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Evaluation of intestinal microbiocenosis regarded in the age aspect

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Abstracts: Disturbances of intestinal microbiocenosis in the young age was determined to be accompanied by fermentative dyspepsia. In patients of the mature age an increase of conditioned pathogenic flora was noted.

Key words: intestinal microbiocenosis, age aspect

The most representative and important for the human being is micro flora of the gastro intestinal tract. It is microbiocenosis that is the most complicated one in the human organism. Its content includes the agents of 17 families, 45 genus and more than 500 species of microorganisms. In different parts of gastro intestinal tract a composition of normal micro flora is significantly different. Intestinal dysbacteriosis is the background for the development of chronic gastro intestinal diseases, chronic allergic diseases and also a factor of weakness of immune system. Normal intestinal micro flora has the very important general biological significance for the vital activity of human organism. For the recent decades, a natural notion about that the intestinal microbiocenosis is a highly specialized system distinctly reacting qualifiedly and quantities shifts on the dynamic state of the organism and unfavorable out words has been formed. Age changes of the intestinal micro flora contest in the certain extend reflects the human ability to resist different harmful influence as well as to adapt to the changing conditions of the growing and mature organism. Due to it, the disturbances of intestinal biocenosis should not be always regarded as pathology. The aim of our study was to follow the interconnection between the intestinal micro flora and clinical manifestations in patients at different age.

Materials and methods: 53 patients with gastro intestinal diseases have been examined. Among them 20 patients at the age of 19-39 years (the first group), 17 people at the age of 40-59 (the second group) and 16 patients at age of 60 and older (the third group). Besides the conditional examination in the in-patient-department the feces inoculation on microbial picture has been made. Clinical manifestations of intestinal dysbacteriosis were characterized by diarrhea in combination with fermentative dyspepsia and painful syndrome. In 10% of the patients of this group the allergic dermal syndrome was noted. The main causes of dysbacteriosis were the intestinal infections and due to it frequent treatment by antibiotics. Bacteriological examination on the background of the significant suppression of intestinal bacilli demonstrated the conditional pathogenic flora (clebsiella, protei, fungi Candida). Intestinal syndrome manifested in the interchange of persistent constipation with periodical diarrhea was noted in the second group (17 patients) 75%. Painful syndrome was conditioned by the increased gasification and meteorism. In bacteriologic picture of feces the increase of total number of intestinal bacilli due to the lactose negative and fermentative weakened ones on the background of moderate reduction of bifido bacteria. Stable constipation of the combined genesis, weekend intestinal peristalsis and delayed chyme movement in the large intestine was revealed in the third group (16) patients. In the feces inoculation the sharp suppression of bifido and lacto bacteria, growth of different conditional pathogenic flora was noted.

Conclusions: Having compared the clinical bacteriological indices we came to the following conclusions:

1. At the young age disturbances of the intestinal biocenosis occur during the small period of time after intestinal infections and taking the antibiotics. The disturbances of stool are manifested in fermentative processes conditioned by the suppression of functional active forms of Escherichia. In 10% the complications in the form of dermal reactions developed.

2. The patients of the second group according to the microbial picture of feces were given the bio preparations. The course of treatment was determined individually.

3. In the third group of the patients the content of intestinal micro flora was characterized by the large amount of the conditional pathogenic flora without distinct clinical signs. The therapy aimed to the stimulation of the secretory and fermentative function of the digestive system was conducted.

Peculiarities of ion beams interaction with biological tissues

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Abstract: In paper the computer experiments results of simulation of energy distribution of particles in biological media are received by the using of software packages Geant4 and Fluka. The possibilities of these packages for the calculation of the absorbed dose distribution with the atomic composition of the target and the type of particles are shown.

Key words: ion beam, biological tissue, hadrons beam, Bragg curve, radiation therapy, cancer

The modern investigations in the area of the interaction of radiation with matter are characterized by a broad and multifaceted involvement of all branches of physics for the interpretation of the results [1, 2]. The development of accelerator technology has led to the use of the achievements of nuclear physics in medicine. For example, the radiation therapy - one of the most effective treatments for malignant tumors. This method consists of irradiating high-energy charged particle beam.

The disadvantage of this approach is that by using of electron beams and gamma rays occurs not only malignant lesion, but also healthy tissue. To reduce side effects allows using of beams of hadrons (protons and carbon ions C^{12}). The therapeutic effect is based on the ability of charged particles to experience a sharp slowdown and to transfer most of the energy absorbed by the material. This property is reflected in the graph of the loss of energy of the particle penetration into the substance (Bragg curve) as defined peak shortly before stop particles. This peak is called the Bragg peak. [3] This phenomenon allows us to localize the impact of the beam, limiting its area of tumor.

However, effective treatment requires careful preparation. One of the conditions of this training is to simulate the processes occurring in biological tissues. In this case, consider the physical properties, chemical composition of the tissue, the actual geometry of the irradiated body should be considered. The data source for this can be pre-conducted diagnostic studies, as well as data tomography examination of the patient.

Materials and methods

To solve this problem we suggest using the tools that are used in nuclear physics. The standard tool for modeling here are the methods of Monte Carlo. They are used in a number of packages intended for modeling the interaction with the substance of the various particles. Extensive use is made of software packages Fluka and Geant4 [4, 5]. Both packages are used to model the propagation of