

PREVENTION AND COMPLEX TREATMENT OF INFLAMMATORY COMPLICATIONS IN SURGICAL INTERVENTIONS ON PERIODONT IN PATIENTS WITH TYPE 2 DIABETES MELLITUS*

A. Gudaryan, N. Pertseva, S. Shandyba, S. Shirinkin, D. Cherednik

*SE «Dnipropetrovsk medical academy Ministry of Health of Ukraine», Dnipro, Ukraine
borisovadi@ukr.net*

The number of patients with type 2 diabetes mellitus (DM) is dramatically increasing. This leads to increased number of complications and concurrent diseases. Periodontitis is one of many others problems in type 2 DM that may influence to quality of life in this category of patients. Generalized periodontitis is a multiethiological disease. However, in recent time great attention is paid to the role of immune system in pathogenesis of this disease. Therewith a distinct relation between peculiarities of clinical manifestation of generalized periodontitis and disorders of local immunologic defense reactions is seen, being a possible cause of development of extremely unfavorable course of inflammatory-destructive process in periodont [1, 2]. Integral manifestation of immune system reaction on it is development of secondary immune insufficiency, characterized

both as suppression of all links of the immunity and as a stimulation of immune response against a background of inferiority of cooperation of immune cells [3, 4]. In response to this, essential changes in biocenosis of periodontal tissues develop: antibiotics elimination, appearance or growth of incidence of replacement of conditionally-pathogenic and non-pathogenic anaerobes (including specific ones) with new types [5–7].

It is known, that appearance of microorganisms pathogenic to periodont in periodontal tissues against a background of secondary immune-deficiency significantly increases the risk of development of sharply progressing inflammatory-destructive process in periodont, which is difficult to be cured by traditional complex therapy, susceptible to constant relapsing. Special difficulties appear in carrying out

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treatment-preventive measures in generalized periodontitis, aggravated by type 2 DM. Few years ago, researchers found higher levels of inflammation in patients with type 2 diabetes. It is a result of both insulin resistance and increased blood sugar. Thus, the levels of certain inflammatory cytokines are often higher in patients with type 2 DM compared to people without diabetes. Surrogate markers for this chronic inflammation include CRP, IL-6 and TNF-alpha [8, 9].

It is extremely important to have a good control of DM. Aggressive glucose lowering may not be the best strategy in all patients. Individual risk stratification is highly recommended. It is important that patients with type 2 DM should be educated and encouraged to follow an appropriate treatment plan. Adherence to diet and exercise should continue to be stressed throughout treatment, because these lifestyle measures can have a huge influence on glucose control that patients can achieve. Some antidiabetic agents that reduce insulin resistance can decrease inflammation. Antiinflammatory drugs may improve glucose tolerance. Vasoactive drugs such as statins, angiotensin converting inhibitors and angiotensin receptor antagonists, also counteract inflammation and reduce the risk of type 2 diabetes. Anyway this drugs are influence generally. For many patients it is necessary to improve local reaction. Taking into account that patients with diabetes mellitus develop decrease of humoral and cellular factors of local defense of the oral cavity, decrease of oral mucosa resistance to pathologic microorganisms but lesion of vessels and changes of metabolic processes, one should suppose that against this background the disease is accompanied by significant destructive changes [10].

This requires usage of reconstructive methods of periodontitis treatment in many cases. In the literature there exist evidence that surgical interventions in the oral cavity, especially in patients with concomitant diseases are performed in conditions of the increased risk of development of inflammatory complications in the wound and those of destructive in the late postoperative [11].

Obviously, with this is related that presently a great number of conservative and surgi-

cal methods of generalized periodontitis treatment, aggravated with concomitant pathology are proposed. Nowadays unmerited less attention is paid to prevention of complications after performed surgeries on periodont. In the literature available we failed to find pathogenetic approaches to prevention of relapses of inflammatory-destructive events in periodont in the remote terms, to osteodestruction prevention, which consist of impact on local immunologic mechanisms and metabolic tissue processes.

