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L. L. Reshetnyk
ORCID https://orcid.org/0000-0001-9295-7800

M. L. Shemelko
ORCID https://orcid.org/0009-0009-1906-5078

Bogomolets National Medical University

PECULIARITIES OF PREOPERATIVE PREPARATION IN THE TREATMENT OF GENERALIZED PARODONTAL DISEASES IN ATIENTS WITH MUSCULOSKELETAL DYSFUNCTION OF THE TEMPOROMANDIBULAR JOINTS AND EATING DISORDERS

Л. Л. Решетник, М. Л. Шемелько

Національний медичний університет імені О. О. Богомольця

ОСОБЛИВОСТІ ПЕРЕДОПЕРАЦІЙНОЇ ПІДГОТОВКИ ПРИ ЛІКУВАННІ ГЕНЕРАЛІЗОВАНИХ ЗАХВОРЮВАНЬ ПАРОДОНТА В ПАЦІЄНТІВ ІЗ М'ЯЗОВО-СУГЛОБОВОЮ ДИСФУНКЦІЄЮ СКРОНЕВО-НИЖНЬОЩЕЛЕПНИХ СУГЛОБІВ ПРИ РОЗЛАДАХ ХАРЧОВОЇ ПОВЕДІНКИ

INFORMATION

Email address
for correspondence:
reshetnik.lujdmila@gmail.com

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ABSTRACT

The rational use of various surgical methods significantly increases the quality and efficiency of treatment of generalized diseases of parodontal tissues in patients with TMJ dysfunction and eating disorders, and also prolongs the period of stabilization of the disease and reduces the number of relapses. The success of surgical treatment depends on the quality of preoperative preparation and appropriate postoperative support.

Aim: to increase the effectiveness of surgical treatment of generalized periodontal tissue diseases in patients with TMJ dysfunction and eating disorders by substantiating a personalized approach to the correction of delayed-type hypersensitivity at the stage of preoperative preparation.

The study was conducted with the participation of 135 people aged 26–40, who were diagnosed with generalized parodontitis, I–II degree, chronic course, and a control group of 56 practically healthy people. According to the results of the study, it was established that in the vast majority of patients with generalized parodontitis, I–II degree, chronic course, hypersensitivity of the delayed type to one or simultaneously two streptococcal and staphylococcal antigens, as well as to bone antigen, was detected.

The study of the first stage showed that according to the data of the RGML in patients with chronic pharyngitis, stage I–II, GUT to streptococcus was detected in 85 cases out of 135, which was 62.9 ± 1.81 %, $P < 0.01$ with a migration index (MIF) of 0.1–0.5 versus 24.7 ± 0.62 % in the control group. GUT to staphylococcus in patients of the main group according to the RGML data was observed in 61.5 ± 4.14 %, $P < 0.01$ (migration index 0.3–0.5), while in the control group this indicator was equal to 0.

Conclusions: we consider it expedient to include specific microbial hyposensitization followed by immunization in the list of measures for preoperative preparation for surgical intervention on parodontal tissues in patients with TMJ dysfunction and eating disorders.

ІНФОРМАЦІЯ

Електронна адреса
для листування:
reshetnik.lujdmila@gmail.com

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Ключові слова: генералізовані захворювання пародонта; гіперчутливість уповільненого типу; специфічна мікробна гіпосенсибілізація; м'язово-суглобова дисфункція; скронево-нижньощелепний суглоб; розлади харчової поведінки; нервова анорексія.

АНОТАЦІЯ

Раціональне використання різних хірургічних методів значно підвищує якість та ефективність лікування генералізованих захворювань тканин пародонту в пацієнтів із дисфункцією СНЩС при розладах харчової поведінки, а також пролонгує період стабілізації захворювання та зменшує кількість рецидивів. Успіх хірургічного лікування залежить від якості передопераційної підготовки й відповідного післяопераційного супроводу.

Мета дослідження – підвищення ефективності хірургічного лікування генералізованих захворювань тканин пародонту в пацієнтів із дисфункцією СНЩС при розладах харчової поведінки шляхом обґрунтування персоніфікованого підходу до корекції гіперчутливості уповільненого типу на етапі передопераційної підготовки.

