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MODERN FEATURES OF INFECTIOUS DISEASES IN CHILDREN

Rasulova Muazzam Turgunovna

Senior Lecturer of the “Academy of
Nurses” Tashkent, Uzbekistan.

Annotation. An assessment of the dynamics of infectious morbidity in children and the modern spectrum of the most frequently registered forms of childhood infections is presented. An analysis of the reasons for persistent morbidity in both “managed” and “unmanaged” childhood infectious diseases has been conducted.

Keywords: children, infectious diseases, morbidity, diagnosis, treatment, prevention, organization of children's infectious services.

Introduction. Understanding the essence of the infectious process led to the emergence of etiotropic therapy at the end of the 19th century, which became terminologically defined thanks to works on infectious diseases. Notably, among the first Nobel laureates were the developers of treatment methods for infectious diseases (Emil Bering, Ronald Ross, Jules Borde, Alexander Fleming, and others). The organization of infectious disease hospitals at that time allowed for a reduction in the high mortality rate from measles, scarlet fever, and diphtheria in a short period; then, only from these three nosological forms, every fourth or fifth child died. The mass training of doctors and their specialization in infectious diseases contributed to the establishment of an infectious disease service in the country. Undoubtedly, the fight against infectious diseases in children was carried out not only reliably, etc.

Their list can be lengthy; it suffices to say that, according to preliminary calculations, there are more than thirty of these «new» infections today. In Table.

Here are some of them. Moreover, we began to talk about diseases associated with infectious agents.

Methods. The current level of knowledge does not yet allow us to definitively explain and classify the observed phenomena as the main manifestations or complications of the infectious process. This refers to a whole spectrum of pathological syndromes and chronic non-communicable diseases described in modern literature - from Crohn's disease and various types of lymphomas to the hemophagocytic syndrome, which has become one of the main causes of fatal outcomes in pandemic influenza or severe degenerative diseases of the nervous system in the last two years. And the matter here is not only in the achievements of modern science. It seems that understanding and defining the patterns of these infectious processes will allow us to change our therapeutic capabilities and more effectively prevent these, still largely uncontrolled, diseases. Another conclusion is clear: the principle of training an infectious disease specialist must also change.

Along with knowledge of classical childhood infections, the doctor should also have an understanding of modern pathological processes. A kind of universal training that allows for the prompt resolution of assigned tasks. Infectious disease hospitals should also become modern, accumulating all diagnostic capabilities when working with patients. Perhaps, as the overall incidence of mass childhood infectious diseases decreases, the number of such hospitals will decrease, but their personnel and material-technical potential should increase significantly.

Results and Discussion. Such hospitals should serve patients of all ages, including adults, as only coordinated work will help form the necessary qualification of a doctor. The nature of the development of an infectious disease can be understood and assessed only by observing the patient throughout their entire life. In our view, the profession of an infectious disease specialist should be unified, without division into adult and child infectious disease specialists.

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When analyzing the spectrum of gastrointestinal diseases, attention is drawn to the significant decrease in the number of cases of bacterial intestinal infections in all age groups. After all, shigellosis and salmonellosis were defined as the main, if not the main, cause of infectious diarrhea in children until the late 90s of the last century. Modern industry Children's nutrition, built on high-tech principles of preparing and preserving finished products, has practically eliminated the «human factor» from this process. The requirements for the bacteriological safety of products have significantly increased. Today, we no longer use semi-craftsmanship products, as was the case relatively recently. In fact, whole cow's milk is excluded from the infant's diet, and a significant portion of the diet consists of hydrolyzed and canned products, making bacterial contamination practically impossible.