In this regard preparation «Likopid» is of particular interest, being an immune-modulator and successfully being used nowadays in the therapy of a wide range of immune-pathologic states. We place great hopes on the methods, which favor improvement of microcirculatory violations and simultaneously stimulate metabolic processes in periodont in patients with generalized periodontitis and type 2 DM.

In many instances it has become possible due to development of new technologies, application of laser-therapy in dentistry, HELBO-therapy specifically. Judging from literature data, laser irradiation, applied in this technology, causes not only pronounced antibacterial effect, but may positively influence on microcirculatory and metabolic processes in periodontal tissues [12, 13]. Moreover, laser-therapy features immune-correcting, anti-inflammatory and hyposensitizing action.

So, mentioned-above testifies to decrease of degree of immunologic defense both in generalized periodontitis and in type 2 diabetes mellitus. It is necessary to consider that in diabetes mellitus bacterial contamination of the oral mucosa increases, microcirculatory and metabolic processes are suppressed. However, their role in development, treatment and prevention of different complications arising in surgical interventions on periodont is not studied enough, reliable and biologically expedient ways of their correction at the postoperative stage are not found; this determined conducting present investigations.

The purpose of this study is an improvement of methods of treatment and prevention of postoperative complications at the stage of regeneration of periodontal tissues in patients with generalized periodontitis and type 2 diabetes mellitus.

MATERIALS AND METHODS

Clinical-laboratory observations were carried out over 64 patients with generalized periodontitis I–II stage at the age of 36–52 years (36 males and 28 females, median age 44.6 ± 1.7 years) and type 2 DM. Patients were in good glucose control with HbA1c 7 ± 0.3 % confirmed by endocrinologists. Depending on treatment tactics and prevention of inflammatory complications, patients were divided into two groups, matched by age, gender, generalized periodontitis and type 2 DM. 30 patients underwent flap surgery with directed regeneration of osseous tissue and antibacterial therapy with the usage of collagen membrane by generally-accepted procedure (I group — comparison group); in 34 patients (II — main group) for normalization of regenerative osteogenesis - membranes from platelet-rich fibrin (a-PRF) together with «Bio-Oss» graft were used against background of antibacterial, immune-modulating therapy and topical action of HELBO-system by developed procedure.

Control group included 21 practically healthy volunteers with intact teeth and periodont of the analogous age and gender with patients of the first and second group in percentage correlation.

Examination of periodontal tissues state was carried out by generally accepted procedure using basic and additional means of investigation. Comprehensive clinical investigation of quantitative and qualitative assessment of the obtained results was carried out in all patients. Detailed taking of complaints and anamnesis was done, peculiarities of gingival periodontal tissues and their hygienic status was revealed. Investigation included visual inspection, paraclinical and roentgenologic methods. In all patients Roentgenologic investigation of alveolar process using intraoral and panoramic films was performed in all the patients. While analyzing roentgenograms, attention was paid to form, height, state of interalveolar septa, mineralization of spongy substance, state of cortical layer and type of bone resorption.

Assessment of oral hygiene state and operation zone was performed on the basis of defining indices of dental deposits and dental tartar by Green-Vermillion (OHI-S), and activity of

inflammatory process in gingival tissues — by means of bleeding index of gingival sulcus by Muhlemann-Cowell (IB). For digital defining of OHI-S and IB assessment, scale from «0» to «3» scores were used.

Immunologic investigation included establishment of two sides of immune defense:

- 1) local humoral defense of the oral cavity;
- 2) total cellular defense. As an agent, inducing inflammation and resorptive processes, interleukin 18 (IL-18) was chosen, and interleukin 4 (IL-4) — as an agent causing anti-inflammatory effect.

To assess state of local humoral immunity in the oral cavity, content of secretory immunoglobulin A (SIgA), immunoglobulin G and M (IgG, IgM) in a mixed non-stimulated saliva was defined by method of radial immunodiffusion in the gel by G. Mancini with the use of mono-specific anti-serums to the mentioned immunoglobulins. Saliva was collected in the morning on an empty stomach, being spilled into sterile test tubes.

