The State of Gastric Microbiocenosis in Patients with Reactive Arthritis of Urogenic and Enterogenic Etiology in the Dynamics of Treatment

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ABSTRACT

The aim of the study is to study the state of gastric microbiocenosis in patients with reactive arthritis of urogenic and enterogenic etiology in the dynamics of treatment.

Keywords: Gastric Microbiocenosis, Urogenic And Enterogenic Etiology

The term "reactive arthritis" was first used more than 50 years ago to name arthritis developing after yersiniosis in the absence of infectious agents in the joints. But after a few years, this name began to be associated with some infections of the gastrointestinal tract, genitourinary organs and nasopharynx.

Currently, non–purulent inflammation of the joints is considered reactive arthritis, which develops no later than 6 to 8 weeks after a urogenital, intestinal or nasopharyngeal infection. The ICD code is 10 M02. Young men aged 17-40 years get sick more often after sexual infections (women get sick much less often). The incidence is increasing, which is largely due to genetic predisposition, asymptomatic course of infections and untimely appointment of adequate treatment. Uncontrolled intake of antibacterial drugs for reactive arthritis also affects the microbiocenosis of the stomach, which in turn leads to a number of other complications.

The studies undertaken in recent years aimed at studying the microbial composition of the gastric mucosa (SOJ) have made it possible to re-evaluate the microbial landscape of the biocenosis of this organ and the digestive tract as a whole, as well as to expand scientists' understanding of the etiology of diseases such as acute and chronic gastritis, peptic ulcer, dyspeptic disorders, etc. At the same time, there is a contradiction in the opinions of experts on the quantitative and qualitative composition of the microflora forming the gastric biotope [1,3], as well as on the role of Helicobacter pylori (HP) in the development of the infectious process [2]. Thus, the study of the species composition of the microflora colonizing the stomach and the leading biological properties of its representatives in various pathological conditions is certainly relevant [4,5].

The aim of the study is to study the state of gastric microbiocenosis in patients with reactive arthritis of urogenic and enterogenic etiology in the dynamics of treatment.

Materials and methods. The study included 36 patients with reactive arthritis of urogenic

and enterogenic etiology. Of these, 20 and 16 patients with urogenic and enterogenic reactive arthritis, respectively. The study included patients only with impaired microbiocenosis of the gastroduodenal zone, without additional concomitant diseases. The age of the examined patients ranged from 32 to 51 years. The average age of the patients was 37 years.

36 samples of stomach biopsy were examined by microbiological method. Sowing of biological material was carried out on helicobacter agar, blood agar, Endo agar, yolk-salt agar, Saburo agar. An enriched nutrient medium was used to isolate the anaerobic microflora. A part of the saline solution with a piece of biopsy was used for a urease test. Thus, the study of the gastric microflora included its quantitative (from dense primary sowing media) and qualitative analysis (from enrichment media). Species typing of isolates was carried out on standard nutrient media, rapid diagnostic test systems. To confirm colonization of the gastric mucosa of Helicobacter pylori in the studied group of patients, additional research methods were carried out, including biopsy cytology, enzyme immunoassay (ELISA) of blood to detect total IgM, IgA, IgG antibodies to the CagA antigen.

The results of the study. Taking into account the fact that dysbiotic changes in the stomach take place in the conditions of the studied joint diseases, a study was conducted to assess the nature of the influence of the traditional pharmacotherapy of RHEA on the detection of disorders in the microbiocenosis of the stomach. The results of the conducted research in this direction are presented in Table 1.

Table 1.

The spectrum and frequency of the release of microorganisms from the coolant in the dynamics of the treatment in the examined patients.

	Rhea is urogenic				Rhea is enterogenic			
	biopsy		gastric juice		biopsy		gastric juice	
	before treatment	after treatment	before treatment	after treatment	before treatment	after treatment	before treatment	after treatment
Coccoid forms:								
Staphylococcus	33,3	37,5	26,6	25	33,3	25	26,6	12,5
Streptococcus	20	-	33,3	12,5	26,6	-	20	12,5
micrococcus	6,6	12,5	-	-	26,6	25	-	-
tetracoccus	-	-	-	-	6,6	-	-	-
Fungi of the genus Candida	-	-	-	-	-	-	6,6	-
Gram-positive. sticks (bacilli)	20	-	20	-	6,6	-	14,6	-

Enterobacteria:								
Escherichia	46,6	-	20	-	20	-	-	-
klebsiella	33,3	-	-	-	14,6	-	-	-
Enterococci	20	37,5	6,6	12,5	33,3	62,5	20	37,5
Pseudomonas	26,6	-	14,6	-	6,6	-	-	-
Anaerobic gram-positive.cocci	60	62,5	80	75	46,6	75	53,3	75

