THE SPECIALITY OF PATHOGENETIC BASES AND PREVALENCE OF PARASITIC INFECTIONS IN CHILDREN: REVIEW

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Resume: *The purpose of this study was to analyze the literature of recent years on the incidence, morbidity structure and pathogenetic bases of parasitic infections found in children. In addition, the peculiarities of detectability of nematodes, cestodoses and trematodoses in different countries of the world are given. The basics of the diagnosis and prevention of parasitic infections in children are described.*

Key words: *parasitic infections, helminthiasis, children, degree of occurrence, pathogenesis and prevention of parasitic infections.*

Currently, one of the factors determining the state of public health is socially caused diseases, including protozoa and helminthic infections, which account for 99% of all parasitic diseases [13, 29]. Parasitic diseases are group of diseases caused by worms and arthropods. A parasite is an organism that lives at the expense of another, which is called the “owner of the parasite”, and which coordinates its vital activity with its physiology.

Despite the existence of parasitic diseases from ancient times, they remain the most common diseases in the world. Currently, there are about 50 thousand species of organisms leading a parasitic lifestyle. Over 342 species of helminthes and 18 protozoa cause disease in humans, with the result that the invasiveness of the population reached 2 billion people. This is especially true of children; among the sick, they make up more than 80%. Schoolchildren and children of preschool age account for 90-95% of all patients with enterobiasis, 65.1% of patients with ascariasis. Today, the most widespread parasitic diseases include enterobiosis (725.83 per 100 thousand), ascariasis (158.03 per 100 thousand), and trichocephalosis (35.44 per 100 thousand of population). Annually, 200 million people are infected with giardiasis, and 500,000 people suffer from clinically severe forms [5, 7, 31]., The increase in the incidence of helminthes infections in different countries of the world is the result of high environmental pollution by helminthes eggs as a result of wastewater discharge, increased population migration, increased human contact with animals, a low socio-economic standard of living, weakening of the immune system of the population [25].

It has been established that children are the most vulnerable category of the population in relation to parasitic invasions. This is due, on the one hand, to a lower level

of compliance with sanitary and hygienic norms, and on the other hand, to more intensive growth and development processes, which decrease in conditions of parasitic infections. In childhood, parasites are often factors that contribute to the development of chronic eating disorders, gastrointestinal dysfunctions (GIT), intoxication, body sensitization, and weakening of the immune system. The migrating helminthic larvae can damage organs and tissues on their way: visceral membranes, eyes, nervous system. 5-7% of larval migrants enter the brain, the larvae of more than 30 types of parasites infect the lung tissue [7].

According to the international classification of diseases - ICD-10 (WHO, 2007), parasitic diseases belong to class 1. Helminthiasis ranks 4th in the degree of damage to the health of the world's population, after diarrhea, tuberculosis and coronary heart disease [32].

Depending on the source of the invasion, pathways of infection, and transmission factors, all human helminthic infections are divided into 3 main groups [14]: geohelminthiasis (ascariasis, trichocephalosis, ankylostomidosis, strongyloidosis); biohelminthoses (teniarinhoz, teniasis, opisthorchiasis, diphyllobothriasis, clonorchosis, fascioliasis, paragonimiasis, trichinosis, echinococcosis); contagious helminthiasis (hymenolepiasis, enterobiosis, in some cases strongyloidosis and cysticercosis).

Taking into account the biological characteristics of the causative agents of helminthiasis, they are divided into 3 main classes [14]: nematodes: ascariasis, enterobiosis, trichocephalosis, hookworm (ankylostomosis and necatoriosis), trichinosis, etc.; cestodiasis: teniarinhoz, teniasis, diphyllobotriasis, hymenolepiasis, echinococcosis, etc .; trematodosy: opisthorchiasis, clonorchosis, fascioliasis, etc.

According to localization in the human body, helminthes are classified into intestinal and extraintestinal, including tissue helminthes infections.