Characteristics of functioning of cellular immunity was conducted on the basis of studying content of subpopulation of peripheral blood lymphocytes by method of immune-ferment analysis with the use of monoclonal antibodies to the molecules CD₃, CD₄, CD₈, CD₁₆, CD₂₂ и CD₂₅, produced by «Sorbent» (Russian Federation).

Level of IL-18 and IL-4 content in the oral cavity was assessed by means of solid phase immune-ferment analysis method using «Pro-Con» test (Russian Federation).

Microbiologic investigation was carried out by means of bacterioscopic and bacteriologic method. Microscopic analysis of smears stained by Gram's or with methylene-blue enabled to assess degree of bacterial content of the oral cavity and periodontal tissues and by morphologic and tinctorial properties to define belonging of microorganisms to obligatory-anaerobic species, to assess invasiveness with lactobacilli and bifidobacilli, which define state of periodontal normobiosis in many respects.

Defining specific causative microorganisms of generalized periodontitis in the content of periodontal pockets was performed by DNA-diagnostics of polymerase chain reaction (PCR).

It is directed at revealing of five the most aggressive bacteria, participating in inflammatory disease of periodont, and thus directed at revealing of «marker» microorganisms.

By the results of clinical and roentgenologic investigation, the need in surgical intervention combined with procedure of directed regeneration of bone tissue was ascertained in all patients. In an effort to prepare patients for surgical interventions, by indications, oral cavity sanitation, professional hygienic measures were carried out, they included removal of dental deposits by means of periodontal curets, ultrasonic scaler and air-sand blower.

Pre-operation preparation envisaged undergoing of courses of systemic antibacterial therapy by «Amoksiklav» 875/125 mg 1–2 days before the surgery and daily during 5 days and immune-correcting therapy («Likopid» 1 mg daily during 15 days).

Combined topical antibacterial, local immunomodulation therapy and correction of microcirculatory disturbances in periodontal tissues was performed with HELBO system.

Surgical technique included the following: under infiltration anesthesia from vestibular and oral gingival sides, horizontal incision along the apexes of interdental papillae at angle of 35° was made, preserving configuration of gingival margin. In the margins of the operated area of the dentition, two vertical incisions were made up to the bone, they came along from gingival margin toward muco-gingival junction. Mucous-periosteum flaps were dissected with periosteal elevator from vestibular and oral surface. Afterwards

by means of periodontal curets and ultrasonic scaler a thorough revision of surface of the exposed dental roots and periodontal defect was done, ultimately saving unaffected bone tissue. Antiseptic treatment of operation area was carried out by 0.05% chlorhexidine solution. Deepithelialization of tissues was carried with scissors. Later, bone defects were filled with osteo-inductive preparation «Bio-Oss» (Switzerland) mixed with injecting platelet-rich fibrin (i-PRF) of patient's autoblood. Procedure of applying osteo-inductive material envisaged full covering the roots of teeth and restoration of volume of the bone lost. Isolation of bone graft was performed by means of membranes. We tried them to fully overcover bone defect by 2–3 mm from bone margin, to firmly adhere to the dental cervixes, go out of folds on the surface and solid margins. In postoperative period patients were administered sparing diet, analgesics if necessary, hygienic dental care 2–3 times daily over 8 days' period (gargling of oral cavity with «Givalex»). Sutures were removed on the day 10–11.

Statistic processing of the data was made with program package Statistica 6.0 Stat Soft Inc (USA) on personal computer, Windows using processor Microsoft Excel. Statistical processing of variation series included calculation of arithmetic means (M) and standard errors of arithmetic means (m).

In the work methods of nonparametric statistics were used. To assess significance of differences between the groups, t-criterion Student was calculated. In $p < 0.05$ differences were considered to be significant.

