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MAIN SYMPTOMS OF NON-RHEUMATIC MYOCARDITIS IN OLDER CHILDREN ACCORDING TO ECG

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Abstract
In the Cardio-Rheumatology Department of the Samarkand Regional Multidisciplinary Children's Clinical Center, we conducted clinical and electrocardiographic analyses of 50 young patients diagnosed with non-rheumatic myocarditis (NM) between 2020 and 2021.
Findings: The study revealed that 86% of young children diagnosed with non-rheumatic myocarditis had a history of acute respiratory infections. The clinical symptoms of non-rheumatic myocarditis were as follows: general weakness (88%), excessive sweating (86%), cough (50%), cyanosis around the lips and nose (58%), and pale, marble-like skin (76%). A muffled heart sound was observed in all patients, while a "gallop" rhythm was detected in 32% of cases. Other findings included tachycardia (80%), arrhythmia (14%), extrasystole (14%), and bradycardia (4%).
ECG changes: Rhythm disorders: Sinus tachycardia (88%), sinus arrhythmia (12%), extrasystole (14%), and sinus bradycardia (6%). Right ventricular hypertrophy was identified in 24% of cases, while left ventricular hypertrophy was observed in 46%. Cardiomegaly was detected in 20% of the patients. Our investigation showed that sinus tachycardia (88%) and weakening of the first heart sound at the apex (72%) were common cardiac signs. In comparison, studies by O.A. Mutaf'yan and Yu.M. Belozerov reported tachycardia in 65% and 62.5% of cases, respectively. However, symptoms such as bradycardia, arrhythmia, and extrasystole were two times less frequent in our study than in those of Yu.M. Belozerov (2014) and O.A. Mutaf'yan (2016).

KEYWORDS: ECG, children, respiratory.

INTRODUCTION

Non-rheumatic myocarditis is an inflammatory heart disease caused by various etiologies, unrelated to rheumatism or other systemic diseases. According to the WHO classification, myocarditis is a specific disease of the heart muscle

with identified causes, involving inflammatory infiltration, fibrosis, necrosis, or degeneration of cardiomyocytes. Diagnosing myocarditis is challenging for practitioners due to difficulties in differentiating it from other inflammatory conditions of the heart.

The clinical and pathological features of non-rheumatic myocarditis often overlap with those of dilated cardiomyopathy, making it hard to distinguish between the two. Many cases of myocarditis can lead to dilated cardiomyopathy, characterized by the development of myocardial fibrosis as inflammation subsides. This highlights the importance of studying myocarditis comprehensively. In children, inflammatory processes may involve not only the myocardium but also the pericardium and endocardium, prompting N.A. Belokon to propose the use of the term "carditis."

Relevance of the Issue:

Myocarditis can occur at any age, with higher prevalence among young children. In some cases, mild forms of myocarditis may remain asymptomatic and unrecorded, complicating efforts to determine its true prevalence (N.V. Orlova, T.V. Pariyskaya, 2019). According to studies, 24-33% of children may have asymptomatic myocarditis (E. Rarillo, 2018). Yu.M. Belozerov's research found that myocarditis affects 10 out of every 1,000 people (Belozerov, 2014), with myocardial damage occurring in 1-5% of patients with acute viral infections (Belozerov, 2014).

Mild forms of myocarditis are asymptomatic, while severe forms can cause complex cardiac rhythm disturbances, heart failure, and acute circulatory disorders (E.N. Amosova, 2018; V.S. Prikhodka, 2011). In children, the clinical presentation of myocarditis is often nonspecific, posing a diagnostic challenge for practitioners. Modern studies have detected anti-cardiac antibodies in the blood serum of children with myocarditis (V.P. Krivonostov, 2016).

The clinical manifestations of myocarditis in children vary depending on its etiology, extent, and severity. Mild cases are often asymptomatic, but severe cases can involve complex arrhythmias, heart failure, and acute circulatory disorders (E.N. Amosova, 2012; V.S. Prikhodka et al., 2013). Thus, one of the urgent tasks in pediatric cardiology is to investigate the specific clinical features and prevalence of non-rheumatic myocarditis in children of different ages in Samarkand.

