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Modern Aspects of the Etiology of Acute Intestinal Infections

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Abstract: The article presents modern data on etiology of acute intestinal infections, their clinical manifestations, modern approaches to diagnosis and treatment. The questions of probiotic and metabolic therapy in acute intestinal infections are discussed.

Keywords: Infectious Diarrhea, Acute intestinal infections, Diagnostics, Gastroenterology, Infections.

Relevance. According to WHO, about 1.7 billion cases of acute diarrhea are registered in children every year in the world, and 525,000 children under the age of five die from it [2]. In Russia, in the structure of infectious morbidity, acute intestinal infections still occupy a significant place, the second after acute respiratory viral infections, and in 2016 compared to 2015, there was an increase in the incidence of acute intestinal infections of unspecified etiology by 5% (364.88 cases per 100 thousand population). population), norovirus infection by 38% (15.51), a high incidence of rotavirus infection (83.26) and salmonellosis (26.03) remained [3].

Acute intestinal infections are a polyetiological group of diseases (bacterial, viral or protozoal), which are united by the development of the symptom complex of acute diarrhea [4]. In different countries, the etiological structure of AEI may differ significantly [5]. The main causative agents of bacterial AII are microorganisms of the Enterobacteriaceae family. The role of about 50 serovars of the genus Salmonella in the development of pathology in humans, mainly Salmonella group B, is known. S. enteritidis has become most widespread in recent years. Shigellosis, or dysentery, is caused by bacteria of the genus Shigella, which includes more than 40 serological variants, with Flexner and Sonne shigella being the most common. In recent years, there has been an increase in the proportion of dysentery caused by Shigella flexner 2a, which is characterized by a pronounced destructive component in inflammation of the colon. A characteristic property of Shigella has become a high polyresistance to the main, most commonly used antibacterial agents.

Of the other bacterial agents, pathogenic Escherichia are of significant importance in children as etiological agents of AII. There are five groups of pathogenic bacteria of the genus Escherichia, causative agents of escherichiosis:

1. Enteropathogenic Escherichia coli (EPEC) are the causative agents of colienteritis in children.
2. Enteroinvasive Escherichia coli (EIEC) cause dysentery-like diseases in children and adults. Strains O124 and O151 are of the greatest importance.
3. Enterotoxigenic Escherichia coli (ETEC) cause cholera-like diseases in children and adults, these include serogroups O6, O8, O15, O20, O25, O27, O63, O78, O115, O148, O159, etc.

4. Enterohemorrhagic Escherichia coli (EHEC) are the causative agents of dysentery-like diseases in both children and adults. These include strains O157: H7, O141, producing Shiga-like toxin (SLT-Shigalike-toxin).
5. Enteroaggregative Escherichia coli (EAgKP) cause long-term diarrhea in children and adults, which is associated with strong adhesion of bacteria on the surface of the epithelium of the mucous membrane of the small intestine.

Of the pathogenic bacteria, the causative agents of AEI are also Yersinia (Yersenia enterocolitica, of the known 30 serovars of which O3, O4, O5, O8 are of primary importance in human pathology), cholera vibrios and NAG vibrios. Conditionally plays an important role in the development of AEI in children. pathogenic microflora. The diseases caused by it are more often the result of the activation of one's own endogenous flora as a result of the failure of the body's defense system, which explains the associated development of a severe form of the disease and the difficulty in treatment. Among the most relevant opportunistic pathogens are bacteria of the genus Citrobacter, Staphylococcus aureus, Klebsiella, Hafnia, Serratia, Proteus, Morganella, Providencia, Bacillus cereus, Clostridium perfringens, etc. Clostridium difficile bacteria cause colon lesions in the form of pseudomembranous colitis in patients receiving intensive antibiotic therapy [4]. The etiological agents of bacterial AEI in children depend on the geographical region. In developing countries, Vibrio cholerae still causes epidemics, but the most common bacterial causative agent of AII is Shigella, particularly in Africa and South Asia. In Europe, the most common bacterial pathogens are Campylobacter, Salmonella spp., enteropathogenic and enteroaggregative E. coli. In a recent study in central China, the most frequently detected enteric pathogens were Salmonella spp. (8%), pathogenic E. coli (5%), Campylobacter jejuni (3%) and Aeromonas spp. (2%) [5]. Viruses are the predominant etiological factors of acute intestinal infections in children, especially young children, and especially in children of the first year of life. Thus, up to 80–90% of cases of acute diarrhea in children are virus-associated [6, 7]. According to systematic reviews, currently the leading cause of sporadic cases and outbreaks of acute gastroenteritis (AGE) in all age groups is norovirus infection, which accounts for almost a fifth of AGE. The development of severe OGE in children is associated with noroviruses [8]. Despite the introduction of vaccination against rotavirus infection in many countries, rotaviruses remain an actual cause of OGE, especially in young children, causing more than 200 thousand deaths, mainly in underdeveloped countries [9, 10]. The etiological agents of viral AII are also adenoviruses of serovars 40 and 41, enteroviruses of serovar 73, coronaviruses, caliciviruses and astroviruses. The causal role of thoroviruses, picornaviruses, and bocaviruses in the development of acute diarrhea is being studied [6].

Acute intestinal infections are one of the most serious problems of modern medicine. They cause a huge number of diseases around the world and, in particular, annually lead to the death of 2.5-3.2 million children under the age of five years. In developed countries, mortality is significantly lower than in developing countries, however, high incidence (tens of millions of cases annually) leads to heavy burdens on healthcare systems and large economic losses [18].

The most common agent causing outbreaks of acute gastroenteritis is norovirus (old name Norfolk virus, after the city in Ohio where it was first identified). More than 90% of cases of gastroenteritis of non-bacterial origin and about half of all cases of epidemiological gastroenteritis are caused by norovirus [4]. It is common in both developing and developed countries, affecting both children and adults. The contagiousness of the virus is very high. Approximately 23 million cases of norovirus-associated disease are reported in the United States each year [16], the vast majority of all viral gastrointestinal infections. The cause of most acute viral intestinal infections in Russia in both children and adults is also norovirus [1, 2].

The main route of spread is through household contacts, as well as infection by inhalation of aerosols containing particles of the patient's vomit. Outbreaks of the disease occur during sanitary violations, in particular, when the contents of the sewer enter the water supply [6]. Most

outbreaks occur in limited groups: schools, kindergartens, summer camps, hospitals, health care facilities, nursing homes, ships, etc.

Once in the external environment, norovirus remains viable for many days (up to a month). It is resistant to high and low temperatures, some disinfectants, ultraviolet radiation. Such resistance is one of the factors that ensure the high contagiousness of the virus.

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