BENIGNE ARRHYTHMIAS IN SCHOOLCHILDREN

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Abstract

Children arrhythmias may be transient or permanent, congenital or acquired (rheumatic fever, myocarditis), caused by a toxin, drugs, or be a sequel of surgical correction of congenital heart disease. The major risks of any arrhythmia are those of severe tachycardia or bradycardia leading to decreased cardiac output, or the risk of degeneration into a more severe situation, for example, ventricular fibrillation. One of the major issues in the management is to determine whether the rhythm disturbance is prone to deteriorate into a life-threatening tachyarrhythmia or bradyarrhythmia. Some rhythm abnormalities, such as single premature atrial and ventricular beats, are common among children without heart disease and in the great majority of instances do not pose a risk to the patient.

Key words: arrhythmias, sudden death

Introduction

Not all arrhythmias occur in a symptomatic context in small children. But in older patients usually a rhythm disturbance associates several symptoms that can alert the parents or the teachers and lead to further investigations. Sometimes symptoms are overwhelming the child, producing a wide distress to the audience. Unfortunately there are situations when without any warning an arrhythmia strikes and ends in sudden death, more often during exercise in a sport class. This is the main reason why we performed this study, among children, mainly from the neighborhood schools. Fortunately, during the 4 year period of this study, we did not experienced any life threatening situations among this children, although we manage to discover some conditions that could led in the future t such events.

Purpose

The aim of this paper is to check the incidence and occurrence of arrhythmias in a group of 500 school children from Timisoara, including a high school with sport profile.

Material and method

The study has been performed during a 4 years period from 2001 to 2004. The group of patients consisted of 500 school children aged between 7 and 18 years, outpatients of the pediatric ambulatory of the Clinical County Hospital Timisoara. This was a randomized lot of patients, with poor or lack of symptomatology, submitted to a routine control prior to sport classes in order to discover no symptomatic cardiac diseases.

The initial evaluation of each scholar began with a careful history, specifically questioning the patient regarding the presence of palpitations, syncope, chest pain, or other symptoms. We also inquired about any circumstances that can trigger an arrhythmia, such as emotionally upsetting events, ingestion of caffeine-containing beverages, cigarette smoking, exercise, or gastrointestinal problems. Family history can be helpful because a variety of familial disorders can result in arrhythmias, including myotonic dystrophy, Duchenne muscular dystrophy and hypertrophic cardiomyopathy

The physical examination was complete, insisting on the cardiovascular system. This included the blood pressure measurement in orthostatic and sitting positions.

Regardless of previous findings, each child was investigated recording a 12-lead electrocardiogram (EKG). The investigation was completed by echocardiography, biological explorations, exercise stress testing and a 24 hours Holter monitoring in particular cases in order to discover an underlying cardiac disease. This last part of the evaluation was mostly performed in Clinic II Pediatrics, the children being hospitalized for 2-5 days.

Results

Sex distribution of the children

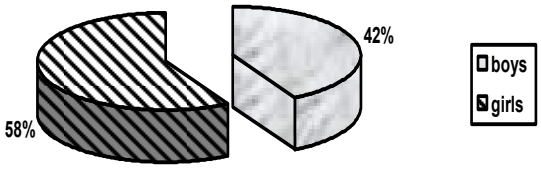

Fig.1. Sex distribution

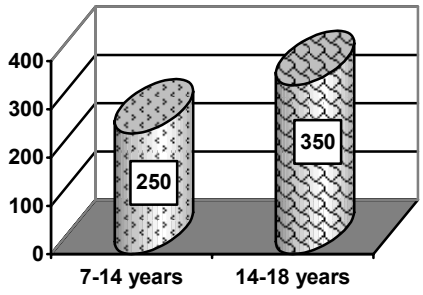

Fig.2 Age distribution

From all 500 school children 370 had no cardiac disease or electric disturbances at the moment of the examination. In 130 cases we noticed EKG modifications, associated or not with a positive history and/or clinical findings, as shown in the following table. We mention that the percentage refers to the total of 500 children investigated and that sometimes more than one of the EKG anomalies were found in some cases.