As can be seen from the data presented in Table 1, against the background of treatment in patients with RHEA of urogenic etiology, peptostreptococci were more often sown in the parietal layer – in 62.5% of patients, staphylococci, enterococci – in 37.5% of patients, micrococci – in 12.5% of patients, in the number of cultures from 2.61 to 4.43 lg CFU/g. With enterogenic RHEA, there is a decrease in the frequency of occurrence of staphylococci, streptococci and micrococci, as well as an increase in the frequency of occurrence of enterococci and peptostreptococci in the number of cultures from 2.88 to 4.78 lg CFU/g. Consequently, in the mucosal layer of the stomach in patients with urogenic RHEA, there is an increase in the frequency of occurrence of the parietal microflora peculiar to it and some decrease in it in patients with enterogenic RHEA, while there was an increase in the frequency of occurrence of conditionally pathogenic parietal microflora and anaerobic gram-positive cocci in all examined patients.

As for the intraluminal microbiocenosis of the stomach, there was also a decrease in the frequency of occurrence of its characteristic microflora and an increase in the frequency of occurrence of normal fecal and opportunistic microflora. Thus, the following changes in gastric juice were observed in patients with RHEA of urogenic etiology: peptostreptococci were sown more often – in 75% of patients, staphylococci – in 25%, streptococci and enterococci – in 12.5%, in the number of cultures from 102 to 3.8 x 103 lg CFU/ml. In patients with RHEA of enterogenic etiology, peptostreptococci were also most often sown – in 75% of patients, enterococci – in 37.5%, staphylococci and streptococci in 12.5%, in the number of cultures from 102 to 0.2 x 105 lg CFU/ml.

It should be emphasized that in all the examined patients, in the dynamics of the treatment, the spectrum of the sown microflora was somewhat narrow both in the intra-lumen and in the wall biocenosis.

The quantitative characteristics of the lumen and wall microflora of the stomach are presented in Table 2.

As can be seen from the presented data, in patients with RHEA of urogenic etiology, there was a decrease in the number of cultures of microorganisms – staphylococci (2.61 lg CFU/g), micrococci (3.3 lg CFU/g) and slightly enterococci (4.43 lg CFU/g), as well as an increase in cultures of peptostreptococci (3.38 lg CFU/g). In patients with RHEA of enterogenic etiology, there was a decrease in the number of cultures of microorganisms – staphylococci (2.88 lg CFU/g), micrococci (3.53

lg CFU/g) and slightly enterococci (4.78 lg CFU/g).

Table 2.

Quantitative characteristics of the gastric microflora in the dynamics of the treatment in the examined patients (lg CFU/g and lg CFU/ml).

	Rhea is urogenic				Rhea is enterogenic			
	biopsy		gastric juice		biopsy		gastric juice	
	before treatment	after treatment	before treatment	after treatment	before treatment	after treatment	before treatment	after treatment
Coccoid forms:								
Staphylococcus	3,92	3,34	$3,2x10^3$	10^2	3,5	2,88	$3x10^4$	10^2
Streptococcus	5,55	-	$7,7x10^5$	10^3	4,62	-	$0,9x10^4$	10^3
micrococcus	5	3	-	-	4,5	3,53	-	-
tetracoccus	-	-	-	-	3	-	-	-
Fungi of the genus Candida	-	-	-	-	-	-	$4x10^3$	-
Gram-positive. sticks (bacilli)	3.45	-	$4x10^3$	-	3	-	$0,9x10^4$	-
Enterobacteria:								
Escherichia	9,94	-	$3,1x10^4$	-	9.33	-	-	-
klebsiella	10,4	-	-	-	12	-	-	-
Enterococci	5	4,33	10^3	$3x10^3$	4,8	4,78	10^5	$0,1x10^5$
Pseudomonas	8	-	$2,9x10^5$	-	8	-	-	-
Anaerobic gram-positive.cocci	3,27	4,13	$2,4x10^3$	$3,8x10^3$	3,94	3,93	$6,2x10^3$	$4,1x10^3$

Consequently, the study of the microbial landscape of the stomach in the dynamics of the treatment revealed noticeable shifts in the lumen and in the wall layer, characterized by a slight decrease in both the frequency of occurrence and the number of cultures of microorganisms of its characteristic microflora, as well as a slight increase in the frequency and number of cultures of microorganisms of normal fecal microflora and conditionally pathogenic microbes. Which is expressed as dysbiosis of mucosal and lumen microflora [6].

