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PECULIARITIES OF THE COLON MICROFLORA CONDITION IN PREGNANT WOMEN WITH ASYMPTOMATIC BACTERIURIA

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Abstract

The investigation deals with studying of species content and population level of the colon microflora in pregnant women with asymptomatic bacteriuria in comparison with practically healthy pregnant women. A significant disorder of the qualitative and quantitative composition of the colon microflora content has been found to occur in pregnant women with asymptomatic bacteriuria, which in combination with physiological factors associated with pregnancy may result in the development of asymptomatic bacteriuria.

Key words: colon microflora, asymptomatic bacteriuria, pregnancy.

Introduction. The colon is largely exposed to exogenous factors, the contact with which during prolonged passage along the digestive tract is extremely tight and can lead to the formation of acute or chronic diseases of microbial etiology, exogenous and endogenous intoxication, sensitization to certain antigens and haptens, tolerance to them and to the formation of local and systemic immune response [3, 5]. At the same time, changes can develop in the colon itself, as well as in other organs, tissues, systems. Under certain conditions translocation of pathogenic and opportunistic microflora into other organs, cavities

and tissues can occur [4, 7].

According to the results of the study conducted in the previous stage [6], the leading microorganisms persisting in the urine of pregnant women with asymptomatic bacteriuria (AB), are enter bacteria, which cover about 83% of all detected uropathogens. Other 17% of microorganisms refer to different taxonomic groups, but also often appear in the cavity of the large intestine. All this suggests that urine can be contaminated with the microflora of the large intestine.

The aim of the study is to investigate the species composition and population level of autochthonous, obligate anaerobic, facultative anaerobic and aerobic microflora of the colon contents in pregnant women with asymptomatic bacteriuria.

Material and methods. Bacteriological study of the colon contents in 93 pregnant women with asymptomatic bacteriuria (main group) was compared with the results of the corresponding examination in 37 healthy pregnant women (control group). The condition of cavitary microflora of the colon was estimated by bacteriological examination of faces in accordance with the guidelines for diagnostics, modern pharmacotherapy and dysbioses prevention. The condition of the intestinal microbiocenosis was assessed by the index of constancy and the indicator of the frequency of occurrence of a microorganism. The assessment of the severity of dysbiotic disturbances was carried out according to Kuvaeva I.B., Ladodo K.S. classification [2].

Results of the research and their discussion. To reveal the mechanisms of persistence, colonization and contamination of the contents of the colon by microorganisms in pregnant women with AB we used an ecological method that allows to characterize the coexistence of the inhabitants of the ecological system “microorganism microbiota” and determine the orientation of microecological changes in the microbiocenosis of the intestinal cavity of pregnant women with asymptomatic bacteriuria. Based on the selection and identification of microbiocenosis components, their index of constancy, frequency of occurrence, and the Simpson’s dominance index, it has been established that the constituent (dominant) microorganisms of the colon cavity in practically healthy women are bifid bacteria – the most important ones by their representation in human colonal biocenosis and by multifunctionality in their support of microecological homeostasis, as well as lacto bacteria which are physiologically valuable in microbiocenosis of this medium. Significant place in the cavity microflora of the colon in practically healthy pregnant women belongs to obligate anaerobic bacteroids, as well as to bacteria of the genera *Escherichia* and *Peptostreptococcus*. These microorganisms in the cavity of the large intestine of practically healthy adults form the

basis of the colonal microflora. Bacteria of the genera *Enterococcus, Proteus* and *Staphylococcus* are referred to the additional microflora of the large intestine in practically healthy pregnant women.

In pregnant women with asymptomatic bacteriuria obligate anaerobic bacteria of the genera *Bifidobacterium, Lactobacillus, Bacteroides, Escherichia* and *Peptococcus* belong to constant microorganisms that persist in the cavity of the colon; Peptostreptococci, pathogenic (enterotoxic escherichia) and opportunistic pathogenic enterobacteria (proteus) – to additional microflora; clostridia, enterococci, staphylococci, opportunistic pathogenic enterobacteria (enterobacter, citrobacter, hafnia, Klebsiella) – to incidental microflora. The above-mentioned demonstrates diverse changes in the species composition of the colonal microflora in pregnant women with AB.

Disturbances in the species composition of the cavity of the colon are stipulated by the contamination of the biotope with pathogenic (enterotoxic escherichia) and opportunistic pathogenic (enterobacter, citrobacter, hafnia, Klebsiella) enterobacteria, clostridial forms of anaerobic bacteria, and yeast-like fungi of the genus *Candida*.

Therefore, in pregnant women with asymptomatic bacteriuria, disturbances in the species spectrum of the microflora of the colonal cavity occur at the expense of taxa changes that form additional and incidental microflora, the species composition of the base microflora practically does not change and remains stable.