In such a situation, viruses have taken over the «environmental niche» of causative agents of acute infectious diarrhea. Today, virtually every second case of etiologically confirmed intestinal infection (47.7%) is caused by viruses. In the overall structure of intestinal infections, they constituted practically a quarter (22.9%) in 2010. Moreover, the incidence of viral intestinal infections (primarily rotavirus) is increasing every year. Clearly, the reason for this is not only the improvement of diagnostic capabilities in laboratories of infectious disease hospitals. The increase in morbidity is largely explained by the trends of the last five years, namely the growth in the structure of infectious causes. The improvement of the demographic situation and the increase in the number of children quickly led to the «over-fulfillment» of groups in preschool institutions and an inevitable increase in overall morbidity in children's collectives. “If we consider the biological characteristics of viruses - the causative agents of intestinal infections (high resistance in the external environment, long-term isolation by disease recoverers, a large number of erased and subclinical forms, etc.), then we can confidently predict their further dominance in the structure of causes of infectious diarrhea” [1].

Today, these infections are the main reason for children being hospitalized. and to try to gradually expand the range of preventive vaccinations through the creation of regional calendars, and subsequently through the updating of the National Vaccine Prevention Calendar. Already now, an analysis of the current situation shows that organizing vaccination against two infections (pox and rotavirus infection) and revaccination against whooping cough can fundamentally change the epidemiological situation regarding childhood infections.

After all, these infections account for almost half of all infectious diseases in children.

«Elasticity» in solving preventive tasks can be reduced, especially in its initial stages, to various prevention schemes: from disease prevention in target groups (for example, patients with immunodeficiencies, people with increased risk of infection and/or development of severe forms of the disease) to organizing universal mass vaccination. “It is already clear that the prospects for expanding the calendar will largely be determined by the financial capabilities of its provision, the availability of combined vaccines, vaccines with intradermal or other methods of delivery” [2].

As mentioned above, the instability of patients' admission to infectious disease hospitals (seasonality of acute intestinal and respiratory infectious diseases, viral hepatitis) led to a decrease in bed capacity and, accordingly, a 20-25% reduction in funding. The number of intensive care beds in infectious disease hospitals is also automatically decreasing.

With the establishment of specialized laboratories, the introduction of protocols and standards for treatment and diagnostics, the scope and volume of laboratory examination of patients have increased dramatically. Accordingly, the need for reagents, the cost of which is twice as high as for medicines, has increased sharply. “With the introduction (hypothetically in the future) of virological examination and molecular genetic diagnostics, reagent costs will increase even more” [3].

Today, the etiological interpretation is extremely poor; these are mostly serological methods, which are only effective for typhoid fever and have little information for other

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infectious diseases. Hence the result: primitive diagnosis is primitive treatment. This is also reflected in the qualification level of doctors.

The level of treatment and diagnostic process in infectious disease hospitals remains unsatisfactory. It's good that patients recover themselves, if they are not interfered with. And many examples can be given. Thus, the «face» of modern childhood infections has fundamentally changed, and these changes have occurred mainly in the last 10-12 years. New diagnostic and preventive technologies have had the greatest impact on this branch of pediatrics. The relative epidemiological well-being of recent years has formed the impression that the era of mass infectious diseases in the country has passed irreversibly, and the profession of infectious disease specialist will become increasingly less and less in demand in the coming years. But that's not the case. And there are several reasons for this. Infectious diseases will remain leading in childhood morbidity in the near future. Even if it is in a changed structure. “Expanding our knowledge about the causes and nature of disease development in children will further confirm the close connection between a large number of «non-communicable» diseases, both with the inhabitants and with the microbes around us. This will require the participation of an infectious disease specialist in the development and use of rational diagnostic and treatment schemes” [4].

It is also clear that the future of the infectious disease service lies in its powerful laboratory re-equipment, which allows it to respond promptly to any extreme situation in the country. After all, it is no coincidence that the emergence of each new infectious disease pathogen or cases of mass infection becomes a subject of public discussion and, as life shows, even a reason for political decisions.

It is clear that the so-called «bloody» (according to foreign classifications) diarrhea corresponds to this type of syndrome. From a clinical point of view, if invasive, «bloody,» or dysentery-like diarrhea develops, the patient will require etiotropic antibacterial therapy.