The following table shows the spectrum and frequency of occurrence of gastric juice microorganisms in the examined patients, depending on the activity of the disease.

Table 3.

The spectrum and frequency of occurrence of gastric juice microorganisms in the dynamics of the treatment in the examined patients, depending on the activity of the disease (in %).

	Rhea is urogenic				Rhea is enterogenic			
	biopsy		gastric juice		biopsy		gastric juice	
	before treatment	after treatment	before treatment	after treatment	before treatment	after treatment	before treatment	after treatment
Coccoid forms:								
Staphylococcus	14,2	28,5	42,8	-	20	20	33,3	-
Streptococcus	14,2	-	57,1	100	20	20	22,2	-
micrococcus	-	-	-	-	-	-	-	-
tetracoccus	-	-	-	-	-	-	-	-
Fungi of the genus Candida	-	-	-	-	20	-	-	-
Gram-positive. sticks (bacilli)	14,2	-	14,2	-	40	-	-	-
Enterobacteria:								
Escherichia	14,2	-	28,5	-	-	-	-	-
klebsiella	-	-	-	-	-	-	-	-

Enterococci	14,2	14,2	-	-	20	40	22,2	33,3
Pseudomonas	14,2	-	14,2	-	-	-	-	-
Anaerobic gram-positive.cocci	85,7	71,4	71,4	100	80	80	33,3	66,6

As can be seen from the above data, in the gastric juice of almost all examined patients with an increase in the degree of disease activity, there was a decrease in the frequency of occurrence of microorganisms peculiar to this biotope, and an increase in the frequency of occurrence of representatives of normal fecal and opportunistic microflora.

The quantitative characteristics of the microflora of gastric juice against the background of the treatment are presented in Table 4.

Table 4.
Quantitative characteristics of the gastric juice microflora in the dynamics of the treatment in the examined patients, depending on the activity of the disease (lg CFU/ml).

	Rhea is urogenic				Rhea is enterogenic			
	biopsy		gastric juice		biopsy		gastric juice	
	before treatment	after treatment	before treatment	after treatment	before treatment	after treatment	before treatment	after treatment
Coccoid forms:								
Staphylococcus	10^3	10^2	$5,5x10^3$		$6x10^5$	10^2	$0,1x10^4$	
Streptococcus	10^8		$3,1x10^5$	10^3	$2x10^2$	10^3	10^5	
micrococcus	-		-		-		-	
tetracoccus	-		-		-		-	
Fungi of the genus Candida	-		-		$4x10^3$		-	
Gram-positive. sticks	10^4		$4x10^3$		$0,9x10^4$		-	

(bacilli)								
Enterobacteria:								
Escherichia	10^8		$5,9x10^2$		-		-	
klebsiella	-		-		-		-	
Enterococci	10^3	$3x10^3$	-		10^5	$6,8x10^4$	10^5	$2x10^5$
Pseudomonas	10^7	-	$7x10^3$		-	-	-	-
Anaerobic gram-positive.cocci	$2,1x10^3$	$3,1x10^3$	$3x10^3$	10^4	$4,1x10^3$	$3,6x10^3$	$2,2x10^3$	10^4

The analysis of the quantitative characteristics of gastric juice in the dynamics of the treatment in the examined patients showed that with the increase in the activity of the disease, the number of cultures of representatives of the biotope peculiar to this slightly decreases, while the number of cultures of normal fecal and opportunistic microflora increases.

The following table 5 presents an analysis of the frequency of occurrence of mucosal microflora of the stomach, depending on the activity of the disease.

Table 5.

Spectrum and frequency of occurrence of gastric mucosal microflora in the dynamics of treatment in the examined patients, depending on the activity of the disease (in %).

	Rhea is urogenic				Rhea is enterogenic			
	biopsy		gastric juice		biopsy		gastric juice	
	before treatment	after treatment	before treatment	after treatment	before treatment	after treatment	before treatment	after treatment
Coccoid forms:								
Staphylococcus	42,8	42,8	28,5	-	20	20	33.3	33,3
Streptococcus	14,2	-	28,5	-	60	-	11,1	-
micrococcus	14,2	14,2	-	-	20	20	33,3	33,3

tetracoccus	-	-	-	-	-	-	11,1	-
Fungi of the genus Candida	-	-	-	-	-	-	-	-
Gram-positive. sticks (bacilli)	14,2	-	14,2	-	-	-	11,1	-
Enterobacteria:								-
Escherichia	28,5	-	57,1	-	40	-	11,1	-
klebsiella	28,5	-	28,5	-	20	-	11,1	-
Enterococci	28,5	28,5	14,2	100	40	60	22,2	66,6
Pseudomonas	14,2	-	42,8	-	20	-	-	-
Anaerobic gram-positive.cocci	28,5	57,1	85,7	100	40	80	55,5	66,6

As can be seen from the presented data, with RHEA of the urogenic etiology of the I degree of disease activity, the frequency of occurrence of peptostreptococci increases, and with the II degree, an increase in the frequency of occurrence of enterococci and peptostreptococci is observed. In patients with enterogenic RHEA, with the I degree of activity, the frequency of seeding of peptostreptococci and enterococci increases, with the II degree of activity, an increase in the frequency of seeding of almost all microorganisms is noted.

