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Research Article

EARLY DIAGNOSIS OF HEART BUTTON NUCLEONS IN CHILDREN AND IMPROVEMENT OF MODERN TREATMENTS

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ABSTRACT

To analyze the frequency and prevalence of congenital heart defects in a tertiary care center for children with heart diseases.Children with congenital heart defects are mainly referred during the neonatal period and infancy with impairment in gaining weight. Ventricular septal defect is the most frequent heart defect.

KEYWORDS

Congenital heart disease, epidemiology, prevalence.

INTRODUCTION

Congenital anomalies of the heart and great vessels are the most common severe congenital malformations 1, and they have high mortality in the first year of life 4. Several studies carried out with specific populations have had an incidence of between 2 and 10 per 1,000 live births. Based on a recent study in the city of Londrina, an incidence of 4/1,000 live births was estimated in the state of Paraná 5.

This study aimed at establishing the frequency and prevalence of congenital heart anomalies in children referred to a tertiary care center of pediatric cardiology.

The patients were divided into 4 groups: 1) group I – comprising 2,268 (50%) children whose cardiological assessment was considered normal; 2) group II – comprising 2,017 (44.4%) patients with congenital heart defects; 3) group III – comprising 201 (4.4%) patients with acquired heart disease; and 4) group IV – comprising 52 (1.2%) patients with arrhythmias.

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The diagnosis of a structural defect was based on the echocardiographic study. Based on this, 56 children in the congenital heart disease group were excluded from the analysis because they had not undergone echocardiography at our service. All group III patients had their diagnoses confirmed on echocardiography. Thirteen group IV children underwent only electrocardiography.

The following age groups were considered: neonates (1-30 days), infants (31 days to 2 years), preschool children (from 2 to 6 years), school children (from 6 to 12 years), and adolescents (> 12 years).

The classification was based on the sequential analysis of the heart performed on the echocardiogram, following the nomenclature of the European Paediatric Cardiac Code 6 and the Congenital Heart Surgery Nomenclature and Database Project 7.

We considered a complex heart disease as a set of associated malformations necessary for maintenance of the patient's life, each of them receiving a specific name in the literature as follows: total anomalous pulmonary venous drainage, hypoplastic left heart syndrome, single ventricle, mitral atresia, pulmonary atresia with intact ventricular septum, tricuspid atresia, double right ventricular outflow tract, double left ventricular outflow tract, tetralogy of Fallot, truncus arteriosus, and transposition of the great vessels. Therefore, persistent ductus arteriosus, atrial septal defect, ventricular septal defect, and pulmonary stenosis were not considered independently when they were part of a complex heart disease and necessary for the patient's survival.

When a set of alterations did not have a specific name and their association was not required for the patient's life, the malformations were considered as associated diseases and computed alone.

The following anomalies were excluded from the analysis: the anomalies of position and laterality, the right aortic arch, peripheral pulmonary stenosis, and the bicuspid aortic valve. In the same way, functional alterations, such as mitral, tricuspid, aortic, and pulmonary insufficiencies were not considered in the analysis.

Categorical data are shown in absolute figures and percentages. The continuous variables are shown as mean, standard deviation, and median. The comparative study of the demographic variables was performed only between groups I (normal) and II (congenital heart diseases). Groups II and III had significantly fewer cases than the other groups. For comparison, the Student t test and the Kruskall Wallis test were used for continuous variables, and the chi-square test was used for qualitative variables. Data were computed and analyzed with EPI INFO software and were considered statistically significant when $p<0.05$.

Cardiac anomaly is the most frequent congenital malformation and is mainly associated with genetic or chromosomal alterations. Its clinical manifestation fundamentally depends on the hemodynamic repercussion and usually exteriorizes in the first year of life. Autopsy studies show that the greatest mortality occurs at this age 2-4.

A study of infants below the age of 1 year at the Royal Brompton Hospital, in England, showed that most infants hospitalized were neonates 8.