Результати. Дослідження проводили за участі 135 осіб віком 26–40 років, яким постановлено діагноз генералізований пародонтит I–II ступеня хронічного перебігу, і контрольної групи з 56 практично здорових осіб. За результатами дослідження встановлено, що в більшості хворих на генералізований пародонтит I–II ступеня хронічному перебігу виявлено гіперчутливість уповільненого типу до одного або одночасно двох антигенів стрепто- та стафілококу, а також до кісткового антигену. Дослідження I етапу засвідчили, що, за даними РГМЛ, у хворих на ГП I–II ступеня хронічного перебігу ГУТ до стрептококу виявлена у 85 випадках зі 135, що становить 62,9 ± 1,81 %, $P < 0,01$ при індексі міграції (МІФ) 0,1–0,5 проти 24,7 ± 0,62 % в контрольній групі. ГУТ до стафілококу в пацієнтів основної групи, за даними РГМЛ, спостерігалася у 61,5 ± 4,14 %, $P < 0,01$ (індекс міграції 0,3–0,5), при цьому в контрольній групі цей показник дорівнював 0.

Отже, уважаємо за доцільне включити до переліку заходів з передопераційної підготовки до хірургічного втручання на тканинах пародонта в пацієнтів із дисфункцією СНЩС при розладах харчової поведінки специфічну мікробну гіпосенсибілізацію з наступною імунізацією.

Introduction. Generalized parodontal diseases (GPD) occupy one of the leading places in the structure of dental morbidity of the population, almost surpassing the prevalence of caries and its complications. According to the WHO, parodontal disease is diagnosed in 83 % of children and 96 % of the adult population worldwide. Generalized parodontitis (GP) is the main cause of tooth loss in people over 35 years of age. In Ukraine, the prevalence of parodontal diseases among the population aged 36–45 years is from 93 % to 99 %, with a steady tendency to increase the incidence among young people [1; 2; 3; 4]. Specialists are especially concerned about a significant number of complications, which, in turn, act as a factor in temporomandibular joint (TMJ) dysfunction with the formation of a number of neuromuscular and occlusive disorders, the development of various diseases of the gastrointestinal tract, etc. [5; 6].

In this sense, the question of the development of delayed-type hypersensitivity (DTH) in generalized periodontitis – both to microorganisms of the oral cavity and to parodontal tissues – as a factor in the induction of an autoimmune component in the pathogenesis of the disease [7; 8; 9; 10] is relevant. In this way, the immune system begins to mistakenly produce antibodies against its own periodontal tissues. This is facilitated by the presence of similar and cross antigens in microorganisms with periodontal tissues. A failure that once occurred in the recognition of "self"-"foreign" antigens induces self-support, which leads to further irreversible destruction of periodontal tissues, significantly changes the balance of local and general immunity.

The modern approach to the treatment of GP in patients with TMJ dysfunction involves complex and targeted treatment taking into account the individual characteristics of parodontal status and TMJ diseases, as well as the general somatic condition of the patient [11; 12; 13]. Parodontal surgery has a priority role in this.

The rational use of various surgical methods significantly increases the quality and efficiency of treatment, prolongs the period of stabilization of the disease and reduces the number of relapses [14; 15; 16]. The success of one or another method of surgical treatment of GP largely depends on the quality of preoperative preparation and appropriate

postoperative support. The standard stages of preoperative preparation are: substantiation and implementation of hygiene programs, professional hygiene, sanitation of the oral cavity, preparation (depulping) of teeth in the area of surgical intervention (according to indications), occlusal rehabilitation (immobilization of movable teeth, elimination of traumatic occlusion, restoration of occlusal relationships), anti-inflammatory and antibacterial therapy. The goal of these measures is the maximum reduction of inflammatory phenomena in the parodontal tissues for the prevention of complications and reconstruction of the affected tissues [17; 18].

In turn, insufficient or ineffective conservative therapy is one of the leading risk factors for the development of complications at the stage of surgical treatment of patients with GP with TMJ dysfunction. The reason for the development of the latter in most cases is considered to be parodontal microflora, which causes a toxic effect on parodontal tissues, metabolic processes, provokes vasomotor disorders, sensitization of periodontal tissues and the body as a whole [16; 17].

Without underestimating the importance of the generally accepted scheme of treatment of GP, to the same extent as the preoperative preparation of the patient, it is possible to note, as a significant drawback, the lack of a personalized approach to the selection and justification of the tactics of complex treatment of the disease, first of all, in the part of data on the state of GP to microbial and tissue (including bone) antigens.

The purpose of the research was to increase the effectiveness of surgical treatment of generalized diseases of parodontal tissues in patients with TMJ dysfunction and eating disorders by substantiating a personalized approach to the correction of delayed-type hypersensitivity at the stage of preoperative preparation.

