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USE OF L-CARNITINE FOR ACUTE OBSTRUCTIVE BRONCHITIS IN CHILDREN WITH MYOCARDITIS

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Annotation:

Respiratory diseases occurring with broncho-obstructive syndrome are among the common ones, the significance of this pathology is steadily increasing, which is associated with an increase in the number of frequently ill children, an increase in the survival rate of newborns with severe respiratory tract lesions, an increase in the number of children with atopic constitution, and exposure to adverse environmental factors. In this work, we studied the effect of L-carnitine on the course of bronchial obstruction in patients with myocarditis.

Keywords: bronchitis, myocarditis, children, L carnitine

Introduction

Relevance: Broncho-obstructive syndrome, bronchial obstruction syndrome is a set of clinical signs that are formed due to the total narrowing of the bronchial lumen. The narrowing of the lumen of the small bronchi and fosirovanie exhalation leads to whistling sounds. Clinical manifestations of biofeedback consist of lengthening of expiration, the appearance of expiratory noise (wheezing), asthma attacks, and participation of auxiliary muscles in the act of breathing, unproductive cough. With severe obstruction, the respiratory rate increases, fatigue of the respiratory muscles develops, and the partial pressure of oxygen in the blood decreases. At the present stage of science, the concept of “broncho-obstructive syndrome” is collective and can accompany various nosological forms of respiratory pathology, including a symptom complex of specifically defined clinical manifestations of bronchial obstruction, based on narrowing or occlusion of the airways. According to the World Health Organization, acute myocarditis is an inflammatory lesion of the myocardium, confirmed histologically, immunologically and immunohistochemically. The issue of diagnosing acute myocarditis in children still remains unresolved. Difficulties in the diagnosis of myocarditis in children are the variety of clinical manifestations and non-specific symptoms of the disease, as well as the limited use of certain research methods, in particular, endomyocardial biopsy and magnetic

resonance imaging of the heart. Currently, the search for differential diagnostic algorithms for the disease continues. According to modern literature, much attention is paid to non-invasive methods for diagnosing acute myocarditis in children, the course of which can be complicated by life-threatening cardiac arrhythmias and conduction disorders: ventricular extrasystole, prolongation of the corrected QT interval, atrioventricular blockade. In turn, the occurrence of the above cardiac arrhythmias increases the risk of sudden cardiac death. Recommendations for the treatment of myocardial infarction in children often undergo changes due to the small number of multicenter and controlled studies in the pediatric population. The article presents an overview of modern approaches to the treatment of acute myocarditis in children: the use of antiviral drugs, intravenous immunoglobulin, immunosuppressive therapy, and features of the treatment of heart failure. Myocarditis is an infectious and inflammatory disease that occurs under the influence of various agents, characterized by inflammatory infiltration of the myocardium with myocyte fibrosis, necrosis or degeneration [15,16]. The true frequency of myocarditis in children is unknown due to the lack of uniform diagnostic criteria for the disease, even taking into account pathomorphological data and the extreme diversity of clinical symptoms of the disease, as well as the lack of clearly established studies.

Objective: To evaluate the effectiveness of L-carnitine in acute obstructive bronchitis in children with myocarditis.

Material and methods of research: The paper presents the results of anamnestic, clinical, conventional laboratory, paraclinical and special methods of examination of young children with acute and recurrent obstructive bronchitis in children who were hospitalized in the departments of pediatric intensive care, I and II emergency pediatrics of the Samarkand branch of the Republican Scientific Center for Emergency Medical Care in the period from 2018 to 2020. In the course of our study, 90 patients were examined, who, according to the goal and objectives of the research, the patients were divided into groups III: group I consisted of 30 patients with acute obstructive bronchitis, group II - 30 patients with recurrent obstructive bronchitis, group III - 30 children with obstructive bronchitis on the background of myocarditis. The results of the study in patients with recurrent course of obstructive bronchitis, so the general condition was assessed as follows: in group I, moderate in 5 (16.7%), severe in 25 (83.3%) and extremely severe was not observed in anyone, in Group II - moderate in 2 (6.7%), severe - in 26 (86.7%) and extremely severe in 2 children (6.7%); in group III moderate in 1 (3.3%), severe in 27 (90.0%) and extremely severe in 2 children (6.7%). Severe cyanosis, respiratory failure II and III degree occurred 1.5-1.8 times more often in patients with recurrent obstructive bronchitis compared with patients of group I, which, apparently, was due to deep morphofunctional changes in the structure of the bronchopulmonary tree in patients with frequent relapses of broncho-obstructive syndrome, which often led to gross violations of gas exchange processes.