In our study, most children with congenital heart disease were infants followed by neonates. Even considering that our evaluation concerns patients at the outpatient care unit and that carried out at the Royal Brompton Hospital analyzed hospitalized

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children, we observe a difference regarding the time of referral of the patients.

With us, the predominance of the diagnosis of congenital heart disease in infants coincided with the clinical manifestation of shunt heart defects with pulmonary venocapillary hypertension, such as ventricular septal defect and persistent ductus arteriosus, which were prevalent in our study. We should consider, however, that in our study, many children came from the countryside or other states, and this may have delayed their access to a specialized center.

Complex defects, which prevailed in other studies 7-11, manifesting in the first days of life, such as hypoplastic left ventricle and transposition of the great vessels, were less frequently found among us. Because these patients die early, we may suppose that many cannot receive specialized care in time or may even die without a diagnosis.

Delay in weight gain is significant considering that the control group belongs to the same population of children. The hemodynamic repercussion may have influenced this difference.

Children with congenital heart disease with great left-to-right shunt, heart failure, and pulmonary hypertension usually have growth delay. The degree of hypoxia, however, does not show a linear correlation with the degree of impairment 12.

Epidemiological studies have shown varied frequency and prevalence of congenital heart diseases. The technological advance and routine use of echocardiography have contributed to improvement in the establishment of the diagnosis, and, therefore, to increase the prevalence of some heart defects. Ventricular septal defect is the most dramatic example in recent studies, with a frequency of 41.6% in the study by Samánek and Voríšková 11 versus 15.7% in the NERICP series 10.

Ventricular septal defect, with an incidence of 30.5%, was the most common defect in our study, similarly to the results of other studies. That incidence was lower than the incidence reported in recent studies, 41.59% 11 and 39% 13, but higher than the incidence reported in older studies, 15.4% 8 and 15.7% 10. Factors, such as the cross-sectional analysis of the cases, the gold standard of the diagnosis, the spontaneous closure of the lesion, and the nonrecognition of minimum or small septal defects by the physician responsible for primary care, may have contributed to the difference between our figures and those in the literature.

Atrial septal defect (19.1%), persistent ductus arteriosus (17%), and pulmonary stenosis (11.3%) were the most frequent anomalies, with an incidence greater than 10%. A lower frequency has been reported in the literature, because those anomalies have been classified in a secondary hierarchical scale, and have been usually associated with other anomalies.

Coarctation of the aorta, the fifth most frequent anomaly in this study, has a high degree of association with other anomalies and shows frequency similar to that in the study by Samánek and Voríšková 11. Aortic valve stenosis, the third anomaly in the study by those authors, had a low prevalence in our study, but a prevalence similar to that reported in other studies 9,10,14.

In regard to cyanotic heart defects, tetralogy of Fallot (6.9%), transposition of the great vessels (4.1%), and tricuspid atresia (2.3%) were the most frequent anomalies. According to the literature, the most prevalent anomaly is transposition of the great vessels, with an incidence ranging from 3.5 to 10.9% 9,14.

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Data collection was based on a uniform protocol of patient's assistance, but performed in a retrospective manner, which significantly limits its interpretation. By choosing echocardiography as the gold standard, some cases that had been previously considered mild or had been ignored were computed. However, the echocardiographies at the Hospital Infantil Pequeno Príncipe were performed by several members of the clinical team and not specifically by an echocardiographer, which may lead to different interpretations of the same defect.

CONCLUSION

In conclusion, congenital heart defects are mainly referred for treatment during infancy and the neonatal period, ventricular septal defect being the most frequent anomaly. Complex heart defects with high mortality in the first days of life had a lower prevalence than that reported in the literature, suggesting that, among us, these cases have not reached adequate care in time. Other studies should be carried out to confirm these numbers and to stimulate continuous medical education to improve the prognosis of these patients. Impairment of ponderal development requires better evaluation and orientation by us.

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