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RISK FACTORS OF OCCURRENCE TUBERCULOSIS IN CHILDREN

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Abstract:

Tuberculosis in children is a multifactorial disease. Predisposition to tuberculosis can be explained by the presence of risk factors that often simultaneously affect the child's body. The most common risk factors are biomedical (infection, tuberculosis vaccination defects, presence of concomitant pathology), epidemiological (contact with a tuberculosis patient), geographical and environmental, age-sexual, social (unfavorable living conditions).

Keywords: tuberculosis, risk factors, children.

According to many Russian and foreign authors, a feature of the current epidemiological situation of childhood tuberculosis is the increase in the number of cases mainly from risk groups [2]. The risk group for infection and tuberculosis is children who have one or more factors that determine the high probability of infection and disease [2,7,9]. The following main risk factors are identified: biomedical, epidemiological, geographical, age-sexual, social [1,2,3,4]. Among the newly diagnosed patients, the number of people with various risk factors is 73.2%, with several factors – 49.2% [5].

Medical and biological factors. In modern conditions, the largest proportion of children observed in tuberculosis dispensaries are those infected with Mycobacterium tuberculosis [3]. Infected children form a large risk group for reactivation of the tuberculosis process in the future [2,3,5]. If for an adult the risk of disease after infection with mycobacterium tuberculosis is 5-10%, then for a 5–year-old child it is 25%, and for children who came into contact with the infection at the 1st year of life, the probability of developing tuberculosis reaches 100% [3]. The risk of disease in newly infected people in the first 1-2 years is 4-5% and increases with the development of hyperergic sensitivity to tuberculin [15]. The risk of disease in children who have been infected for a long time (more than 2 years) with hyperergia is 8-10 times higher than in children with allergic reactions [3].

The risk group for tuberculosis also includes infected children who are often and long-term ill with acute respiratory viral infections and other nonspecific respiratory diseases, who are 6.5 times more likely to develop tuberculosis [5,7]. Primary infection in this group develops 2.4 times more often than in healthy people [3]. In the BDB group, the total infection rate reaches 69-85% [2,5,8]. Intercurrent diseases are an important cause of the development of tuberculosis and complications of this process resulting from a decrease in the resistance of the macroorganism [3].

The epidemiological process of tuberculosis infection is directly dependent on the volume and quality of preventive measures in children [4]. Unvaccinated or poorly vaccinated children develop tuberculosis 10-15 times more often than vaccinated children [2,4]. The absence of BCG is most dangerous for young children [4]. BCG vaccination during the newborn period protects the child from the occurrence of local forms by 58% [44]. At the same time, about 10-15% of children in the first year of life remain unvaccinated [2]. One of the most informative signs in determining the risk of tuberculosis in children is the size of the post-vaccination scar [10].

Complicated forms are much less common among vaccinated people than among unvaccinated ones: 22.0% and 60.3%, respectively [5]. The risk of disease in poorly vaccinated patients increases significantly in the presence of family contact with tuberculosis patients: among contact children with tuberculosis, from 50.0 to 62.1% do not have a post-vaccination mark or a scar less than 3 mm [4,9].

Epidemiological risk factors. The vast majority of children (92.8%) become infected through accidental contact with patients with active tuberculosis [3]. The nature of tuberculosis contact (family, family, apartment, casual) can influence the further course of a specific process in children. Family contacts are the most dangerous for children, because they differ in intensity and prolongation. In the majority of infected (57.1%) people at an early age, the sources of infection are parents and close relatives [6]. The presence of family or kinship contact is seen in 31.0-57.3% of sick children [16, 48, 49]. In children of early and preschool age, active, pronounced forms of tuberculosis are more often detected from family contact [5, 6]. In foci of tuberculosis infection, the risk of primary infection is 22 times higher than in children from a healthy environment, and the infection rate is 5 times higher [11, 32]. Children who come into contact with patients in foci become ill mainly at 1-2 years of follow-up [3,4].