Materials and methods. We used clinical, radiological, immunological and statistical research methods. 135 people (age 26–40) took part in the research, in whom, on the basis of standard clinical and radiological methods, a diagnosis of generalized parodontitis, I–II degree, chronic course was established (classification of parodontal diseases after M. F. Danylevsky) with musculoskeletal dysfunction of the TMJ.

The control group consisted of 56 people (practically healthy patients) of the same age, in whom stomatological diseases, as well as diseases of internal organs and systems, as well as TMJ diseases, were ruled out through a comprehensive clinical and radiological examination of the maxillofacial system and ultrasound examination of internal organs.

It should be noted that the groups were homogeneous in terms of gender and age. All examined patients signed an informed consent for the study.

All researches were conducted at the stage of preoperative preparation for standard flap surgery by the method of direct tissue regeneration with the use of resorbable membranes (Periogen, Perio-system) at the Department of Stomatology, Institute of Postgraduate Education of Bogomolet National Medical University, Kyiv, Ukraine.

The conduct of the study was coordinated with the commission on bioethical expertise and ethics of scientific research of Bogomolets National Medical University (protocol dated 05/27/2024 № 185), the study was conducted with the informed consent of the patients and in compliance with the principles of bioethics and patient rights.

The research was carried out as part of the scientific research work of the Department of Dentistry of the National Medical University named after O. O. Bogomolets “Interdisciplinary approach in the prevention, treatment and rehabilitation of patients with periodontal diseases and functional occlusion disorders” (state registration number 0123U105134).

The research was carried out in two stages:

I stage is the determination of delayed-type hypersensitivity (DTH) to bone and microbial antigen. All patients with GP (the main group) and individuals of the control group participated in the study.

II stage – evaluation of the application of the method of immunocorrection (reduction) of DTH to microbial and tissue antigens.

At this stage, the patients of the main group were divided into two subgroups:

– main A (74 patients), which included patients with GP with muscle and joint dysfunction with DTH and eating disorders, who were included in the complex of preoperative preparation measures, the method of specific microbial hyposensitization followed by immunization (with positive informed consent of the patients regarding the use of this treatment method);

– main B (61 patients with GP and TMJ dysfunction and eating disorders), in which, in the presence of DTH, specific immunocorrection was not carried out (in connection with the patients’ refusal of the specified treatment method). DTH to microbial and tissue (bone) antigens was studied during the leukocyte migration inhibitory reaction (RLMI) and skin-reactive test (SRT).

The choice of SRT was due to the well-known experience of its use for the purpose of diagnosing allergic conditions, high specificity and informativeness. With the help of RLMI, it is possible to detect not only circulating antibodies in the blood (reagins), but also antibodies fixed on cells under the influence of a specific antigen [8].

It is included in the list of reactions recommended by the WHO for immunological studies and is a type

I screening reaction [7; 8]. RLMI was carried out according to the standard method of M. George et al. (1962).

Antigens were used: streptolysin-O, staphylococcus toxin. A water-salt extract of bone tissue of the O/ID group was used as a tissue antigen, which was obtained in the laboratory of immunology of the State University "Institute of Traumatology and Orthopedics of the National Academy of Medical Sciences of Ukraine". Specific microbial hyposensitization followed by immunization was carried out using adsorbed staphylococcal toxoid and streptolysin-O. Intradermal injection under the shoulder blade of small doses of antigen from 0.1 to 0.5 ml with an interval of 3 days (specific microbial hyposensitization). After a 3-week break, 0.5 ml was administered and after 3 days – 1.0 ml of antigen (course of immunization). The total duration of treatment was 1.5 months.

The nearest results (after 3 months) of treatment were considered satisfactory provided the patient had no complaints; reduction of gum bleeding to 1 point, according to the bleeding index (H.R. Münlemann, S. Son, 1971); a significant decrease in the gingival index (GI) to 1.1–2 points; reduction of the sensitization index (IS) [4] to 0.25–0.5, as well as the absence of an increase in the number of lymphocytes and destroyed formed elements.

The nearest results were considered unsatisfactory under conditions of complaints of pain and discomfort in the area of surgical intervention; bleeding gums, which reached 3.5–5 points; high GI index (2.1); isolated serous or purulent exudate; increased IS over 1.0; increase in the number of lymphocytes and destroyed epithelial cells.