Consequently, in almost all examined patients with an increase in the degree of disease activity, there was a decrease in the frequency of occurrence of microorganisms peculiar to this biotope, and an increase in the frequency of occurrence of representatives of conditionally pathogenic microflora, however, in patients with enterogenic RHEA, an increase in the frequency of occurrence of representatives of microorganisms peculiar to this biotope was noted in the dynamics of the treatment.

The quantitative characteristics of the mucosal microflora of the stomach, depending on the treatment, were also analyzed (Table 6).

The table shows that with urogenic RHEA of the I degree of activity, the treatment contributed to a decrease in the number of cultures of staphylococci - by 12.9%, micrococci - by 34%, enterococci slightly - by 1%, the number of peptostreptococci increased by 6.6%; with the II degree of activity, there was a decrease in the number of enterococci by 12%, and an increase in peptostreptococci – by 19.3%. In patients with enterogenic RHEA of I degree of activity, there was a decrease in the number of cultures of staphylococci – by 7.6%, micrococci – by 34%, peptostreptococci – by 2.3%, the population of enterococci increased by 3.5%; with II degree of activity, there was a decrease in the number of staphylococci by 14.2%, streptococci – by 12.9%, enterococci –

by 1%, the population of peptostreptococci increased by 10%.

It was found that with RHEA of both urogenic and enterogenic etiology, as the degree of activity increases, the therapy leads to a decrease in the number of microorganisms in the mucosal layer.

Table 6.

Quantitative characteristics of the mucosal microflora of the stomach in the dynamics of the treatment in the examined patients, depending on the activity of the disease.

	Rhea is urogenic				Rhea is enterogenic			
	biopsy		gastric juice		biopsy		gastric juice	
	before treatment	after treatment	before treatment	after treatment	before treatment	after treatment	before treatment	after treatment
Coccoid forms:								
Staphylococcus	3	2,61	5,3	-	3	2,77	3,5	3
Streptococcus	3,77	-	6,45	-	4,16	-	6	-
micrococcus	5	3,3	-	-	5	3,3	4,33	3,77
tetracoccus	-	-	-	-	-	-	3	-
Fungi of the genus Candida	-	-	-	-	-	-	-	-
Gram-positive. sticks (bacilli)	3,77	-	3,3	-	-	-	3	-
Enterobacteria:								
Escherichia	12	-	8,4	-	8	-	12	-
klebsiella	10	-	10	-	12	-	12	-
Enterococci	5	4,45	5	4,4	4,5	4,66	5	4,95
Pseudomonas	8	-	8	-	8	-	-	-
Anaerobic gram-	3	3,2	3,2	4,14	3,8	3,71	4	4,4

positive.cocci								

Consequently, against the background of treatment in patients with RHEA, the mucosal microflora undergoes changes depending on the degree of activity of articular pathology. In addition, it depends on the nosological form of pathology. With RHEA, the number of microbes in the mucosal layer, regardless of its etiological form, tends to decrease.

Further, the severity of dysbiosis of the gastric lumen microflora in the dynamics of the treatment was studied (Fig.1,2)

