

Relative risk for prenatal diagnosis of Congenital Heart Disease according to referral patterns in a tertiary center

Kiaffas MG¹, Malamitsi-Puchner A², Hasiakos D², Boutsikou M, Iliodromitis EK³, Rammos S¹

Pediatric Cardiology Department Onassis Cardiac Surgery Center,¹ Neonatal Division and 2nd Department of Obstetrics and Gynecology Aretaieion Hospital², 2nd Department of Cardiology -Attikon Hospital³ University of Athens, Athens Greece

OBJECTIVES

The aim of this study is to:

1. Follow the pattern of referral for fetal echocardiograms (FE) at a single pediatric cardiology - cardiac surgery care center
2. Record the relative risk for diagnosis of Congenital Heart Disease (CHD) according to the indications for FE
3. Note the impact of a positive diagnosis of CHD to the pregnancy outcome

RESULTS

- 4,016 FEs were performed in 2,984 patients, involving 3,085 pregnancies; 2,880 (93.4%) were singleton and 205 (6.65) were multiple; 2,906 pregnancies were product of normal conception and 179 of assisted fertilization.
 - Maternal age ranged from 14.3-50.7 years (median 32.6) and GA 14-38 weeks (median 23), abnormal cardiac findings were identified in 889 (28.9%) fetuses with 295 (9.6%) being major and 594 (19.3%) having minor disease. From the multiple pregnancies 25 (12.8%) had major CHD (P<0.001) and from the assisted fertilization 17 (9.5%) (p<0.001). Fetuses <20 weeks GA had relative high risk for major CHD (p<0.001)
 - Indications for FE referral and relative risk for CHD per indication are presented in Table 1, with the preventive/self-referral group being used as the control group for the analysis.
- Outcome:** From the 295 pregnancies with major CHD, 28 (12%) were lost to follow-up. From the remaining 166 (54%) elected termination of pregnancy with only 34% reaching term. The majority of affected fetuses were delivered at a tertiary obstetrical care center and transferred to a pediatric cardiology - cardiac surgery center for further management. Three fetuses were delivered prematurely due to cardiac dysfunction and in three cases of fetal tachyarrhythmias were treated in utero.

Table 1

Indications	Number (%)	Major CHD	Relative Risk(CI)	P value
Preventive - Self referral	998 (32.4%)	17(1.7%)		
1 st trimester anomalies	564 (18.3%)	18(3.2%)	1.93(1.01- 3.71)	P=0.048
Suspicion of CHD at ultrasound	441 (13.9%)	224(50.8%)	39.48(24.57-63.46)	P<0.001
Family history of CHD	358 (12.1%)	9(2.5%)	1.52 (0.69- 3.38)	P= 0.30
Cardiac echogenic foci	240 (7.7%)	4(1.7%)	0.99 (0.34 -2.91)	P=0.019
Extracardiac/ Chromosomal fetal anomalies	199 (6.5%)	10(5.0%)	3.22 (1.50- 6.90)	P=0.002
Maternal glucose abnormalities	149 (4.7%)	1(0.7%)	0.39 (0.05- 2.92)	P=0.361
Suspicion of fetal arrhythmias	82 (2.7%)	12(14.6%)	10.76(5.41- 21.41)	P<0.001
Maternal indications	54 (1.7%)	0	0.54 (0.03- 8.88)	P=0.428

METHODS

This is a retrospective study

1. FE studies performed between January 2005 to December 2012 by a single operator (MGK) were reviewed.
All studies were performed with a GE Vivid 7 scanner (GE, USA), using a 3.5-5 MHz probe and using two-dimensional, M-mode and Doppler Echocardiography
2. Main indication for the study, maternal and gestational age (GA) were noted as well as the diagnosis
3. CHD was categorized as major or minor depending on its severity and need for medical or interventional/surgical treatment after birth
Statistical analysis was performed using the SPSS statistical package ed 21.0.

CONCLUSIONS

In our series 9.6% of FEs had major cardiac findings

Indications in the study justified regarding FE referral and risk for CHD

- a. Suspicion of CHD at the obstetrical scan
- b. Abnormal findings during the 1st trimester
- c. Chromosomal and extracardiac fetal anomalies
- d. Presence of echogenic foci
- e. Suspicion of arrhythmias

Highest relative risk for CHD had the suspicion of CHD at the anomaly scan

Diagnosis of major CHD is associated with high termination rate