

Microecology and local factors of oral cavity protection in patients with mandibular fractures.

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ABSTRACT

Recent advances in theoretical and clinical medicine make it possible to see the prospect and increase in the effectiveness of methods for the diagnosis and treatment of inflammatory complications in fractures of the mandible. Inflammatory processes in the maxillofacial region in all cases are infectious, that is, the microbial flora plays a large role in their occurrence, development and course. The development and course of purulent-inflammatory complications in fractures of the lower jaw depends not only on the species composition of microorganisms, but also on violations of the nonspecific and immune response of the macroorganism, that is, on reactivity.

Keywords

normal flora, nutrient medium, oral cavity, fracture of the lower jaw, maxillofacial region, complications, diagnostic methods, immune system.

Introduction

The development and course of purulent-inflammatory complications in fractures of the mandible depends not only on the species composition of microorganisms, but also on violations of the nonspecific and immune response of the macroorganism, that is, on the reactivity of the organism (Bazhanov N.N., T.T. Robustova, 1999). Most authors associate an increase in the number of patients with purulent - inflammatory processes of the face and neck, as well as the complication of injuries with a decrease in the body's resistance. Most authors associate an increase in the number of patients with purulent - inflammatory processes of the face and neck, as well as the complication of injuries with a decrease in the body's resistance. In this regard, the study of immunological disorders at the systemic and local levels is a promising direction in predicting the course and diagnosis of the disease, which makes it possible to expand the understanding of the mechanisms of development of pyoinflammatory diseases, reparative processes of the maxillofacial region, as well as to develop effective methods of therapy (Aganov V S., 2005; Ter Asaturov G.P., 2005; Porfuzhadis M.P., 2017. Purpose of the study to study the state of microecology and local factors of protection of the oral cavity in patients with fractures of the mandible.

Materials and research methods. To solve this goal, we carried out microbiological and immunological studies in patients with fractures of the mandible. Table 1 shows the volume of the research carried out. The table shows that a total of 541 analyzes were carried out, of which the largest number were microbiological studies, 190 (43%). As a rule, oral fluid was taken from all these patients for microbiological studies by flushing from the oral mucosa (by rinsing) (Efimovich O.I., 2002). Subsequently, a certain volume was inoculated onto the surface of differential diagnostic nutrient media. For this we used highly selective nutrient media produced by the Indian company "XeiMedia". Inoculations on blood agar, Endo agar, milk-salt agar and in Sabouraud's medium, were cultivated under normal conditions for 18-24 hours at $t^{\circ} 37^{\circ} C$, and the cultivation of crops for the isolation of anaerobes was carried out in an anaerobic container by using gas generator bags (Fig. №1).

The volume of microbiological and immunological studies in patients with fractures of the mandible.

№	Patient groups	Microbiol research	Immunol research	Exploring colonization resistance	
1	Control group	21	21	21	63
2	Patients with unilateral fracture	50	40	40	130
3	Patients with bilateral fracture	44	44	35	123
4	Patients with traditional treatment	35	30	40	105
5	Patients with special treatment	40	30	40	110
	Total	190	165	146	541

When working according to the modified method, the result was taken into account according to the last dilution in which the growth of bacteria was obtained, their number was calculated using the formula: $K = A \times 200 \times P / \text{CFU} / \text{ml}$, the number of microbes was expressed in Lg CFU / ml. In parallel with microbiological studies, in the same patients with fractures of the mandible, the state of local factors of protection of the oral cavity, such as phagocytic activity of leukocytes, the level of lysozyme and the titer of class A immunoglobulin - secretory fraction (s IgA), was studied.

To determine the phagocytic activity of neutrophils in the oral fluid, a modified method of A.V. Antonov (1996) was used. For this, the collected oral fluid was purified, washed with a buffered solution, and centrifuged at 1000 rpm. The supernatant was decanted, and 0.5 ml of physiological saline was added to the sediment. To 0.2 ml of the resulting suspension in a test tube was added 0.1 ml of a suspension of latex particles (5×10^8 in 1 ml) with a diameter of 0.8 μm .

The mixture was incubated in a humid chamber for 30 min at 37 ° C. Subsequently, from this mixture, smears were prepared according to the type of blood smears, stained according to Romanovsky Giemsa. In smears, at least 100 neutrophils were counted with and without latex in each preparation, the phagocytosis index was determined and expressed as a percentage. The activity of lysozyme in the oral fluid was determined using the method proposed by Sh. R. Aliev (2004), which included the use of sterile

filter paper disks. For this purpose, paper disks (similar to antibiotic disks) were taken with tweezers and thoroughly impregnated with oral fluid. After that, these discs were placed on the surface of Mueller Hinton nutrient agar in Petri dishes, seeded with a lawn of a daily culture of *M. Luteus* stamp №003596/126 oral fluid was determined by the method of diffusion in agar. The titer of class A immunoglobulin of the secretory fraction (s Ig A) was determined. The method is based on the Mancini method, which is based on measuring the diameter of the precipitation ring formed when the oral fluid is introduced into the well, cut out in an agar layer in which monospecific sera are preliminarily dispersed.

Research results. Initially, it was interesting for us to consider in a comparative aspect the normal flora in the oral cavity in adults and children. At the same time, with regard to information on the normal flora in adults, we used the material obtained at the Department of Microbiology of the Tashkent State Institute of Sociology (Mukhamedov I.M., 2016). The data obtained during these studies are presented in the table № 2. The table shows that the healthy children examined by us actually excrete the same types of microorganisms, in addition, microbes are inoculated in children, such as saprophytic staphylococci and lactose-positive *Escherichia*, which are few in adults.