Table 1. EKG anomalies

Arrhythmia	Nr cases	%
Sinus bradycardia	52	10,4
Sinus tachycardia	37	7,4
Atrial parasystolia	18	3,2
Premature atrial beats	14	2,8
Premature atrioventricle complexes	3	0,6
Wolf-Parkinson-White syndrome	4	0,8
Lown-Ganon-Levine syndrome	3	0,6
Premature ventricle beats	34	6,8
Ventricular tachycardia	3	0,6
Heart blocks	44	8.8
Repolarization anomalies	67	13,4

In order to perform a more accurate evaluation of arrhythmias and cardiac or noncardiac underlying conditions, we hospitalized 42 patients in Clinic II Pediatrics. Further exploration included blood chemistry, chest X-ray, echocardiography, repeated EKG, exercise stress testing and Holter monitoring.

Consecutive investigations leaded to the discovery of different situations, as presented in Table 2. We also have to mention that several patients associated more than one pathologic condition.

Table 2. Specific diseases

Diagnosed disease	Nr. Cases	%
Atrial Septal Defect	3	0,6
Ventricular Septal Defect	10	2
Hypertrophic cardiomyopathy	6	1,2
Dilated cardiomyopathy	2	0,4
Mitral valve prolapse	45	9
Streptococcical infection	15	3
Preexcitation syndromes	4	0,8

Atrial parasystolia	22	4,4
Isolated heart blocks	17	3,4
Orthostatic hypotension	35	7
Systemic hypertension	12	2,4
Hypocalcaemia	65	13
Food disorders	25	5

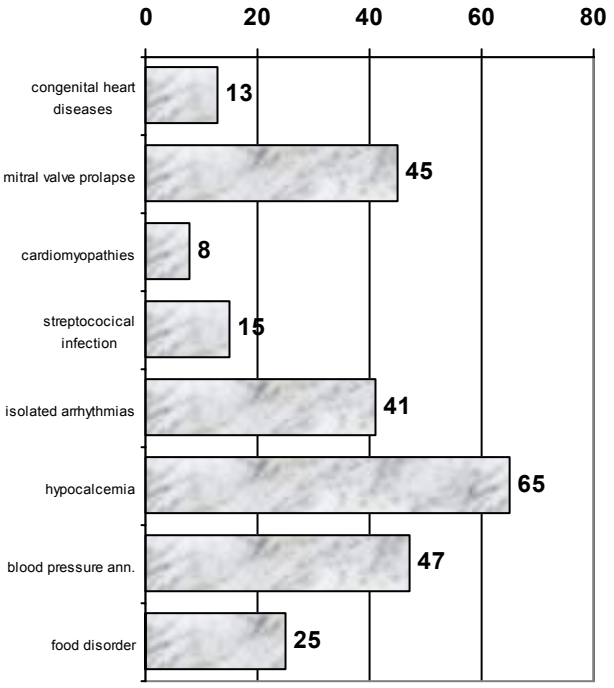

Fig.3 Repartition of specific diseases underlying the arrhythmias

Holter monitoring was a valuable method to investigate higher risk patients regarding the occurrence and frequency of cardiac rhythm disturbances. Unfortunately, we still need more devices, in order to make a more precise evaluation of the patients with sever cardiac diseases, like cardiomyopathies, to extend the monitoring period at home, in a normal life situation. This is the only way to ensure a lower rate of sudden death due to arrhythmias because we can adjust the treatment and life regime indications to individual conditions.

Discussions and conclusions

The availability of an increasing number of diagnostic and therapeutic technologies, coupled with concerns over the rising costs of health care, has generated growing interest in determining the cost and effectiveness of cardiological care. But not the cost of a patient should be our first concern, because we are dealing with children. Every situation that can lead to an accident or incident threatening the life of a child is a matter of importance. Unexpected sudden death is a tragedy at any age but is particularly so in childhood and adolescence. The causes of sudden death in childhood are known but their relative importance is difficult to assess.

Although in our schools few incidences occurred concerning sudden death in children in the last decade, it is important to discover from the very stages of evolution cardiac diseases that can induce dangerous arrhythmias. Physical exercise but also intellectual stress in school children can start a life-threatening rhythm disturbance. The economical conditions does not support schools with medical and human personal trained to deal with emergency cardiac situations.

We noticed that in our lot of study 13 patients "escaped" until this age of being diagnosed with a congenital heart disease. This proves that in our health system many things can be improved, especially the collaboration between the family doctor and the policlinic or hospital specialist physician. There still are patients of different ages with congenital heart anomalies undiagnosed. That is why our research will continue the following years, in order to low as much as possible the risk of life threatening situations, especially of cardiac etiology.

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