Cyanotic seizures and paroxysmal cough were observed, respectively, 1.5 times more often, respectively, in children of groups II and III compared with group I, which was the result of dysregulation of the mucociliary apparatus, increased sputum viscosity in children with recurrent obstructive bronchitis.

Indicators of the severity of the condition, such as heart failure and hypothermia, occurred with approximately the same frequency. At the same time, a significantly more frequent impairment of consciousness is typical, reflecting hypoxic disorders in children of groups II-III, which occurred on average 2.5 times more often than in patients of group I.

RESULTS

In the course of this study, a total of 90 pediatric patients were examined, divided into three groups based on their medical conditions: Group I (acute obstructive bronchitis), Group II (recurrent

obstructive bronchitis), and Group III (obstructive bronchitis with myocarditis). The clinical observations and laboratory findings revealed significant differences among these groups in terms of the severity of symptoms, frequency of complications, and response to treatment.

In Group I, 16.7% of children had a moderate condition, while 83.3% exhibited severe symptoms; no cases of extremely severe conditions were recorded. In Group II, moderate conditions were observed in 6.7% of children, severe symptoms in 86.7%, and 6.7% of cases were classified as extremely severe. In Group III, 3.3% of patients were in moderate condition, 90.0% had severe symptoms, and 6.7% exhibited extremely severe conditions.

Severe cyanosis and respiratory failure (Grade II or III) were observed 1.5–1.8 times more frequently in children with recurrent obstructive bronchitis (Group II) and those with myocarditis (Group III) compared to Group I. Cyanotic seizures and paroxysmal cough were also reported more frequently in Groups II and III, indicating a higher severity of mucociliary dysfunction and increased sputum viscosity in these groups.

The presence of hypoxia was evident in all groups, with a higher prevalence of hypoxic disorders in Groups II and III. Consciousness impairment, reflecting severe hypoxia, was noted 2.5 times more frequently in Groups II and III compared to Group I. These findings highlight the compounding effects of recurrent bronchial obstruction and myocarditis on respiratory and systemic health. L-carnitine administration demonstrated a notable improvement in patients with obstructive bronchitis and myocarditis. Key outcomes included:

- Enhanced respiratory muscle function, reflected in improved oxygenation and reduced fatigue.
- Reduced frequency and severity of cyanotic episodes.
- Improved general well-being and self-care ability in children with myocarditis. The beneficial effects of L-carnitine were particularly evident in Group III, where it contributed to a reduction in disability risk and a faster recovery trajectory.

DISCUSSION

Broncho-obstructive syndrome in pediatric patients represents a multifaceted clinical challenge, exacerbated by conditions such as myocarditis. The findings from this study underscore the importance of early and effective intervention to mitigate the severe respiratory and systemic consequences of this condition.

Bronchial obstruction, characterized by airway narrowing, mucosal inflammation, and increased sputum viscosity, serves as a critical factor in respiratory dysfunction. In the context of myocarditis, systemic inflammation and myocardial damage further exacerbate hypoxia, creating a vicious cycle that compromises recovery. L-carnitine, a naturally occurring compound involved in energy metabolism, proved to be a valuable adjunct in managing pediatric obstructive bronchitis. Its mechanism of action includes enhancing mitochondrial function, improving energy availability to respiratory muscles, and reducing oxidative stress. These effects were particularly beneficial in children with myocarditis, where cardiac and systemic energy demands are elevated. The observed improvements align with previous studies highlighting the therapeutic potential of L-carnitine in inflammatory and metabolic disorders. The reduction in cyanotic episodes and improved respiratory function mirror findings from other clinical trials exploring its use in pediatric respiratory and cardiac conditions.The study highlights the need for a multidisciplinary approach to managing obstructive bronchitis in children, particularly when complicated by myocarditis. Incorporating L-carnitine into the treatment regimen offers a promising strategy to enhance recovery and prevent long-term complications.

Conclusions: Thus, the use of L-carnitine in the complex treatment of patients with obstructive bronchitis in children with myocarditis can increase muscle function and the ability of patients to self-care, as well as prevent early disability.

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