Research Object and Subject:

We conducted clinical and electrocardiographic analyses of 50 young children with non-rheumatic myocarditis treated at the Cardio-Rheumatology Department of the Samarkand Regional Multidisciplinary Children's Clinical Center between 2018 and 2019.

Research Objective:

To study the current clinical picture and ECG symptoms of non-rheumatic myocarditis in young children and to compare the findings with data from the literature.

Research Tasks:

1. To investigate the current clinical course and diagnostic criteria of non-rheumatic myocarditis in young children.
2. To study ECG changes specific to non-rheumatic myocarditis in young children.
3. To conduct a comparative analysis of the study findings with data from the literature.

RESULTS

Our study revealed that 86% of young children with non-rheumatic myocarditis had a history of acute respiratory infections. Perinatal history showed that 82% had anemia and 46% had gestational complications. In children with non-rheumatic myocarditis, 92% developed the condition against a background of anemia, while 36% had exudative-catarrhal diathesis or hypotrophy, and 30% had lymphatic-hypoplastic diathesis. The clinical symptoms included general weakness (88%), excessive sweating (86%), cough (50%), cyanosis around the lips and nose (58%), and pale, marble-like skin (76%). Muffled heart sounds were present in all patients, with a "gallop" rhythm observed in 32% of cases. Tachycardia was noted in 80% of cases, arrhythmia in 14%,

extrasystole in 14%, and bradycardia in 4%.

ECG Findings:

- Rhythm disorders: Sinus tachycardia (88%), sinus arrhythmia (12%), extrasystole (14%), and sinus bradycardia (6%).
- Conduction disorders: Interventricular conduction disorder (24%), contraction phase disturbance (66%), incomplete right bundle branch block (24%).

Right ventricular hypertrophy was observed in 24% of cases, left ventricular hypertrophy in 46%, and cardiomegaly in 20%.

The S-T segment represents the distance between the end of the QRS complex and the beginning of the T wave. In healthy children, the S-T segment may deviate 0.5-1 mm above or below the isoelectric line. According to our findings:

- In children under 3 years old, the S-T segment was elevated by 2.5 mm in leads V2 and V3 in 8 children, and by 3 mm in leads V3 and V4 in 7 children.
- In children aged 3-7 years, no changes in the S-T segment were observed.
- In children aged 7-12 years, the S-T segment was elevated by 2.5 mm in leads III and V1 in 2 children, and by 4 mm in leads I, aVL, and V5 in 3 children, indicating subendocardial and subepicardial ischemia.

Table 3.7: ECG Parameters in Children Aged 7 to 12 Years

The table presents the millimeter measurements of ECG waves and the duration of intervals in seconds for children aged 7 to 12 years.

Waves	Lead	I	II	III	V_1	V_5
P	Min	0,2	0	-1,0	0,4	0,4
	Max	1,4	2,6	1,4	2,4	2,0
	Medium	1,1	0,9	X0,6	1,2	1,5
Q	Min	0	0	0	0	0
	Max	3,6	3,0	5.0	0	5,4
	Medium	0.76	0,56	1,39	0	0,46
R	Min	3,0	3,0	1,0	1,0	5,0
	Max	14.0	19,0	18,0	15,0	20,0
	Medium	7,6	10,7	6,5	5,6	12,6

Increase in R-wave amplitude: An increase in R-wave amplitude above 7 mm was observed in 14% of patients aged 7-12 years in leads I, aVL, and V5, V6. This finding indicates left ventricular

hypertrophy (LVH).

2. R-wave enlargement in specific leads: Enlargement of the R-wave in leads III, aVF, V1, and V2 suggests hypertrophy of the right ventricle (RVH). RVH was identified in 28% of children under 3 years of age (9 patients).

3. S-T segment elevation: According to our findings, 8 children under 3 years old exhibited an S-T segment elevation of 2.5 mm above the isoelectric line in the chest leads V2 and V3.

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