RESULTS AND THEIR DISCUSSION

After carried out complete course of professional oral hygiene and preparatory antibacterial therapy (I group) and immunocorrection (II group) patients of both group noted decrease of gingival hemorrhage during tooth-brushing, absence of swollen mucosa and decrease of exudation from periodontal pockets. Increase of values of hygiene indices and hemorrhage reduced and achieved optimum limits relatively norm already on day 4–5 of preoperative treatment (correspondingly 1.32 ± 0.1 scores and 0.16 ± 0.2 scores, against 2.78 ± 0.3 and 2.47 ± 0.2 scores before treatment); this indicated clinical

efficacy of the carried therapy in patient. At the same time normalization of hygienic index was noted as well, and parameters of gingival hemorrhage remained moderately increased (correspondingly 1.56 ± 0.2 scores and 1.6 ± 0.4 scores, against 2.64 ± 0.3 and 2.46 ± 0.2 before treatment); this testifies to presence of residual inflammatory events in periodontal tissues in the patients under investigation.

Further laboratory investigations of two comparable groups revealed that studied indices changes in different degree, depending on carried preparatory pre-operation therapy.

Bacteriologic landscape of periodontal pockets content on completion of preparatory treatment in patients of the main group was characterized by paucity of isolated species and absence of periodontal pathogens, capable to initiate inflammatory-destructive processes in periodontal tissues and presence of stabilizing microorganisms in more than 90 % of cases. Along with this in comparison group incidence of bacteria revealing, which possess high aggression potential decreased by 66.7 %. Such «markers» of periodontitis as *Prevotella intermedia* and *Porphyromonas gingivalis*, as well as conditionally-pathogenic anaerobic bacteria-*Fusobacterium necroforum*, *Peptostreptococcus micros*, *Streptococcus intermedius*, *Candida albicans*, *Staphylococcus aureus* occurred in dental pocket content the most often, in these patient's growth of incidence of stabilizing microorganisms, normobiosis (lactobacteria, bifidobacteria etc.) in bacterioscopic landscape increased by 33.3 %.

In the patients of II group after carried out preparatory preoperative therapy by the authors' procedure, deviations of findings of local, systemic immunity and functioning of

cytokine system were absent, practically they corresponded to the norm (table 1). On the contrary, in patients of I group, therapeutic complex practically did not cause less influence on immune processes: after preparatory preoperative treatment reliably reduced levels of sIgA remained, findings of IgG and IL-4 content in the oral cavity were moderately increased, dynamics of IL-4 levels and findings of systemic immunity changed in the less extent than in patients of II group (table 1).

Comparative assessment of clinical parameters, characterizing patient's state and that of wound area after performed flap surgeries with directed regeneration of bone tissue in the main and comparison groups revealed more expressed positive dynamics of wound process and low number of early inflammatory complications while using complex developed by the authors (fig. 1).

In the vast majority of cases (79.4 %) patients of the main group already on the day first after performed surgery did not present complaints, in contrast to patients, having undergone traditional complex therapy. For the most part patients noted that on completion of

Table 1

Characteristic of immunological status in patients with generalized periodontitis before and after surgical interventions