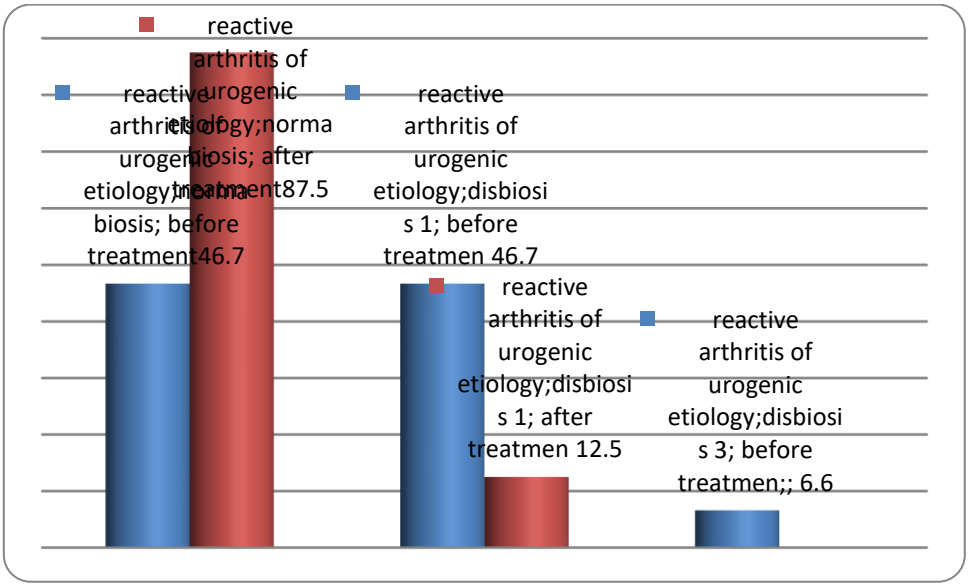

Fig. 1. The severity of dysbiosis of the lumen microflora of the stomach in patients with RHEA urogenic etiology in the dynamics of the treatment (in %)

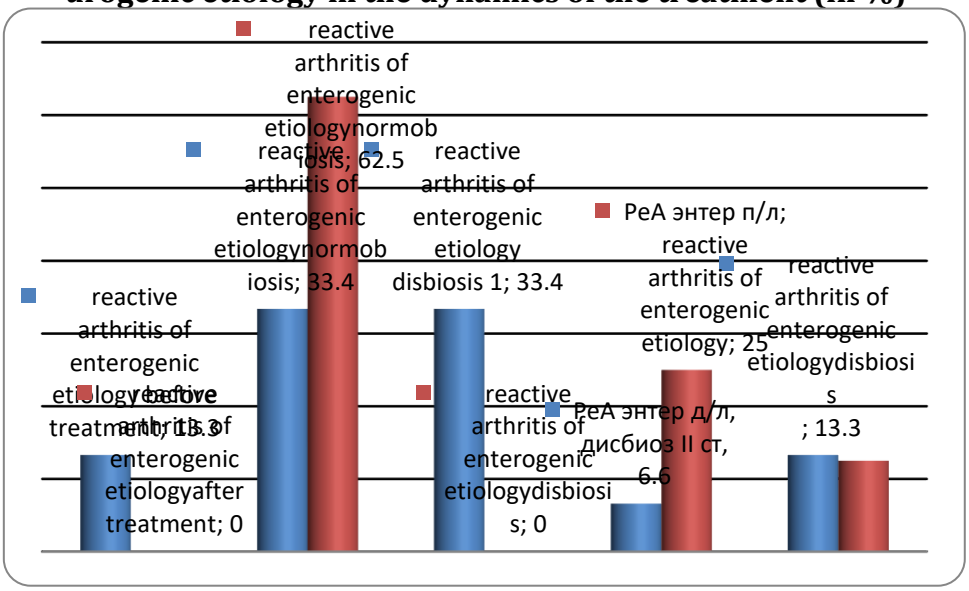

Fig. 2. The severity of dysbiosis of the lumen microflora of the stomach in patients with RHEA enterogenic etiology in the dynamics of the treatment (in %)

At the same time, in patients with RHEA of urogenic etiology, the proportion of patients with normobiosis and dysbiosis of the first degree increases by 1.5 and 1.6 times,

respectively, compared with the baseline. And dysbiosis of the III and IV degrees practically disappears. At the same time, the therapy carried out in patients with RHEA of enterogenic etiology has a less pronounced effect on the degree of dysbiosis of the stomach. At the same time, although the proportion of patients with normobiosis increases, however, among these patients, grade II dysbiosis increases almost 4 times compared to the baseline. And the specific weight of dysbiosis of the III degree in the dynamics of the treatment remains substantially unchanged compared to the initial one.

Conclusions.

Thus, the analysis of the microbial landscape of the stomach during the therapy of RHEA patients revealed a certain pattern: the conducted framacotherapy of the studied diseases contributes to a decrease in both the frequency of occurrence and the number of representatives of microbes in the wall layer, along with a tendency to increase both quantitatively and qualitatively the conditionally pathogenic and fecal flora of the stomach. It should be added that in patients with RHEA enterogenic etiology, with an increase in the degree of activity of the disease in the parietal flora, there was a slight predominance in the frequency of occurrence and an increase in the number of representatives of the indigenic microflora of the stomach.

The study of the effect of the therapy on the degree of infection with helicobacteriosis of the studied articular pathologies, depending on the activity of the disease, revealed certain differences taking into account the nosological form of articular pathology, which is confirmed by literature data [7].

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