Distant results (after 9–12 months) were considered satisfactory provided: no complaints; low degree of bleeding (0–2.5 points); IC indicators 0.25–0.5; absence of tooth mobility and supercontacts; decrease in the number of lymphocytes and destroyed formed elements; reduction of DTH indicators to microbial and tissue (bone) antigens; stabilization of radiological indicators.

Long-term results were evaluated as unsatisfactory under the following conditions: presence of complaints; bleeding index 3–5 points; IC above 1.0; appearance of tooth mobility and supercontacts; reduction of DTH to microbial and tissue antigens, increase in the number of lymphocytes against the background of destroyed formed elements, lack of stabilization in bone tissue (according to X-ray examination data).

The analysis of the obtained results was carried out with the calculation of the mean value (M) and the mean square deviation (SD), the Student's test and the Pearson correlation coefficient (to identify the relationship between quantitative characteristics). The Shapiro-Wilk test was used to test the population for normality of distribution. The analysis was carried out using the program "Statistica 6.1" (SN AJAX909E615822FB). The difference was considered statistically significant at $p < 0.05$

Research results and their discussion. Research of the 1st stage showed that, according to the data of RLMI, in patients with GP, I–II degree, chronic course, DTH to streptococcus was found in 85 cases out of 135, which was 62.9 ± 1.81 %, $P < 0.01$ at the migration index (MI) 0.1–0.5 versus 24.7 ± 0.62 % in the control group. DTH to staphylococcus in patients of the main group according to RGML was observed in 61.5 ± 4.14 %, $P < 0.01$ (migration index 0.3–0.5), while in the control group this indicator was equal to 0.

It should be noted that we detected DTH not only to one of the antigens, but also simultaneous DTH to both microbial antigens in patients of the main group. Thus, according to RLMI data, dialergy in the basic group was detected in 65.1 ± 2.05%, $P < 0.01$, while it was not observed in the control group.

The same regularity was found in the evaluation of DTH according to SRT data. So, before the streptococcus antigen, it was observed in 32.3 ± 4.12 % $P < 0.01$, and in the control group it was noted only in 10.0 ± 5.53 %. For the staphylococcus antigen, DTH was noted in 47.3 ± 2.4 % $P < 0.01$.

In the control group, this indicator was equal to 0. The combination of DTH to streptococci and staphylococcus according to the SRT data in the main group was found in 48.4 ± 3.1 % $P < 0.01$ and in the control group it was not established. As a result of the study, DTH to bone antigen was detected in the main group with a frequency of 66.3 ± 5.7 % with 100 % negative results in the control.

At the II stage of the study, when evaluating the results of specific microbial hyposensitization followed by immunization in the structure of preoperative preparation, it was established that the largest number of satisfactory treatment results (86.2 ± 0.23 %) was observed in the main A group. In comparison, in the main B group, whose participants refused immunocorrective therapy, despite the initial high indicators of DTH to microbial and bone antigens, the number of satisfactory results reached only 39.7 ± 0.24 %. In a number of patients of this group, against the background of the initial improvement in the state of the periodontal tissues, signs of active disease development subsequently recurred, there was no positive trend in the assessment of cytological, immunological and clinical and radiological indicators.

Conclusions. Thus, our studies show that in the vast majority of patients with GP, I–II degree, chronic course and TMJ muscle-articular dysfunction and eating disorders, DTH to one or simultaneously two streptococcal and staphylococcal antigens, as well as to bone antigen, was detected. In this regard, we

consider it expedient to include specific microbial hyposensitization followed by immunization in such patients to the list of measures for preoperative preparation for surgical intervention on parodontal tissues (for example, a typical flap operation by the method of direct tissue regeneration using resorbable membranes).

We believe that such a need is caused by DTH not only to microbial antigens, but also by the presence of similar and cross antigens of human fibroblasts, streptococci and staphylococcus, will contribute to the reduction or elimination of inflammation in periodontal tissues, and will also contribute to the reduction or elimination of sensitization to bone antigen.

Prospects for further research. The inclusion of specific microbial hyposensitization followed by immunization in complex preoperative preparation in patients with generalized diseases of parodontal tissues with TMJ dysfunction and eating disorders showed a high frequency of positive results (about 86%), which allows us to expect positive immediate and long-term results of surgical intervention, as well as the elimination of the autoimmune component in the pathogenesis GP. In our opinion, this is a promising prospect for long-term remission, which will stop further resorption of the alveolar process in such patients.

Conflict of interest. The authors deny any conflict of interest.

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