In Russia, the frequency of infested helminthiasis on average reaches 140–200 cases per 100 thousand population, in the Far Eastern Federal District 330 cases per 100 thousand, in the Khabarovsk Territory 130.5–180.3 cases per 100 thousand population. During the parasitological examination of 1265 children aged from 6 months to 15 years living in different areas of the Khabarovsk Territory, 946 invasive children were found (86.6% of all the examined). The presence of 13 monoinvasions with different helminthes, 18 mixed invasions was established. The most frequent helminth infections in children were ascariasis, toxocarosis, clonorchosis, both in the form of monoinvasions and as associates [15].

Starostina O. Yu. et al. [22] presented an analysis of the incidence of helminthes infections and protozoa in the Omsk region of Russia. There was no tendency to a decrease in the incidence of opisthorchosis, an increase in serological indicators of toxocarosis, and the existence of a high risk of mixed parasites among the rural population.

The group of rare helminthes infections includes endemic in the local territory, the pathogens of which circulate in this territory, but due to biological barriers human

infection occurs rarely, as well as imported helminthes infections, the pathogens of which do not circulate due to the lack of climatic conditions [6] .

Materials on the serological diagnosis of trichinosis in the population of the Tyumen region of Russia indicate the high importance of this biohelminthiasis, with greater danger to the population of the northern territories due to the presence of active natural foci [19].

In Belarus, the complex of natural conditions and the species composition of natural hosts create favorable conditions for the existence of natural foci of trichinosis and determine the endemicity of the territory of the country according to this invasion. It has been established that in the structure of parasitic diseases, helminthes infections were 90.5-94.0%, and protozoa 6.0-8.5%. The total annual incidence rate of parasitic diseases in Belarus was 210.32 per 100 thousand population [8, 9, 28].

In patients with right hypochondriac syndrome of unspecified etiology, liver trematodes are rarely detected. A parasitological examination of 84 patients was carried out, of them 87% had opisthorchiasis, 3.5% had pseudomystomas, and 9.5% had a combination of opisthorchiasis and pseudomastoses. Instrumental examination methods help to identify indirect signs of damage to the organs of the hepatobiliary system [27].

Studies conducted in East African preschool children have demonstrated a strong, direct correlation between hookworm and anemia. In children in the coastal areas of Kenya, anemia was associated with ankylostoma invasion (> 200 eggs per gram) in all age groups, in both sexes, regardless of socio-economic factors. In Zanzibar, Tanzania, low concentrations of hemoglobin have been associated with hookworm in children aged 30-71 months. It is important that this study showed a link between the degree of ankylostoma invasion and iron deficiency indicators (serum ferritin and red blood cell protoporphyrin). Currently, a significant number of studies have been conducted that demonstrate how helminthiasis worsens the nutritional status of children [30].

Helminthiasis is one of the most common diseases in Uzbekistan, accounting for more than 90% of the total number of parasitic diseases. The level of perennial infestation of the population remains consistently high [23].

Every year in Uzbekistan, more than 200 thousand invasions are registered - out of 7580703 people examined for helminthiasis, 263167 invasions (3.5%) were detected. According to a study conducted in the Samarkand region, the invasion of children in separate institutions was more than 50%, the frequency of mixed invasions was 39.6% [17].

The prevalence of worms varies by region of Uzbekistan. Enterobiasis and hymenolepiasis are widespread, both in urban and in rural areas. Foci of ascariasis are registered in the mountain-foothill zones of the Fergana, Namangan and Surkhandarya regions, the center of teniarinhoz is the Khorezm region. Uzbekistan belongs to the regions endemic for echinococcosis. In separate kindergartens and secondary schools, the invasion of children Enterobius vermicularis, Hymenolepis nana, Lamblia intestinalis was 30-35%.

Analyzing the situation on the prevalence and clinical manifestations of parasitosis, we can note a certain role of helminthes infections and parasitoids in the formation of background conditions in children [17].