Findings of immunity	Groups of patients				Control group (n = 21)
	I group (comparison group) (n = 30)		II group (main group) (n = 34)		
	Before treatment	After treatment	Before treatment	After treatment	
sIgA, g/l	0.39 ± 0.02	0.52 ± 0.03*	0.37 ± 0.03	1.26 ± 0.04**	1.30 ± 0.02
IgG, g/l	1.12 ± 0.03	0.94 ± 0.02*	1.26 ± 0.04	0.77 ± 0.02**	0.81 ± 0.04
IgM, g/l	0.97 ± 0.03	0.51 ± 0.03*	0.92 ± 0.04	0.39 ± 0.02**	0.42 ± 0.02
IL-1β, pg/ml	688.19 ± 18.0	300.71 ± 19.2*	703.15 ± 12.9	138 ± 10.4**	147.3 ± 8.12
IL-4, pg/ml	46.42 ± 2.7	72.0 ± 3.3*	45.01 ± 3.37	93.46 ± 5.0**	64.4 ± 4.2
CD ₃ , %	55.25 ± 0.49	66.63 ± 0.51*	58.55 ± 0.96	72.6 ± 1.27**	68.83 ± 1.08
CD ₄ , %	31.68 ± 0.52	38.7 ± 0.58*	32.2 ± 0.46	40.6 ± 0.53**	39.5 ± 1.1
CD ₈ , %	19.26 ± 0.32	20.01 ± 0.4	16.09 ± 0.6	22.9 ± 0.52**	23.1 ± 0.64
CD ₁₆ , %	10.97 ± 0.26	10.42 ± 0.37	10.87 ± 0.49	11.73 ± 0.22**	11.64 ± 0.37
CD ₂₂ , %	15.68 ± 0.31	17.6 ± 0.41*	16.04 ± 0.44	18.93 ± 0.36**	19.17 ± 0.88
CD ₂₅ , %	16.35 ± 0.2	24.38 ± 0.2*	16.22 ± 0.21	26.2 ± 0.2**	26.12 ± 0.47

Note:

* p < 0.05 — reliability with respect to indicators before treatment;

** p < 0.05 — reliability with respect to the indicators of the comparison group.

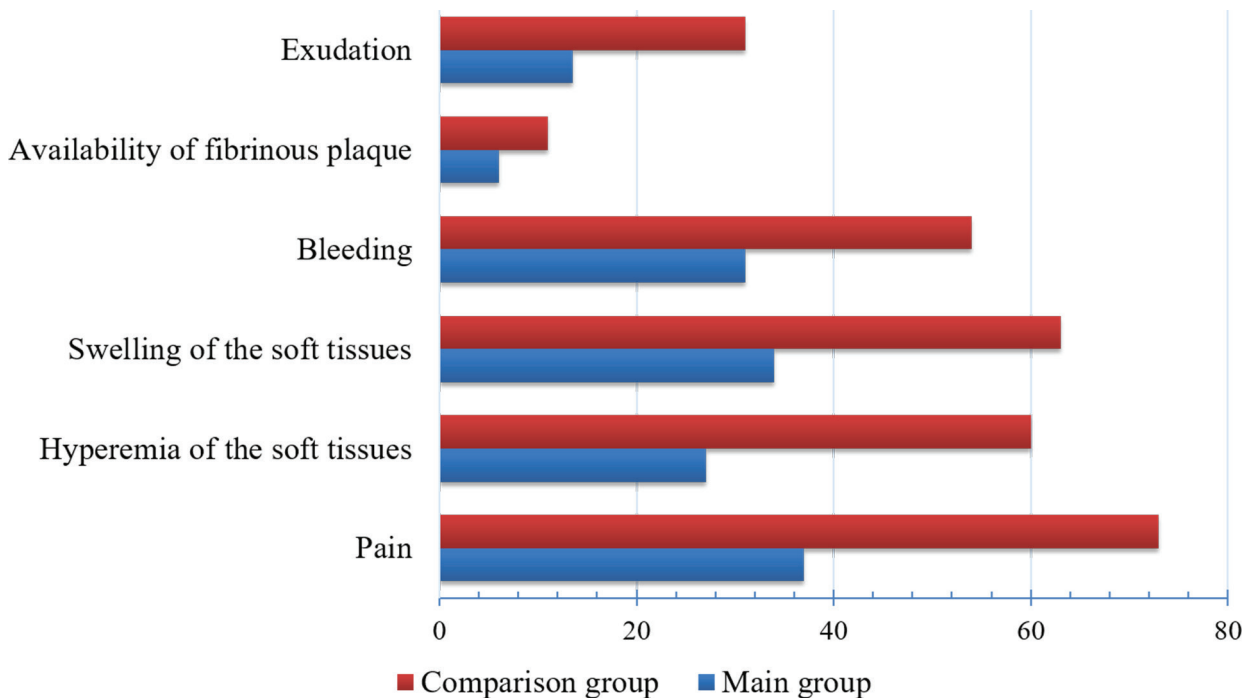


Fig. 1. The incidence and severity of complications in the postoperative period in two weeks' terms in patients of I and II groups, %.

topical anesthetic action, post-operation pains were absent at all and further taking analgesics was stopped.

