in 308 high risk pregnant females 76% showed normal study and 24% are diagnosed as having CHD. VSD accounts 10.4% and is the commonest congenital heart defect in our study subjects (Table-1).

Of the pregnancy outcomes of high risk pregnant women 85.62% were live births, 0.94% were still births, 0.94% were intrauterine deaths, 2.3% underwent termination of pregnancy, and 11.2% there was no follow up (figure-2).

DISCUSSION

Incidence of CHD in our centre was 24% this is because of rural population attending OP from all the surrounding districts as our hospital is tertiary referral centre.

The most common indication for fetal echocardiography is abnormal cardiac finding in routine ultrasound (mostly echogenic focus on USG). 194 cases (62.9%) were referred with abnormal finding on USG. Of these 98 cases with echogenic focus, on fetal echocardiography 6 cases are found to have CHD. 96 cases were referred in view of cardiac abnormality, of these 60 cases were diagnosed as having CHD. Total 31.9% are diagnosed as having CHD among referral cases of abnormal ultrasound. In a study conducted by Cooper MJ et al[9] family history of CHD led to 34%, Maternal diabetes mellitus 28% and abnormal ultrasound 4% of the indications.

Benacerraf et al[10] reported that reccurance risk of fetal CHD was 4% if parents delivered a fetus with CHD before. In our study there are 59 cases in which sibling had CHD. Of these, 51 cases on fetal echocardiography showed normal study and 8 cases are diagnosed as having CHD (2-VSD, 3-HLHS, 3-Others). It implies there is 13% risk of having CHD if sibling has CHD in our study. In a study conducted by Zhu RY et al[11] the most common indications for fetal echocardiography were advanced maternal age (31.7%), fetal arrhythmias (13.5%) and maternal infections (10.4%).

Hoffman and Kaplan[12] in their study on " The incidence of congenital heart disease"', the most common CHD is VSD. In the present study also VSD accounts for majority of CHD. Present study showed the detection rate of CHD was 24% in risk population. Of these VSD accounts for 10.4%, and VSD associated with other conditions such as (DORV, TGA,PS etc) accounts for 9.1%. The next common CHD observed in our

Fetal echocardiography finding	Number	Percentage
Normal study Study	234	76.0
VSD	32	10.4
ASD	1	0.3
HLHS	8	2.6
TOF	5	1.6
Others	28	9.1
Total	308	100.0

Table-1: Showing fetal echocardiography findings in study subjects
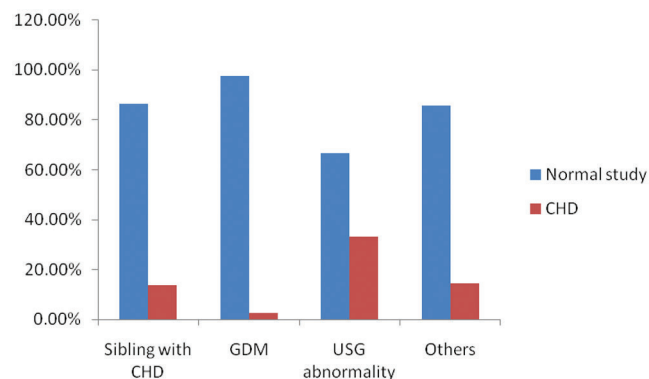
Figire-1: Showing association between indication and CHD
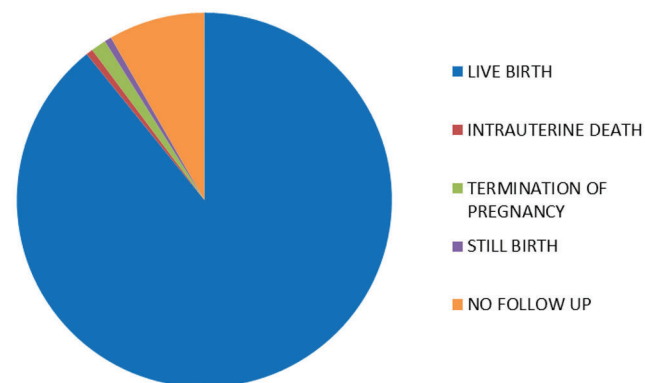
Figure-2: Pie Diagram showing pregnancy outcomes in indicated pregnant women.

population was HLHS (2.6%), followed by TOF(1.62%),ASD (0.3%). Similar results were also observed in a study conducted by Khaled Amro[13], Lorenzo D.Botto et al[14], L.Shamima Sharmin et al[15] and Jatav RK et al.[16]

In present study the live births accounted for 89.2 %, intrauterine deaths 0.64 %, still births 0.64 %, termination of pregnancies 1.3%, and no follow up 8.1% of the pregnancy outcomes of the high risk study subjects. In a study conducted by Zhu RY[11] et al as for pregnancy outcome, there were 52.1% terminations; 2.2 % died in utero, 13% postnatally, and 28.3% survived.

Limitations of the study

The incidence of CHD in present study doesn't correlate with incidence of CHD world wide because this study was done in tertiary cardiac referral centre.

Even though VSD is most common CHD in present study which correlates with world wide statistics, the frequencies of other congenital heart diseases may vary in our general population. Few cases of CHD can be missed by fetal echocardiography as

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small VSD, ASD, PDA, etc, which are diagnosed more often postnatally.

CONCLUSION

Congenital heart disease observed on a preliminary obstetric sonogram is an important indication for foetal echocardiography. Foetal congenital heart disease can be identified by prenatal echocardiography. A sequential segmental approach is critical for correct evaluation of the cardiac malformation. A multidisciplinary approach is needed to the parental counselling and perinatal management planning.

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