Given the absence of a tendency to reduce the incidence of parasitic diseases, the Cabinet of Ministers of the Republic of Uzbekistan on January 23, 2015 issued a decree on measures for the prevention and treatment of helminthiasis in children in Uzbekistan for 2015-2018. The document approved an action plan for the prevention and treatment of helminthes infections in the amount of 9.348 billion sums and $ 30,000 (UNICEF funds).

For the first time in the Bukhara region of Uzbekistan, indicators of infestation with children under 14 years of age with helminthes infections have been studied. The infestation of helminthes infections in children under 14 years of age at the primary health care level was revealed, and a structural analysis of helminthic carcinoma among children in the region was carried out [16].

According to the researchers [13, 14, 18], the pathogenic effect of the worms on children's bodies is as follows: mechanical action on the mucous membranes, which leads to damage to the gastrointestinal tract; toxic-allergic effects of metabolic products and the release of worms, which leads to the development of allergic reactions; the use of nutrients of the human body by helminthes, which leads to a lag in physical, mental and mental development, the formation of asteno-vegetative syndrome; their migration into vital organs and tissues of the body disrupts the normal function of the body; they contribute to chronization, lengthening the duration of treatment of diseases with which they are combined; reduce the effectiveness of vaccinations, is not achieved a sufficient protective level of the immune response during vaccination and revaccination against tetanus, measles, diphtheria, whooping cough; helminthes infections are accompanied by non-specific clinical manifestations: weakness, fatigue, irritability, sleep disturbance, dyspeptic symptoms, growth retardation and weight gain, decreased immune system activity; the production of insulin-like growth factor and an increase in tumor necrosis factor-α, as well as a decrease in collagen synthesis, which reduces appetite, decreases the absorption processes in the intestine; chronic persistent micro blood loss, in particular from the intestines with ankilostomiasis and through the bile ducts with trematodoses of the liver, which also causes the loss of amino acids with bile.

The pathological effect of all parasites is due to the modulating effect on the human immune system. Eosinophilia, IgE overproduction, mast cell release of mediators, mucus hyper secretion, the synthesis of interleukins are a defensive reaction and manifestation of the mobilization of the body in the fight against parasites. On the one hand, research data demonstrate the inverse relationship between the presence of parasitic invasion and the activity of the inflammatory process in allergic diseases. On the other hand, parasites and their metabolic products are allergens, cause inflammatory changes, have a sensitizing effect, which initiates the development of chronic allergic diseases [21].

The evolutionary phenomenon of an allergic reaction was formed due to the molecular similarity of parasite antigens and antigens entering the body from the outside (dust, pollen, food), which determines the development of non-specific sensitization in parasites infested [13, 21].

The helminthes induced immune response is determined by their morphological and biological features. The authors believe that the acquired antiparasitic immunity is due both to increased polymorphism of the biological properties and antigenic composition of the pathogen and complex mechanisms of development of the immune system itself, constant adaptation of the pathogen to avoid the factors of the host's immunological protection [4].

Growth retardation in children with geohelminthiasis is associated with various mechanisms, including a decrease in nutrient intake due to impaired absorption and / or decreased appetite. The study, which was conducted among children of northeastern Brazil, showed that in the cohort of children aged 2-7 years old, provided that there was a helminthes invasion in early childhood, there was a growth deficit of 4-6 cm at the age of 7 years. It is established that a low level of serum vitamin A is associated with ascariasis and trichocephalosis. A study in Nepal showed that the prevalence of xerophthalmia is 3 times higher in children with ascariasis at the age of 6-120 months than in children inactivated by ascaris [14].

Giardiasis is one of the most common parasitic invasions. Parasitizing in the small intestine leads to recurrent or persistent clinical manifestations, combining pain, dyspeptic and asthenoneurotic symptoms. Clinical signs are similar to those in other variants of the pathology of the gastro duodenal zone, intestine, and biliary tract, which makes clinical diagnosis almost impossible [3, 24].

