Short Communication

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Heart Murmur in Neonates: How Often Is It Caused by Congenital Heart Disease?

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Abstract

Objective: Congenital heart disease (CHD) is the most common form of cardiovascular diseases in children. This study was performed from September 2006 to August 2007 in Ardebil, Westnorthern Iran. The aim was to determine the prevalence of heart murmur in newborns and its correlation with CHD.

Methods: In a 1-year cross sectional descriptive-analytic study, 2928 newborns were screened for heart murmur during routine neonatal physical examination. All babies with murmur underwent echocardiography.

Findings: Murmur was detected in 91 (3.1%) neonates, of whom 47 (51.6%) had a congenital heart disease. The most common (17.6%) abnormality was ventricular septal defect. Patent ductus arteriosus was found in 10 (11%) patients.

Conclusion: Remarkable high (round 50 %) rate of CDH in newborns presenting with heart murmur, urges to observe these neonates closely to establish the diagnosis of congenital heart disease and early referral to pediatric cardiologist.

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Key Words: Heart murmur; Congenital Heart Disease; Echocardiography; Ventricular Septal Defect; Patent Ductus Arteriosus; Newborn

Introduction

Congenital heart disease (CHD) is defined as a structural abnormality of the heart or intrathoracic great vessels that is actually or potentially of functional significance[1]. This is themost common form of cardiovascular diseases in children. Cardiovascular malformations affect 6 to 8 infants per 1000 live births[2]. The incidence

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of structural congenital heart disease is estimated to be less than 1% of all live births[3].

Heart murmurs are a common finding in infants and children and mostly originate from normal flow patterns with no structural or anatomic abnormalities of the heart or vessels and are referred to as innocent, physiological or normal murmurs; conversely, murmur may be created by abnormal flow patterns in the heart and vessels resulting from congenital heart abnormalities[4].

According to one study two-thirds of normal newborns have innocent murmurs for several days after birth[5]. Another study found heart murmur within the first week of life in 7.38/1,000 live births[6].

The present study was conducted to evaluate incidence of heart murmur in neonates and its association with congenital heart disease.

Subjects and Methods

Two thousand nine hundred twenty eight newborns admitted to the nursery of Imam Khomeini and Alavi Hospitals, Ardabil, Iran were examined from September 1, 2006 to September 1, 2007. The clinical examination was carried out by a pediatrician within 24 h of delivery.

All neonates with heart murmur underwent echocardiography by cardiologist to explain the nature of the abnormality. The results of echocardiography were categorized as a) structural heart malformation, b) physical variance and c) completely normal.

Birth weight, gestational age and gender in all infants were noted. Maternal age at delivery and folic acid use were recorded in the questionnaire. The Spearman's Rho and Chi^2 tests were used to define correlation and association between variables. Significance level of $P>0.05$ was used in the analysis. All statistical analyses were performed using SPSS software.

Findings

Out of 2928 live-born infants 91 had heart murmur (prevalence: 31 cases per 1000 live births).

Cardiovascular malformations were present in 16 of 1000 infants, 9.9 (61.7%) in female infants and 6.4 (38.3%) cases in male infants. The most common cardiac defect was ventricular septal defect (VSD), and the second most common was patent ductus arteriosus (PDA) (Table 1).

Table 1: Distribution of various causes of heart murmur in neonates

Results of echocardiography	N (%)
normal	44 (48.4)
Ventricular septal defect (VSD)	16 (17.6)
Patent ductus arteriosus (PDA)	10 (11)
Pulmonary stenosis (PS)	5 (5.5)
Atrial septal defect (ASD)	4 (4.4)
Left ventricular hypertrophy (LVH)	4 (4.4)
Transposition of the great arteries (TGA)	2 (2.2)
ASD, VSD	2 (2.2)
VSD, PS	1 (1.1)
VSD, PS, PDA	1 (1.1)
Right ventricular hypertrophy, Right atrial hypertrophy	1 (1.1)
ASD, VSD, Pulmonary arterial hypertension	1 (1.1)
Total	91 (100)

Of 91 neonates 16 had ventricular septal defect, a prevalence of 5.5 per 1000 live births [11 (68.8%) females; 5 (31.3%) males]. None of the patients had a family history of congenital heart disease in first degree relatives.

Birth weight ranged from 1000 to 5000 g. Congenital heart disease was seen more (42.6%) in infants with birth weight between 2500-3499g and there was no significant relation between birth weight and congenital heart disease (*P*=0.4). Congenital heart disease was present in 24 (51.1%) infants born at >39 weeks of gestation. Altogether, 10 (21.3%) infants were born at 30-34 weeks, 9 (19.1%) at <29 weeks and the others (8.5%) at 35-39 weeks. No significant relation between gestational age and congenital heart disease was detected in our data (*P*=0.8).

Discussion

Congenital heart diseases comprise the most common group of congenital malformations. Despite recent developments in interventional and surgical techniques, heart disease in children continues to be an important cause of morbidity and mortality[1]. Neonatal heart murmur is the most common reason for pediatric cardiologist consultation in neonatal intensive care units and nurseries[7].

Tanner et al observed innocent murmur in 44 (48.4%) and congenital structural heart defects in 47 (51.6%) newborns[8]. Rein et al found that 24% of heart murmur in neonates was innocent[9]. Another study has shown the prevalence of heart murmur in 13.7 per 1000 neonates. If a murmur is heard, there is a 42.5% chance of being an underlying cardiac malformation[10]. Yet another study stated that 84% of heart murmur in neonates was caused by heart diseases and only 16% were innocent and urged echocardiography with a clinically diagnosed or possible heart disease[11]. Many types of congenital heart disease may be associated with an asymptomatic murmur, the most common being ventricular septal defect (VSD)[3,9,11-16].

As a limitation to the study we did not measure the quality, grading and location of murmur. Because of the high prevalence of VSD in our study, it might be advantageous to create a longitudinal study that would allow subgroup analysis of patients with specific forms of CHD (e.g. VSD).

Conclusion

Approximately 51.6% of neonates with heart murmur had congenital heart disease and only in 48.4% the murmur was innocent. Although clinical evaluation could determine the presence or absence of heart diseases in most neonates, the lesion-specific diagnoses were not quite satisfactory. Echocardiography is necessary for neonates with a clinically diagnosed or possible heart disease.

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Conflict of Interest: None

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