STUDY OF MICROELEMENT IMBALANCES IN INTESTINAL HELMINTHIASIS AND IMPROVEMENT OF THEIR CORRECTION

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Abstract

Intestinal helminthiasis remains a common parasitic disease worldwide and is associated not only with gastrointestinal manifestations but also with systemic metabolic disturbances. Chronic helminth infections can disrupt microelement homeostasis due to impaired intestinal absorption and competition for essential micronutrients.

Key words: Intestinal helminthiasis; microelements; iron deficiency; zinc deficiency; micronutrient imbalance; correction therapy.

Introduction

Intestinal helminthiasis remains a significant public health problem, particularly in developing countries, where sanitary conditions and access to clean water are limited. Helminth infections affect millions of people worldwide and are especially prevalent among children and socially vulnerable populations. Beyond gastrointestinal symptoms, intestinal helminths exert systemic effects on the host, leading to nutritional deficiencies, metabolic disturbances, and impaired immune function.

One of the important consequences of chronic helminth infections is the disruption of microelement homeostasis. Helminths compete with the host for essential micronutrients such as iron, zinc, copper, selenium, and magnesium, and may also impair their absorption in the intestine. Microelement deficiencies contribute to anemia, growth retardation, cognitive impairment, and reduced resistance to infections. Despite the clinical importance of these disturbances, microelement imbalances in intestinal helminthiasis remain insufficiently studied, and approaches to their correction are not standardized.

Therefore, investigation of microelement status in patients with intestinal helminthiasis and the development of improved strategies for correcting detected imbalances are of considerable clinical and preventive importance.

Aim. To study microelement disturbances in patients with intestinal helminthiasis and to improve approaches for their correction.

Materials and Methods

This study included patients diagnosed with intestinal helminthiasis based on clinical presentation and parasitological stool examination. The control group consisted of apparently healthy individuals without evidence of parasitic infection.

Patients with chronic systemic diseases, acute infections, or conditions affecting mineral metabolism were excluded from the study.

Clinical evaluation included assessment of gastrointestinal symptoms, general condition, and nutritional status. Laboratory investigations involved determination of serum microelement levels, including iron, zinc, copper, selenium, and magnesium, using standardized biochemical methods. Hematological parameters, such as hemoglobin concentration and red blood cell indices, were also analyzed.

All patients received standard anthelmintic therapy according to current clinical guidelines. To improve correction of microelement disturbances, patients were additionally prescribed individualized microelement supplementation based on detected deficiencies. Follow-up laboratory assessments were performed after completion of therapy to evaluate the effectiveness of the correction.

Statistical analysis was conducted using standard methods. Quantitative data were expressed as mean ± standard deviation, and differences were considered statistically significant at $p < 0.05$.

Results

Patients with intestinal helminthiasis demonstrated significant microelement imbalances compared to the control group. The most pronounced deficiencies were observed for iron and zinc, which were detected in the majority of patients. Reduced levels of selenium and magnesium were also frequently identified, while copper deficiency was less common.

Microelement disturbances were more severe in patients with prolonged infection and higher parasitic burden. Iron deficiency was closely associated with decreased hemoglobin levels and signs of anemia, whereas zinc deficiency correlated with asthenic symptoms and reduced immune resistance.

Following anthelmintic treatment combined with targeted microelement supplementation, a significant improvement in serum microelement levels was observed. Iron and zinc concentrations increased toward normal values, accompanied by improvement in hematological parameters and general clinical condition. Patients receiving combined therapy showed more rapid and stable normalization of microelement status compared to those treated with anthelmintic therapy alone.

Discussion

The findings of this study confirm that intestinal helminthiasis is associated with significant disturbances of microelement homeostasis. Chronic parasitic infection leads to increased loss, reduced absorption, and competitive consumption of essential micronutrients by helminths. These mechanisms contribute to the development of anemia, immune dysfunction, and metabolic impairment.

The results demonstrate that standard anthelmintic therapy alone is insufficient for complete restoration of microelement balance. An integrated approach that includes

both elimination of the паразitic infection and targeted correction of microelement deficiencies is necessary for optimal clinical outcomes. Individualized supplementation based on laboratory assessment allows more effective and safer correction of deficiencies.