Was studied the dental incidence in children with nematodes. Ascariasis was detected in 38.3%, enterobiasis in 4.97%, giardiasis in 26.6% of cases. Combined parasitic lesions were diagnosed: ascariasis and giardiasis occurred in 22.1%, enterobiasis and giardiasis in 2.7%, ascariasis and enterobiasis in 2.2%, ascariasis, enterobiosis and giardiasis in 2.98% of cases. Among children under 3 years of age with nematodoses, the incidence of caries of temporary teeth was 27.1%. Desquamate glossitis was found in 8.5%, atopic cheilitis in 19.2%, acute herpetic stomatitis in 23.4% of cases. 25.5% complained about the unpleasant smell from the child's mouth, and 40.4% of the parents surveyed indicated night bruxism [10].

The wide spread of parasitic diseases among people and animals contributes to the intensive seeding of various environmental objects with helminthes eggs. Non-compliance with the rules of personal hygiene, lack of preventive measures among people and animals, contamination of environmental objects with eggs and larvae of parasites leads to an increase in the number of cases of parasitic morbidity [1].

Khalafli H.N. [26] believes that in addressing the problem of intestinal parasitosis and children's health is important - the rationalization of approaches for comprehensive examination of children for intestinal parasitosis; assessment of the incidence of intestinal parasitosis in children; assessment of the effect of intestinal parasitosis on the physical and mental development of children; identification of the epidemiological patterns of the incidence of intestinal parasitosis in children; evaluation of the effectiveness of combinations of essential antiparasitic agents in the treatment of children; development of methods for the rehabilitation of the health of children with intestinal parasitosis; approbation of regional epidemiologically based preventive measures to reduce the risk of infection of children with intestinal parasitosis.

Kozlovsky A.A. [11] allocates specific and nonspecific prevention of helminthes infections. Non-specific prophylaxis includes: a healthy lifestyle; observance of sanitary and hygienic skills in the family, children's institutions, medical and preventive institutions; proper culinary food processing; use only boiled, bottled, filtered water; prevention of faecal pollution; correct keeping of pets; early detection of patients, timely treatment. Specific prophylaxis includes: helminthes chemoprophylaxis for children at risk for infection, as well as for children with persistent eosinophilia in the general blood test (1-2 times a year, in spring and / or autumn). Some authors have determined the effectiveness of preventive work to reduce helminthes infections in children in kindergartens [2].

LITERATURE:

1. Alyokhina N.A., Sokolova Y.O., Ismailova Z.M., Martynova O.V., Kenembaeva A.S. Parasitic cleanliness of the environment of the Astrakhan region for 2014-2016. Electronic magazine "Concept". 2017; 396: 2711-2715.

2. Akhatova G.Kh., Nazarova U.Kh., Tursunova Kh.N. Improving the effectiveness of the use of preventive measures in children to reduce the incidence of helminthes infections. Young scientist. 2017; 16: 25-27.

3. Bekhtereva M.K., Luppova N.E., Kornienko E.A., Minin S.N. Working protocol for the diagnosis and treatment of giardiasis in children. Questions of children's nutrition. 2013; 6: 72-76.

4. Bodnya E.I., Bodnya I.P. Clinical and immunological aspects of parasitic diseases. Clinical immunology. Allergology. Infectology. 2007; 3 (8): 26-29.

5. Bodnya E.I. The problem of parasitic diseases in modern conditions. Related Infections. 2009; 1: 41-44.

6. Guzeeva M.V. The role and place of rare helminth infections in parasitic pathology in Russia. Author. Diss ... for the degree of Ph.D. - Moscow, 2009. - 21 p.

7. Ershova IB, Mochalova A.A., Lokhmatova I.A., Monashova M.G., Petrenko O.V. Non-specific manifestations of helminthiasis in children. Child health. 2015; 8 (68): 45-50.

8. Zharnova V.V., Kuzyuta S.L., Nikitin V.F. Measures for the prevention of nematodoses. Russian parasitological journal. Moscow, 2016; 36: 2: 217-222.

9. Zharnova V.V., Zhmakin D.A., Nikitin V.F. Clinical and epidemiological picture of trichinosis in the Grodno region. Russian parasitological journal. Moscow, 2015; 4: 38-42.