Table № 2.

Characteristics of the normal flora of the oral cavity in adults Lg(M±m) KOE/ml

		The norm in adults
1	The total number of anaerobes	7,60±0,4
2	Lactobacillus	5,80±0,1
3	Peptostreptococci	6,40±0,4
4	Total number of aerobes	6,20±0,4
5	Staphylococcus aureus	0
6	Staphylococcus saprophytic	1,45±0,1
7	Staphylococcus epidermidis	3,35±0,2
8	Streptococci gr A	0
9	Enterococci	4,10±0,2
10	Esherichia LP	3,60±0,2
11	Esherichia LN	2,10±0,1
12	Mushrooms of the genus Candida	1,30±0,2

However, if you look at the obtained quantitative data, you can actually see that in adults, the majority of microbial populations significantly prevail in comparison with the data in children. The most interesting data we obtained during quantitative studies in the oral fluid in patients with fractures of the mandible. The data obtained during these studies are presented in table №. The table shows that in patients with fractures of the lower jaw, dysbiosis develops in the oral cavity, while the number of anaerobes and lactobacilli significantly decreases. But against this background, the sowing capacity of the optional flora significantly increases. It is interesting to note that dysbiotic shifts are more pronounced in bilateral fractures versus unilateral fractures.

Almost the same parameters of dysbiosis were noted in the quantitative parameters of gram-positive flora, such as staphylococci and streptococci, although this cannot be said with regard to gram-negative flora, the same state was noted in the number of fungi of the genus Candida. These quantitative parameters of

dysbiosis in patients with mandibular fractures are actually corrected with data on the degree of occurrence both in monoculture and in associations. All these data once again confirm the unity of homeostasis in the body.

Table № 3

Characteristics of the microflora of the oral cavity in patients with fractures of the mandible. Lg(M±m) KOE/ml

№ Microbial groups The number of microbes in 1 ml of saliva

Microbial groups	The number of microbes in 1 ml of saliva			
	Norm	In patient s upon admissi on	unilate ral fractur e	bilate ral fractu re
1 The total number of anaerobes	5,80±0,4	2,60±0,1	3,10±0,2	2,10±0,1
2 Lactobacillus	4,75±0,3	1,75±0,1	1,60±0,1	1,30±0,1
3 Peptostreptococci	3,90±0,2	4,0±0,2	3,30±0,1	3,15±0,1
4 Total number of aerobes	5,60±0,4	7,10±0,4	6,15±0,3	7,0±0,2
5 Staphylococcus aureus	0	1,30±0,1	1,15±0,2	2,15±0,1
6 Staphylococcus epidermidis	4,45±0,2	4,60±0,2	5,10±0,4	3,85±0,2
7 Streptococcus salivarius	4,85±0,3	5,10±0,3	4,60±0,2	3,85±0,2

Note: units are in mm of microbial growth inhibition zone.

Table № 4

№	Microbial groups	% occurrence	Occurrence rate	
			Minimum	Maximum
1	Streptococci gr. A	27,0	10^4	10^7
2	Staphylococcus epidermidis	20,0	10^4	10^5
3	Staphylococcus aureus	13,0	10^4	10^6
4	Staphylococcus aureus hemolytic	10,0	10^3	10^4
5	Enterobacteriaceae	14,0	10^2	10^4
6	Associations:			
	St. hemolit		10^4	10^6
	C. albican	9%	10^3	10^4
	St. pyogen		10^3	10^5
	St. aureus		10^2	10^5

Along with microbiological studies, we carried out immunological studies in the same patients with fractures of the mandible. At the same time, much attention was paid to the study of the state of local factors of protection of the oral cavity, such as the level of lysozyme, s IgA titer and the rate of phagocytosis in the oral fluid. The data obtained from these studies are presented in the table № 4. The table shows that these indicators in adults and children are close to each other, although it should be noted that the level of lysozyme in saliva and the phagocytic indicator are slightly higher in children, and the level of sIgA is slightly lower. Apparently, this state of local factors of protection of the oral cavity in children is due to the anatomical and physiological characteristics of the child's body. The study of the same parameters of local factors of protection of the oral cavity in patients with fractures of the mandible indicates the presence and formation of reliable immunodeficiency in all the studied parameters.

Table № 5.

Indices of local factors of protection of the oral cavity in patients with fractures of the mandible.

№	Indicators	The norm in adults	In patients with a fracture of the mandible
1	Lysozyme level, mg %	18, 0±0,60	11,5±0,21
2	Phagocytosis index%	54,2±1,8	38,5±1,6
3	Level s IgA mg/l	2,10±0,21	0,71±0,11

Thus, based on the microbiological and immunological studies carried out in patients with fractures of the mandible, the following conclusions can be drawn:

1. In patients with fractures of the mandible in the oral cavity, dysbiotic shifts develop, a characteristic feature of which is a significant decrease in the seeding rate of most anaerobes, and an increase in the seeding rate of the number of opportunistic microbes.

2. The fracture of the lower jaw in patients is accompanied by the development of severe stress, which actually causes the development of immunodeficiency in all the studied parameters. Apparently, it is the development of immunodeficiency that leads to the development of the syndrome of overgrowth of microbes in the oral cavity in these patients.

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