One of the most reliable and informative indices of the microflora and associations of its representatives with each other is the quantitative composition of the biotope microflora [1]. In practically healthy pregnant women, bacteria of the genera *Bifidobacterium, Lactobacillus, Bacteroides* and *Escherichia* are dominant microorganisms in the colonal cavity by their population level, quantitative dominance factor, and quantitative polydominance. Other bacteria play an insignificant role in microbiocenosis. But these microorganisms can provoke their translocation from the colon into the blood and internal organs when the physiological balance between the main components (representatives of the main microbiota) of microbiocenosis is disturbed, especially it concerns opportunistic pathogenic enterobacteria which possess pronounced invasive properties with the further development of various infectious-septic complications.

In pregnant women with AB deficiency of bifid bacteria is 20.55%, lactobacilli – 17.88% and enterococci – 11.87%. The physiological significance of bifid bacteria for the human body and their exceptional importance in the functioning and stability of microbial ecosystems have been proven by numerous studies and do not cause doubts. Reduction of

their population level in the intestinal microbiocenosis and, accordingly, their biological activity disturbs the processes of nutrients absorption; the activity of a number of enzymes and biologically active substances decreases, hypoproteinemia, hypo- or avitaminosis and bacteremia develop, which is highly significant. Deficiency of bifid bacteria and lactobacilli leads to a decrease in the resistance of the digestive tract to the contamination and its settlement by opportunistic pathogenic microorganisms, contributes to the development of infectious and inflammatory diseases.

Against the background of the bifid bacteria and lactobacilli deficiency the population level of bacteroids increases by 12.13% (one order), E. coli by 12.80% (one order), as well as peptococcus, staphylococci and protei. In addition, microorganisms that contaminated the cavity of the colon in pregnant women with the AB reach moderate (yeast-like fungi of the genus *Candida*) and high population levels (bacteria of the genus *Clostridium*, pathogenic and opportunistic pathogenic enter bacteria). Pathogenic and opportunistic microorganisms in the process of vital activity in the cavity of the colon produce enterotoxins and, when destroyed, release endotoxins. Exo- and endotoxins produced by the opportunistic pathogenic microorganisms, significantly reduce the detoxification capacity of the liver, violate the permeability of the intestinal wall, inhibit the regeneration of the mucous layer, lead to the development of dyspepsia, diarrhea, translocation of microorganisms from the colonal cavity to the internal organs and to other morphofunctional disorders. In pregnant women with AB, the number of facultative anaerobic and aerobic microorganisms predominates over obligate anaerobes by 43.90%. In practically healthy pregnant women, obligate anaerobic bacteria dominate over aerobic and facultative anaerobic bacteria by 77.78%.

Therefore, disturbance of the species composition of the additional and incidental microflora of the large intestine occurs in pregnant women with asymptomatic bacteriuria. These changes lead to quantitative violations in the number of representatives of the microecological composition of microbiota, this contributes to the formation of a deficiency of autochthonous obligate anaerobic physiologically useful bifid bacteria and lactobacilli, which play an exclusive role in the functioning of microbial ecosystem “macroorganism-microflora”, and causes disturbances in the physiological processes in the intestines and in the entire organism, promotes the development of bacteremia and can result in bacteriuria due to permeability of the intestinal wall under the influence of endo- and exotoxins of opportunistic pathogenic microorganisms and, first of all, pathogenic and opportunistic enter bacteria.

The study of qualitative and quantitative indices of colon microflora in pregnant women with asymptomatic bacteriuria (main group) in comparison with the control

(practically healthy pregnant women) revealed the presence of intestinal dysbacteriosis/dysbiosis in almost every case. The results of determining the degree of microflora disturbances in the cavity of the colon in pregnant women with AB are given in Table 1.

Table 1

Degree of disturbances of the qualitative and quantitative composition of the microflora in the colonal cavity contents in pregnant women with asymptomatic bacteriuria compared to the control (M±m)

Degree of intestinal dysbacteriosis / dysbiosis	Main group (n=93)		Control group (n=37)		p
	abs.	%	abs.	%	
Normal flora	6	6.45±0.97	26	70.27±1.05	<0.001
I degree	39	41.94±0.42	11	29.73±1.05	<0.05
II degree	36	38.71±0.49	0	-	-
III degree	12	12.90±0.89	0	-	-

Conclusions. Therefore, in pregnant women with AB there is a significant disturbance of the qualitative (additional and incidental microflora) and quantitative composition (main, additional and incidental microflora) of the colonal cavity contents, which, in combination with physiological factors associated with pregnancy, can result in the development of asymptomatic bacteriuria.

Prospects for further research. The obtained data of the conducted research indicate the possibility of developing a differential approach to the treatment of asymptomatic bacteriuria in pregnant women, which requires further studies.

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