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The incidence in the foci always exceeds the average [8,9]. Over the past 10 years, an increase in morbidity among contacts has been noted in the territory of the former USSR by more than 2 times [2,4,9]. In some territories, this figure reaches 592.2 per 100 thousand people [4]. The combination of foci and unfavorable social factors has a particularly negative effect on the epidemiological situation [4,5, 9].

Age and gender factors. Age is one of the most significant factors that play a decisive role in the development of tuberculosis. The body of children differs from the body of adults in the lability of its neuroprotective adaptations, in a very high, intensive metabolism, increased permeability of the blood-brain barrier, and in the energetic course of reparative processes [5]. One of the most important biological features of a growing organism is the existence of critical periods of development when the range of adaptive reactions is limited and sensitivity to exogenous influences increases [8]. Early childhood, especially the 1st year of life, and puberty are considered as the most sensitive to tuberculosis infection [5,6]. The increase in the number of cases occurs most rapidly in childhood and adolescence [8].

A feature of the current epidemiological situation is the increase in the number of patients, mainly of preschool and primary school age, when immunity decreases after BCG [2,8]. The most vulnerable groups of the population in terms of tuberculosis incidence are children of preschool and early school age [5,6,9]. The peak of morbidity is steadily shifting to this age group [5,8].

It is known that social and environmental disasters lead to an increase in the incidence of tuberculosis, and the clinical structure of the disease worsens [1,2,7]. Socio-economic instability in society has led to a sharp decline in the standard of living of the population. The deterioration of the epidemiological situation of tuberculosis is largely due to the deterioration of the financial situation and nutrition of a large part of the population, a sharp increase in migration of significant groups of the population, the appearance of a large group of socially maladapted persons [5,8].

The number of sociopathic families (alcoholic parents, drug addicts; families where parents are offenders, including those who have been to correctional labor institutions) and families of medical and social risk (incomplete, poor; raising disabled children, orphans) has increased [1,2,6].

A new socially unprotected group of the population has appeared - families of refugees, migrants, and internally displaced persons [4]. Tuberculosis is detected 2-5 times more often among the migrating population than among the sedentary [25]. Children from migrant families, as a rule, do not receive preventive vaccinations, they do not undergo tuberculin diagnostics, and only when symptoms of the disease appear, they turn to a doctor for the first time [2].

The incidence of indigenous people depends largely on socio-economic conditions, lifestyle, environmental conditions (nomadic lifestyle, crowding, monotonous diet, low cultural level, insufficient medical care). According to foreign researchers, natural resistance to tuberculosis is higher among the white race than among Africans, Eskimos, American Indians, and Polynesians [3,7].

Children are acutely sensitive to any changes in the external environment. A decrease in adaptive and compensatory reserves, depletion of regulatory systems under the influence of a number of adverse factors lead to an increase in diseases in children. Environmental pollution associated with the release of ammonia, nitrogen oxide, dust, and sulfur dioxide into the atmosphere is accompanied by an increase in the incidence of respiratory tuberculosis [1]. The radiation factor also contributes to an increase in the incidence of tuberculosis in children, a change in tuberculin sensitivity [4,6,7,8].

Thus, despite the complexity of the interaction of the driving forces of the epidemiological process in tuberculosis, the schematic diagram of the interaction of its main factors, which gives an idea of the main patterns of the formation of the incidence of tuberculosis in the population, can be presented as follows. The main factors of the epidemic process in tuberculosis are exogenous infection with sources and transmission routes, endogenous infection and risk factors. Their influence on the epidemic process at various stages of its development varies significantly. The object of influence of all three of these factors is the human body.

It is necessary to take into account the possibility of various combinations of the influence of factors on the human body. Summarizing the above risk factors for tuberculosis in children, it is safe to say that this disease remains a complex biomedical and socio-economic problem.

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