Usage of the developed scheme of drug and photodynamic treatment enabled to significantly reduce terms of hyperemia, edema of gingival tissues and exudation discharge from the wound. If after proposed treatment duration of these processes was on average 4.5 ± 0.2 days, in traditional treatment it was 6.8 ± 0.3 days ($p < 0.05$).

In postoperative period in one patient (2.9 %) of the main group tenderness of wound surface was noted during 4 days period, which was accompanied by edema of gingival soft tissues and discharge of serous exudates on the incision line, and while using traditional reconstructive treatment with undesired post-operative effect, tenderness was considerably larger (60 %).

Terms of primary wound healing in the main group made up 6.56 ± 0.4 days, in the control group — 9.16 ± 0.7 days ($p < 0.05$).

So, additional administration of immunomodulating therapy and HELBO-therapy into complex traditional surgical-operation treatment of generalized periodontitis in persons with type 2 diabetes mellitus causes expressed

preventive effect on development of immediate post-operative complications.

It was set, that reduction of percentage of immediate negative post-operative complications and quicker weakening of developed inflammatory reactions in patients of the main group is achieved at the expense of optimal influence of the developed treatment complex on biocenosis of periodontal tissues and topical immunologic resistance.

Microbiologic investigations carried out in the terms from 6 months after surgery did not reveal bacteria in bacteriologic landscape, which are capable of stimulating development or maintaining inflammatory-destructive process in the periodontal tissues in 91.7 % of patients of the main group and in 53.3 % of controls. On the contrary, in 46.7 % of patients of comparison group in periodontal foci one and the same species of pathogenic microflora, including *Candida* type fungi, *Actinomyces* and fusobacteria, but reduce of number of associating forms of mentioned bacteria was noted. Here, it should be noted that relapses of pathogenic microflora in patients of the main group 12 months after surgical treatment were revealed only in 2 cases (5.9 %), while in the comparison group was significantly more (33.3 %).

Already in 2 weeks after surgery in the vast majority of patients of the main group (82.4 %) total normalization of content of CD₃, CD₄, CD₈, CD₁₆, CD₂₂ and CD₂₅ cells in the peripheral blood was noted. Partial restoration of subpopulation of lymphocytes was noted in 17.6 % of cases. Therapeutic complex favored normalization of functional state of local immunity as well. Full rate restoration of barrier (biocide) function of the oral cavity mucosa in this period was noted in 94.1 % of patients of II group. Normalization of SIgA, IgG, IgM content in the oral cavity was established, switching of synthesis of pro-inflammatory cytokines (IL-1 β decreased to the limits of conditional norm) to anti-inflammatory (IL-4) occurred.

Achieved qualitative changes in humor and cellular immunity in the patients of the main group were at the same level in the remote observation terms (after 6 and 12 months) as well.

In comparison group two tendencies of local and systemic immunity changes were observed, they, the most probably must not be considered as favorable for immediate and remote period course. The first tendency was manifested in the fact that therapeutic complex of the analyzed group did not impact state of cellular factor of defense, the second one — complex caused not enough normalizing action on interleukin profile, and moderately stimulated SIgA synthesis as well (table 1).

Taking mentioned about into account, we considered it necessary to thoroughly analyze remote postoperative complications in the patients of both groups.