Conclusion

Intestinal helminthiasis is accompanied by significant microelement imbalances, most commonly involving iron, zinc, selenium, and magnesium. Comprehensive treatment that combines anthelmintic therapy with targeted microelement supplementation leads to more effective correction of these disturbances and improves clinical outcomes. Assessment and correction of microelement status should be considered an essential component of the management of patients with intestinal helminthiasis.

REFERENCES

1. World Health Organization. Soil-transmitted helminth infections. WHO Fact Sheet. Geneva; 2023.
2. Bethony J., Brooker S., Albonico M., et al. Soil-transmitted helminth infections: ascariasis, trichuriasis, and hookworm. *Lancet.* 2006;367(9521):1521–1532.
3. Crompton D.W.T., Nesheim M.C. Nutritional impact of intestinal helminthiasis during the human life cycle. *Annual Review of Nutrition.* 2002;22:35–59.
4. Stephenson L.S., Latham M.C., Ottesen E.A. Malnutrition and parasitic helminth infections. *Parasitology.* 2000;121(Suppl):S23–S38.
5. Prentice A.M. Iron metabolism, malaria, and other infections: what is all the fuss about? *Journal of Nutrition.* 2008;138(12):2537–2541.
6. Beard J.L. Iron biology in immune function, muscle metabolism and neuronal functioning. *Journal of Nutrition.* 2001;131(2S-2):568S–580S.
7. Sandstead H.H. Zinc deficiency: a public health problem? *American Journal of Diseases of Children.* 1991;145(8):853–859.
8. Haider B.A., Bhutta Z.A. Multiple-micronutrient supplementation for women during pregnancy. *Cochrane Database of Systematic Reviews.* 2017.
9. Elmurodova A.A. (2023). Viral Hepatitis Delta: An Underestimated Threat. *Texas Journal of Medical Science, 26,* 1–3. Retrieved from https://zienjournals.com/index.php/tjms/article/view/4610
10. Oblokulov Abdurashid Rakhimovich Mukhammadieva Musharraf Ibrokhimovna Sanokulova Sitora Avazovna Khadieva Dora Isakovna. (2023).
11. CLINICAL AND LABORATORY FEATURES OF SPONTANEOUS BACTERIAL PERITONITIS IN PATIENTS WITH VIRAL LIVER CIRRHOSIS. Journal of Advanced Zoology, 44(S2), 3744–3750. Retrieved from http://www.jazindia.com/index.php/jaz/article/view/1716

12. Mukhammadieva M.I. (2022). Modern clinical and biochemical characteristics of liver cirrhosis patients of viral etiology with spontaneous bacterial peritonitis //Texas Journal of Medical Science. – 2022.- P. 86-90
13. Abdulloev Mukhriddin Ziyodulloevich. (2023). Modern Therapy of Viral Hepatitis. Texas Journal of Medical Science, 26, 66–69. Retrieved from https://www.zienjournals.com/index.php/tjms/article/view/4636
14. Abdulloev Mukhriddin Ziyodulloevich. (2023). Modern Therapy of Viral Hepatitis. Texas Journal of Medical Science, 26, 66–69. Retrieved from https://www.zienjournals.com/index.php/tjms/article/view/4636
15. Mukhammadieva M.I. (2023). Вирус этиологияли жигар циррози беморларида спонтан бактериал перитонит билан асоратланишнинг профилактикаси ва давосини такомиллаштириш//Oriental Renaissance: Innovative, educational, natural and social sciences. -2023.-P.947-953.
16. Oblokulov A.R., M.I.Mukhammadieva.(2022). Clinical and biochemical characteristics of liver cirrhosis patients of viral etiology with spontaneous bacterial peritonitis//Academicia Globe: Indersciense Research.-2022.- P. 210-216.
17. M. R., M. ., & S. A., S. . (2022). Features of the Course of Contagious Giardiasis Associated with Giardiasis. Miasto Przyszłości, 26, 186–189. Retrieved from https://miastoprzyszlosci.com.pl/index.php/mp/article/view/464
18. Облокулов, А., & Муҳаммадиева, М. (2022). КЛИНИКО-ЛАБОРАТОРНАЯ ХАРАКТЕРИСТИКА СПОНТАННОГО БАКТЕРИАЛЬНОГО ПЕРИТОНИТА ПРИ ЦИРРОЗЕ ПЕЧЕНИ ВИРУСНОЙ ЭТИОЛОГИИИ. Журнал вестник врача, 1(3), 66–69. извлечено от https://inlibrary.uz/index.php/doctors_herald/article/view/2016