American Journal of Medicine and Medical Sciences 2024, 14(6): 1651-1653
DOI: 10.5923/j.ajmms.20241406.38

Laboratory Parameters of Children with Acute Rheumatic Fever and Vitamin D Levels

Muxamadieva Lola Atamuradovna[1], Umarova Saodat Sulaymonovna[2], Kuldashev Sardor Furkatovich[3]

Samarkand State Medical University, Republic of Uzbekistan

Abstract The problem of Acute rheumatic fever (ARF) remains relevant. According to WHO, 5 thousand people worldwide suffer from rheumatic fever every year, 3 thousand of them develop cardiovascular diseases as a result of ARF [Belov B. S. 2008]. ARF and its consequences cause significant morbidity and mortality in developing countries, but are not recognized as a global health problem. ARF in childhood is a common cause of acquired cardiovascular diseases and disability. It is known that cardiovascular diseases are one of the most common causes of death worldwide. The aim of our study was to study the laboratory parameters of children with acute rheumatic fever, depending on the level of vitamin D. Materials and methods of research. 50 children with acute rheumatic fever aged 5 to 15 years who were admitted to the children's department of the multidisciplinary clinic of the Samarkand State Medical University 2020-2023 were prospectively examined. Generally recognized gradations were used to assess vitamin D levels: 0-20 ng/ml - pronounced vitamin D deficiency, 20-30 ng/ml- vitamin D deficiency, 30-100 ng/ml - adequate vitamin D level. The analyses showed that in all patients the indicators were increased in all groups, but in the group with severe vitamin D deficiency they amounted to 453.5±30.8, in the group with vitamin D deficiency 329.0±13.09 and at an adequate level of 309.84±18.18. Thus, vitamin D deficiency detected in children with acute rheumatic fever coincides with the highest frequency of the primary attack of the disease in winter and spring, when the risk of vitamin D deficiency is increased.

Keywords Vitamin D, Children, Rheumatic fever

1. Introduction

Acute rheumatic fever (ARF) is an infectious and allergic disease characterized by systemic damage to the connective tissue of the cardiovascular system, synovial membranes of joints, serous membranes of the central nervous system and serous membranes of the skin. ARF in children is characterized by an acute onset with alternating periods of exacerbation and remission, often with a long course [2].

It should be emphasized that the seeded positive bacterial culture from the pharynx plays an important role in confirming the role of BGS in the development of ARL. In modern medicine, serological studies are indispensable to identify elevated or rising titers of anti-streptococcal antibodies-antistreptolysin-O (ASL-O) and anti-deoxyribonucleic B (anti-DNase B) for the diagnosis of infection. According to many authors, the main factors of the development of ARL, which is BGSA-pharyngitis, are described. It is much less common in children than viral. The incidence of ARF in BHSA pharyngitis is about 3%, in the development of which an individual predisposition plays a role [7,8].

Antibodies to streptolysin O begin to be produced in the body one to two weeks after streptococcal infection. The maximum blood level is reached after 4-6 weeks. Antibodies to streptolysin O can persist in the blood for several months. A negative test result for antistreptolysin O or a very low concentration of it in the blood most likely excludes a recent streptococcal infection. This is especially true if the test is negative again after 10-14 days. ASLO An increase in ASLO titer indicates a recent streptococcal infection. However, the presence or severity of rheumatic fever cannot be determined by the degree of increase in ASLO. However, if symptoms of this disease are present, an increase in ASLO can confirm the diagnosis [10,11].

The prevalence of ARF and CRBS and the high frequency of temporary and permanent disability in economically valuable groups of the population indicate the social, as well as the scientific and practical role of this problem [5,11], In scientific and practical terms, extreme caution is necessary: the prognosis of ARF is determined by timely diagnosis, adequate treatment and complete prevention of recurrent attacks and disease progression [3,10].

To study the laboratory parameters of children with acute rheumatic fever, depending on the level of vitamin D.

2. Materials and Methods

50 children with acute rheumatic fever aged 5 to 15 years who were admitted to the children's department of the

Received: May 9, 2024; Accepted: Jun. 3, 2024; Published: Jun. 20, 2024
Published online at http://journal.sapub.org/ajmms

multidisciplinary clinic of the Samarkand State Medical University 2020-2023 were prospectively examined. All patients were diagnosed using the criteria of Kisel Johnson in the modification of Nesterov A.I. Laboratory studies were conducted to make this diagnosis:indicators of clinical blood analysis, data from biochemical analyses, bacteriological studies, C-reactive protein (CRP), rheumatoid factor (RF), ASLO, cytokine levels in the blood; data analysis of instrumental research methods: ECG, Echo-KG, ultrasound of internal organs. In addition, liquid chromatography was used to determine the level of vitamin D.

Generally recognized gradations were used to assess vitamin D levels: 0-20 ng/ml - pronounced vitamin D deficiency, 20-30 ng/ml- vitamin D deficiency, 30-100 ng/ml - adequate vitamin D level.

3. Results and Discussions

When analyzing the sex, it was revealed that 27 (54%) girls prevailed among the patients, compared with 23 (46%) boys. The most common cases were children aged 5-9 years. Among the 50 children with primary rheumatic attack, the majority of children were admitted and accounted for 46 (92%), 4 (8%) with repeated attack. The examination revealed the following main diagnostic criteria for ARL: rheumatic chorea-14(28%), rheumocarditis-28(56%), polyarthritis-8(16%), rheumatic nodules-2(4%), ring-shaped erythema-1(2%) and a combination of two main criteria-11(42%): rheumacarditis and polyarthritis 7 (14%), rheumacarditis and chorea 3(6%).