Carried out clinical investigation shows that relapses of slightly marked inflammatory process in the zone of surgical interventions developed in (30 %) of patients of comparison group and in (5.9 %) of patients of the main group already in 3 months after surgeries. In 6 months number of relapses of inflammation in periodontal tissues in the patients of the comparison group grew to 46.7 % of cases, while in patients of the main group they were not registered. Thereafter only in 3 patients (8.8 %) of the main group local inflammatory complications developed in the areas of periodontal tissues, neighboring operation zone. Treatment complex used in the main group,

which envisaged additional to traditional therapy use of HELBO-therapy in combination with standard antibacterial treatment and immune-correcting action with likopid has advantage in prophylaxis as compared to traditional complex therapy. Its application in early postoperative period favored not only control of nearest complications and their prevention after surgeries in the remote terms, but potentiates therapeutic effects in the greater extent than under impact of traditional methods. Undoubtedly, its high preventive and treatment efficacy is linked with its optimal influence on ethiopathogenetic links of generalized periodontitis. In the course of carried out research it was established that relapses of the disease in postoperative period developed only in patients with change of biocenosis towards periodontal pathogens, having deficit of sIgA content in the mixed saliva and not-eliminated imbalance in functioning of cytokine system. HELBO-therapy and immunocorrection with «Likopid» is used as preventive and treatment measures in the remote terms after operative interventions (not less than one time in 6 months) together with professional hygienic measures.

It must be noted that in our observation we did not consider development of some or other complications in the remote postoperative period, while carrying out recommended preventive courses of the main group over 12 months. On the contrary, in 4 patients who did not receive preventive treatment, progressive course of inflammatory course in periodontal tissues was noted; this manifested itself on dallying of process of bone defects, and impacted on depth of its replacement.

In the late terms, together with normalization of clinical and betterment of laboratory findings, growth of bone tissue in the postoperative zone was observed in both groups. In patients of the main group a complete recovery of bone tissue was achieved in 88.2 % of cases, partial — in 11.8 % of patients. In 12 months after surgery complete regeneration of the bone tissue was noted in 60 % of patients, partial — in 40 % patient in comparison group.

So, carried out laboratory investigations and clinical observations enable to draw a conclusion that developed treatment-preventive

complex of surgical treatment of generalized periodontitis in patients with type 2 diabetes mellitus may be considered pathogenetically justified. Its usage in pre-operative period and in the following allows to achieve elimination of pathogenic bacteria, normalization of biocidity of gingival mucosa, restoration of findings of

local and systemic immune defense and normal functioning of cytokine system, thus favoring good outcome of surgeries on periodont performed in patients with type 2 diabetes mellitus, good conditions for regeneration of bone tissue.

CONCLUSIONS

1. For effective normalization of inflammation in patients with type 2 diabetes, the most important clinical conditions include hyperglycemia quality compensation.
2. Possibility of development of inflammatory complications in the immediate and remote terms after reconstructive methods of generalized periodontitis treatment in patients with type 2 diabetes mellitus depends on characteristic risk factors: appearing basic species of periodont-pathogenic or conditionally-pathogenic anaerobic bacteria in periodontal tissues, decrease of biocid function of oral mucosa (drop of level of sIgA in the mixed saliva more than by 1.5–2 times).
3. Pathogenetic justifications of program of drug maintenance of surgical interventions on directed regeneration of bone tissue, which consist of short-term courses of antibacterial and immune-modulating therapy together with local impact of HELBO-system on pathologic focus.
4. High clinical, antibacterial and immune-modulating efficacy of the developed program of drug maintenance of surgical interventions on directed regeneration of periodontal tissues provides fast controlling of inflammatory complications in the early and remote periods, potentiates more fully functional restoration of defects of bone structures, interdental septa in periodont in patients with generalized periodontitis, aggravated with type 2 diabetes mellitus.
5. Usage of HELBO-therapy with the course of 5–6 procedures in every 6 months together with immune-modulating therapy in post-operative period allows to prevent development of relapses of inflammatory-destructive process in periodont in patients with generalized periodontitis and type 2 diabetes mellitus.

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**ПРОФІЛАКТИКА І КОМПЛЕКСНЕ ЛІКУВАННЯ ЗАПАЛЬНИХ УСКЛАДНЕНЬ
ПРИ ОПЕРАТИВНИХ ВТРУЧАННЯХ НА ПАРОДОНТІ
У ХВОРИХ НА ЦУКРОВИЙ ДІАБЕТ 2 ТИПУ**

Гудар'ян А. А., Перцева Н. О., Шандиба С. І., Ширінкін С. В., Череднік Д. А.

