EVALUATING THE IMPORTANCE OF FUNGI OF THE CANDIDA GENUS IN ACUTE INTESTINAL INFECTIONS IN CHILDREN OF EARLY AGE

P.A. Khrenov, T.V. Chestnova
Tula State University, Tula, Russia

Introduction.

Fungal infections are a major problem of clinical medicine [4]. Pathogenic fungi of the genus Candida can cause serious infections in humans, especially in immunocompromised patients, and, at the moment recognized agents of nosocomial infections [6]. Outcome of contact with Candida species in the condition of an individual's resistance. In most cases, this contact form transient kandiding. At the same time, individuals with disabilities in the system of antifungal resistance contact can create a persistent carriers and candidiasis [4,5].

The increasing proliferation of fungi of the genus Candida people made due to increased human exposure of various mitigating factors as the specific immune response, and non-specific resistance of the organism, which in turn is connected, first of all, with environmental factors. In addition, the important role played in the development of immunosuppression prolonged use of antibiotics, cytostatic therapy in patients with neoplasms of immunosuppressants after organ transplantation [2].

According to the World Health Organization in the world to grow annually èt immunosuppressive number of persons. In children, the immune system is untenable, for the reason that at this time there is an active formation of immune functions, and therefore they are more vulnerable in terms of a contingent of opportunistic infections. In the pathogenesis of the disease are important sensitizing properties of fungi of the genus Candida and their metabolic products that can interfere with the immunoreactivity of the body [3].

Given the above, we consider it necessary to continue under the dynamic monitoring of circulating Candida fungi in young children with acute intestinal infections. This observation is reasonable not only in terms of epidemiology, but also for the study of changes in virulence properties, the level of resistance to antimycotic drugs. In the available literature there is information on the participation of fungi of the genus Candida in infectious diseases, but they are contradictory and disjointed, and the monitoring of antibiotic susceptibility is carried out in a few cases.

Aim.

To assess the significance of fungi of the genus Candida in acute intestinal infections in young children, study antibiogram and virulent properties of selected fungi.

Materials and methods.

For studying hemogram we conducted a retrospective analysis of 204 case histories of children. The children (mean 4,13±2,3 yrs) were divided into two groups: I group - 102 people - children diagnosed with acute intestinal infections (AII), which were isolated Candida species from the feces; II group - 102 patients - children with a diagnosis of acute intestinal infections, but without isolation of fungal material genus Candida. The material for the study were the feces. Biopsy specimens from patients was performed according to standard methods described in the existing regulations. For identification of isolated microorganisms studied the morphological, tinctorial, cultural properties using medium and Sabouraud agar KANDSELEKT French company Bio Merieux. Determination of antibiotic susceptibility and biochemical profile isolated strains was performed using an automatic analyzer bacteriological VITEK 2 compact French company Bio Merieux. Microbial fungi suspension standardized to 2.0 units. (McFarland) with densitometer. Study of antibiotic susceptibility of fungi was performed to four meters è drugs: flucytosine, fluconazole, voriconazole, amphotericin B antigen detection rotor and adenoviruses used by dry immunochromatography rapid testing firm Bio Merieux. In the study of virulent fungus Candida, to detect their RB-factor (ability to filamentation) using media BIGGY (Spain). Statistical analysis

was performed using a software package for Windows and STDi program Excel 7,0. Data believed to be accurate significant at $p<0.05$.

Results and discussion.

In the clinical material, the children in group I, isolates of Candida were as follows: the dominant fungi is C. albicans-78,6%, followed by C. kruzei-10, 6%, C. glabrata-7, 1%, and C. tropicalis-3 and 6%. Ability to filamentation found in 100% of the strains C. albicans, C. krusei - 36% of the strains, including strains of C. glabrata and C. tropicalis ability to filamentation was not found.

In association with the fungi Candida allocated following etiologic agents: Rotavirus 45,5%, Klebsiella pneumonia 10%, Staphylococcus aureus 10%, Campylobacter coli / jejuni 5%, Enterobacter cloacae 3%, Pseudomonas aeruginosa 3%, Proteus mirabilis 3%, Streptococcus pyogenes 3%, Proteus vulgaris 1,2%, Morganella morganii 1,2%, Citrobacter freundii 1,2%, 13.9% of unknown etiology. Were only those representatives conditional - pathogenic flora, which are found in the material in diagnostic titre and possessed virulence properties. Isolated fungi Candida occurred in the material in 22%. Association with rotavirus in 29.4% of samples. Association with one bacterial type occurred in 24% of samples. Association with rotavirus and a bacterial type detected in 10.2% of samples. Association of fungi with two bacterial species, and the association of rotavirus with two bacterial species detected in 1.2% of samples. In associations with fungi of the genus Candida bacteria in acute intestinal infection Gram-dominated members of the family Enterobacteriaceae in 19.4%. Isolation from one patient at the same time the two strains (C. albicans and C. krusei) fungi reported in 5% of cases. The differences in the etiological structure between groups did not reach a significant criterion validity.