Most patients were hospitalized between October and March, with the peak of hospitalization in February.

Arthralgia was noted in 29 (58%) children. Polyarthritis was characterized by a migratory character. ECG changes in children with carditis: tachycardia was observed in 18 (36%) children, sinus arrhythmia in 9 (18%), bradycardia in 6 (12%) children. Prolongation of the PQ interval, which belongs to the small criteria of ARL, was observed in 8 (16%) patients. On Echo-KG, tachycardia, mitral regurgitation in 28 (56%) children, a combination of mitral and tricuspid regurgitation in 21 (42%) and aortic regurgitation in 1 (2%) child were detected in all patients with carditis.

Depending on the level of vitamin D, the children were divided into 3 groups. The first (I), respectively, children with severe deficiency of 8 children (16%), the vitamin D level in this group was 17.60±1.24, the second (II)-vitamin D deficiency in 24 children (48%)vitamin D -23.37±0.47 and (III) - an adequate level in 18 children (36%), vitamin D -51.27±4.26. Half of the children were deficient or severely deficient in vitamin D.

The groups were compared by a general blood test, CRP, ASLO, bacterial culture of a pharyngeal smear. When comparing the total blood count, blood hemoglobin in the groups did not differ much and ranged from 70 to 106 g/l, the number of red blood cells ranged from 3.2 to 4.25 x1012, that is, anemia was noted in all examined patients. An increase in ESR was observed in 45 patients, which was 90% in all groups.

The ASLO analysis showed that in all patients the indicators were increased in all groups, but in the group with severe vitamin D deficiency they amounted to 453.5±30.8, in the group with vitamin D deficiency 329.0±13.09 and at an adequate level of 309.84±18.18.

Thus, the higher the vitamin D deficiency, the higher the ASLO indicator. The indicators of CRP in the first group with a pronounced deficiency of vitamin D20,60 ± 8.12, in the group with a deficiency of vitamin D10,55 ± 0.95, and in the group with an inadequate level of 7.68 ± 1.16. At an adequate level, the lowest level of CRP is noted.

Bacterial culture of pharyngeal smears showed that in groups with severe vitamin D deficiency and deficiency, hemolytic streptococcus was seeded in association with yeast fungi of the genus Candida in diagnostic titers. And in the group with adequate vitamin D levels, the growth of only yeast fungi of the genus Candida was noted.

4. Conclusions

Thus, in children with acute rheumatic fever, with deficiency or severe deficiency of vitamin D, there are more elevated indicators of c reactive protein, ASLO, in addition, there is an increase in hemolytic streptococcus in association with fungi of the genus Candida.

Vitamin D deficiency detected in children with acute rheumatic fever coincides with the highest frequency of the primary attack of the disease in winter and spring, when the risk of vitamin D deficiency is increased. Vitamin D deficiency in our study was more often noted in the group of children aged 5 to 9 years, when usually these children do not receive this vitamin additionally. In addition, the immunomodulatory and anti-inflammatory effects of vitamin D have been proven, and therefore, vitamin D deficiency may be another predisposing factor in the development of acute rheumatic fever in children, and its deficiency may also affect the activity of the inflammatory process.

REFERENCES

[1] Belov B. S., Nasonova V. L., Kuzmina N. N. Acute rheumatic fever: modern etiopathogenetic aspects // Scientific and practical rheumatology. 2008. №5.

[2] European recommendations for the prevention of cardiovascular diseases in clinical practice // RFK. 2008. No.3.

[3] Kuzmina N.N., Medyntseva L.G., Belov B.S. Rheumatic fever: half a century of experience in studying the problem. Reflections of a rheumatologist // Scientific and practical rheumatology. 2017. №2.

[4] Tsybyrne I., Andreev V., Bezu G. Expert assessment of the definition of disability and work capacity in acute rheumatic fever and chronic rheumatic heart disease with and without heart defect // Public health, economics and management in medicine. 2015. №1 (58).

[5] Cherkashin D.V., Kuchmin A.N., Shulenin S.N., Svistov A.S. Rheumatic fever // Clinical medicine. 2013. №7.

[6] Eid, M., Mostafa, F. A. Z., Tamim, H., Elberry, M., & Sayed, S. (2022). Revisiting The Value of Anti-streptolysin O Titer in Children with Rheumatic Fever. *Pediatric Sciences Journal*, *2*(1), 54-61. doi: 10.21608/cupsj.2021.106125.1034.

[7] Jack S, Moreland NJ, Meagher J, Fittock M, Galloway Y, Ralph AP. Streptococcal serology in acute rheumatic fever patients: findings from 2 high-income, high-burden settings. Pediatr Infect Dis J 2019; 38: 1-6.

[8] RHDAustralia (ARF/RHD writing group). The 2020 Australian guideline for prevention, diagnosis and management of acute rheumatic fever and rheumatic heart disease. Version 3.2. Darwin: Menzies School of Health Research; 2020.

[9] Mukhamadiyeva L.A., Umarova S.S., & Nabiyeva F.S. (2023). THE PATHOGENESIS OF RHEUMATIC FEVER. *Journal of New Century Innovations*, *29*(4), 164–169. Retrieved from http://www.newjournal.org/index.php/new/article/view/6905.

[10] Kudratova, Z. E., Mukhamadieva, L. A., Rustamova, G. R., Mamatkulova, D. H., & Umarova, S. S. (2021). The Role of Cytokine Regulation in Obstructive Syndrome of Atypical Genesis in Children. *Annals of the Romanian Society for Cell Biology*, 6279-6291.