«Secretory» diarrhea occurs when several secretory agents enter the intestinal lumen: bile and fatty acids, bacterial entero toxins, laxatives, vasoactive intestinal peptide, glucagon, serotonin, calcitonin, etc. The pathogenesis is based on the hypersecretion of interstitial fluid into the intestinal lumen due to the activation of the adenylate cyclase system in mucosal cells. Simultaneously, the activity of water and electrolyte absorption processes in the tissue is suppressed. A classic example of developing this type of diarrhea is, of course, cholera, the causative agent of which produces a powerful exotoxin - cholergen. Nevertheless, factors contributing to the active secretion of tissue fluid into the intestinal lumen also form many other agents of acute intestinal infections. The «secretory» component of pathogenesis is based on bacterial, viral, and protozoal intestinal diseases. Moreover, most severe forms of «children's» intestinal infections, accompanied by dehydration phenomena, are formed precisely by this component of the diarrhea mechanism. Such variations of the disease will at least «depend» on the nature of the patient's diet, and strict dietary regimen will not be of decisive importance in curbing diarrhea. Traditionally, it is believed that this mechanism underlies the pathogenesis of gastrointestinal forms of salmonellosis, enterotoxic and enteropathogenic escherichiosis, and severe viral infections. “It is clear that adequate rehydration therapy should be the leading treatment method in such cases” [5].

“Osmotic” diarrhea is the result of impaired digestion and absorption of any origin (maldigestion and malabsorption). Etiological factors of acute intestinal infection of the “osmotic” type can be various microorganisms: from viruses and bacteria to protozoa. Nevertheless, in practice, viruses are often the cause of this type of diarrhea. Under the influence of an infectious agent. The death of «mature» enterocytes occurs primarily in the upper part of the intestinal mucosa's microvilli.

Conclusion. At the same time, the process of maturing epitheliocytes moving from the crypts to the villi apex accelerates. Low-differentiated cells form a structurally and functionally immature layer of mucous membrane. One of the outcomes of this phenomenon is enzymatic, disaccharide (primarily lactase) deficiency. The substances with high osmotic activity

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(disaccharides) accumulated in the intestinal lumen contribute to the movement of water and electrolytes of the interstitial fluid into the intestinal lumen along the osmolarity gradient. Excess carbohydrates become a substrate for their fermentation by intestinal amylolytic microflora, forming large amounts of organic acids, gaseous hydrogen, carbon dioxide, methane, and water. Based on the specifics of the pathogenesis, a strict elimination diet will be the primary treatment for viral (osmotic) diarrhea. The absence of substrate (undigested disaccharides) in the intestinal lumen leads to a decrease in diarrheal syndrome (and often to copulation). In other words, foods containing carbohydrates, including cow's milk, should be completely excluded from the sick child's diet. "It should be emphasized that breastfeeding (despite the presence of milk sugar in breast milk) remains a priority in the nutrition of children of the first year of life, as mother's milk is a «supplier» of biologically active substances (antibodies, immune complexes, lysozyme, lactoferrin, sIgA, oligosaccharides, nucleotides, cytokines, etc.), bifido-/lactoflora, which enhance the protective functions of the child's body. Additionally, the role of breast milk in preventing rotavirus gastroenteritis in breastfed children has been proven" [6].

The classical osmotic type of diarrhea (related to insufficient intestinal enzymatic activity) usually does not contribute to dehydration. Children with this type of diarrhea, despite persistent diarrhea, do not lose weight.

Thus, assessing the current general clinical and epidemiological situation with acute intestinal infections, we can note that the most noticeable changes have recently occurred in this area of pediatric infectiology. The range of diseases, the peculiarities of modern epidemiology, and understanding the mechanisms of diarrhea development contributed to the revision of the traditional approach to this pathology in both diagnostic and therapeutic aspects, which, in our opinion, will allow us to preserve the health and lives of our patients.

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