Analysis of antibiotic susceptibility of isolated fungal strains produced the following results: 100% of the strains C. krusei were resistant to fluconazole, voriconazole to 14% of the strains and to flucytosine, amphotericin B 11% and 34% respectively. Intermediate susceptibility to amphotericin B was found in 11% of the isolates. You must also note the presence of C. krusei strains associated with resistance - 40% of strains with cross-resistance - 11%. We showed a significant ($p<0.05$) increase in the minimum inhibitory concentration (MIC) antifungal drugs in isolates of C. krusei, such as BMD in strains resistant to fluconazole were as follows - flucytosine <= 1, fluconazole = 4, voriconazole <= 0.12, amphotericin B = 0.5, whereas the values of the IPC in the strains resistant to three drugs were: flucytosine>= 64, fluconazole, >= 64, voriconazole= 1, amphotericin B = 4. Strains resistant to all four drugs were following the IPC - flucytosine= 32, fluconazole> = 64, voriconazole= 4, amphotericin B = 4. All 100% of isolates of C. albicans sensitive to flucytosine, voriconazole and amphotericin B. For fluconazole sensitivity of 93% and 7% showed intermediate sensitivity. 100% of the strains C. tropicalis, and C. glabrata, are susceptible to all four drugs. In our opinion, the cause of multi-drug resistant strains, and increase the IPC, is the excessive use of antifungal drugs, not only for therapeutic but prophylactic without identifying not only specific accessory fungi Candida, but also to determine their antibiogram.

A retrospective analysis of medical records of children (using data from blood count at the time of hospitalization before the start of drug therapy) gave the following results. Significant differences in terms of blood counts in children in both groups had only hemoglobin (I group - 113±9,2, II group - 120,3±9,6, $p<0.05$), lymphocytes (I group - 48,7±12,3, II group - 44,4±10,2, $p<0.05$) and segmented neutrophils (39±11,1 - I group and 44,9±10,1 - II group, $p<0.05$). Although the number of monocytes was higher in Group I (4,2±1,7 in comparison with children of group II 2,9±1,1), but the differences did not reach certainty. Other data hemogram (erythrocyte sedimentation rate, the number of red blood cells, eozinofillov, stab neutrophils and color index) did not differ among children of both groups. Analysis of the data suggests hemogram possible role of Candida in the pathogenesis of intestinal infection. Significantly higher levels of lymphocytes in children in group I can testify to the antigenic stimulation of the immune system fungal antigens in addition to antigens Assiociants. Significant excess of the number of segmented neutrophils in patients of group II (without isolation from clinical fungi) can testify in favor of a more adequate

response to the cellular level, as is well-known fact that more frequent fungi infection immunocompromised individuals. We can assume that a significant decrease in hemoglobin levels in group I due to a violation of the process of iron absorption, and other trace elements necessary for the normal process of hematopoiesis in the gut.

Thus, the results indicate the participation of fungal-bacterial associations in inflammatory bowel disease. Therefore, given the urgency of the problem, the data obtained in research, we consider it necessary to conduct further monitoring of antibiotic susceptibility patterns of change virulent fungi and a more detailed study of the role of fungi in the pathogenesis of inflammatory diseases.

References.

1. I.D. Avdienco Search biological agents against fungi Candida. /Avdienco I.D., Ryabchenko N.F.// Journal of Microbiology Epydemiology and Immunobiology. № 6. 2002. P. 79;
2. L.S. Stratchunsci A practical guide to anti-infective chemotherapy./Stratchunsci L.S., Belousov Y.B., Kozlov S.V.// 2000-2007,P. 311;
3. O.A. Gankovskaya Changing the level of expression of signaling receptors of innate immunitu during infection with C. albicans in vitro and in vivo./Gankovskaya O.A., Zverev V.V.// Journal of Microbiology Epydemiology and Immunobiology. № 3. 2009. P. 61;
4. T.V. Chestnova Medical Mycology. /Chestnova T.V., Serehina N.V. // Teaching aid, Tula 2010.– P.5, P.73.;
5. T.V. Chestnova Landscape of clinical isolates of Candida fungi and resistance to antifungial drugs./Chestnova T.V., Serehina N.V. // Abstracts XIII International Congress ESCMID on antimicrobial therapy. Moscow, 2011. P.35;
6. N.N. Mishra Pathogenicity and drug resistance in Candida albicans and other yeast species. A review. / Mishra NN Prasad T, Sharma N, Payasi A, Prasad R, Gupta DK, Singh R. // Acta Microbiology Hung 2007 Sep;54(3):201-35.