10. Isaeva N.S. Dental morbidity in children with helminthiases (nematodes). Bulletin of Medical Internet Conferences. 2013; 3: 9: 1080-1081.

11. Kozlovsky A.A. Helminthiasis in children of the Gomel region. Medical news. Minsk, 2015; 6: 19-25.

12. Kotlyarov P.M., Yegorova E.V. Differential diagnosis of parasitic lung diseases according to radiological methods. Pulmonology 2016; 26 (4): 453-458.

13. Lysenko A.Ya., Vladimova MG, Kondrashin AV, Majori J. Clinical Parasitology. Guide. Geneva, WHO, 2002; 752.

14. Marushko Yu.V., Gracheva M.G. The current state of the problem of helminthiasis in children. Issues of diagnosis and treatment. Modern pediatrics. Kiev, 2012; 3 (43): 1-5.

15. Miropolskaya N.Yu., Molochny V.P. Helminth infections of the Far East of Russia. Far Eastern Medical Journal. 2014; 2: 116-122.

16. Mukhitdinov S.T., Zhuraeva F.R. Problems of helminth infections in children under 14 years of age and organizational methods of dealing with them in primary care. International Journal of Internauka. 2017; 6 (28): 30-32.

17. Norkulova G.S. Helminthiasis in children: frequency and causes // European research: Innovation in science, education and technology XXVIII International scientific and practical conference // London. United Kingdom. 2017; 73-74.

18. Odintseva V.E. Modern features of the diagnosis and treatment of parasitic parasitic invasions in children. Diss ... for the degree of Ph.D. St. Petersburg, 2010; 128

19. Peklo G.N., Stepanova T.F., Panarina P.V. Serological monitoring of trichinosis in the Tyumen region. Epidemiology and Vaccination. 2010; 1 (50): 30-33.

20. Romanova MA, Mordyk A.V. Infectious and parasitic diseases in children with active tuberculosis. Medical Bulletin of the North Caucasus. 2018; 13 (2): 343-347.

21. Sannikova A.V. Comorbidity of allergic and parasitic diseases in children: clinical and diagnostic features: Diss ... for the degree of Ph.D. Yugra, 2016; 129.

22. Starostina O.Y., Panyushkina I.I., Yemtsova TB, Tishkova E.L. The spread of endemic helminthiasis and protozoa in the south of Western Siberia (Omsk region). Epidemiology and Vaccination. 2010; 1 (50): 33-36.

23. O'lmasov M.M. Epidemiological features of some helminthes infections and the organization of the fight against them in the Tashkent region. Diss. for the degree of Ph.D. Tashkent, 2007; 116.

24. Usenko D.V., Konanykhina S.Y. Modern aspects of diagnosis and treatment of giardiasis. Questions of modern pediatrics. 2015; 14 (1): 108-113.

25. Fayzullina R.A. Samorodnova E.A., Dobrokvashin V.M. Helminthiasis in childhood. Practical medicine. 2010; 3: 31-36.

26. Khalafi Kh.N. The effect of intestinal parasitosis on the health of children. Basic research. 2013; 9: 156-162.

27. Khamidullin A.R., Sayfutdinov R.G., Khaertynova I.M. Human helminthes: opisthorchiasis and psevdamphistomosis. Practical medicine. 2011; 3 (50): 35-37.

28. Chistenko G.N., Vedenkov A.L. Parasitic diseases in the Republic of Belarus // "Modern aspects of the pathogenesis, clinic, treatment and prevention of parasitic diseases". Proceedings of the VIII Republican scientific-practical conference with international participation. Vitebsk, VSMU, 2012: 197-200.

29. Baldursson S., Karanis P. Waterborne transmission of protozoan parasites: review of worldwide outbreaks - an update 2004-2010. Water Res. 2011; 15:45 (20): 6603-6614.

30. Bethony J., Brooker S., Albonico M. Soil-transmitted helminthes infections: ascariasis, trichuriasis, and hookworm. Lancet