*ДЗ «Дніпропетровська медична академія МОЗ України», Дніпро, Україна;
borisovadi@ukr.net*

У статті наведені результати комплексного лікування та профілактики запальних ускладнень при оперативних втручаннях на пародонті у 64 хворих на генералізований пародонтит I–II ступеня тяжкості при цукровому діабеті 2 типу.

Мета дослідження — вдосконалення методів комплексного лікування і профілактики післяопераційних ускладнень, що виникають на етапі регенерації тканин пародонта у хворих на генералізований пародонтит та цукровий діабет 2 типу.

Виявлено, що ймовірність розвитку запальних ускладнень після хірургічного лікування на пряму залежить від наявності в пародонтальних тканинах пародонтопатогенних бактерій, зниження біоцидної функції слизової оболонки порожнини рота і дисбалансу в цитокіновій системі. Розроблено програму медикаментозного супроводу хірургічних операцій з спрямованої регенерації тканин пародонта, що полягає в антибактеріальній і імунорегуючій терапії в поєднанні з місцевим впливом на патологічний осередок системою HELBO.

Застосування окремих компонентів запропонованого лікувально-діагностичного комплексу проводилось і раніше як українськими дослідниками, так і закордонними авторами, але такого комплексного впливу на основні етіологічні чинники та патогенетичні механізми генералізованого пародонтиту на тлі цукрового діабету 2 типу до нині не застосовувалось. Запропонований комплекс лікувально-профілактичних заходів забезпечує швидке блокування запальних ускладнень в найближчому та віддаленому післяопераційному періоді, потенціє більш повноцінне відновлення дефектів кісткових структур у хворих на генералізований пародонтит та цукровий діабет 2 типу.

Ключові слова: генералізований пародонтит, цукровий діабет 2 типу, клаптеві операції, спрямована регенерація кісткової тканини, HELBO-терапія.

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Gudaryan, N. Pertseva, S. Shandyba, S. Shirinkin, D. Cherednik

*SE «Dnipropetrovsk medical academy Ministry of Health of Ukraine», Dnipro, Ukraine;
borisovadi@ukr.net*

Surgical treatment of generalized periodontitis in patients with type 2 diabetes mellitus, presents considerable difficulties associated with high-risk inflammatory complications caused lower local immunity and periodontitis infection.

The purpose of this study is an improvement of methods of treatment and prevention of postoperative complications at the stage of regeneration of periodontal tissues in patients with generalized periodontitis and type 2 diabetes mellitus.

Materials and methods. The article presents the results of the treatment and prevention of inflammatory complications during surgery in 64 patients with generalized periodontitis I-II severity with type 2 diabetes mellitus.

Results. It was revealed that the risk of inflammatory complications after surgery directly depends on the presence of periodontal tissues of pathogenic bacteria, reduction of barrier function of the oral mucosa and cytokine imbalance in the system. Developed a program for tracking surgical operation of directed regeneration of periodontal tissues, consisting in antibacterial and immunocorrective therapy in combination with a local impact on the pathological focus by system HELBO.

The use of individual components of the proposed treatment and diagnostic complex has been carried out before by both Ukrainian researchers and foreign authors. But such a complex effect on the main etiological factors and pathogenetic mechanisms of generalized periodontitis on the background of type 2 diabetes has not been applied to date.

Conclusions. The proposed complex of therapeutic and preventive measures provides rapid relief of inflammatory complications in the early and late postoperative period, potentiates a full recovery of the defects of bone structures in patients with generalized periodontitis with type 2 diabetes mellitus.

Key words: generalized periodontitis, diabetes mellitus type 2, flap operations, directed regeneration of bone tissue, HELBO-therapy.

**ПРОФИЛАКТИКА И КОМПЛЕКСНОЕ ЛЕЧЕНИЕ
ВОСПАЛИТЕЛЬНЫХ ОСЛОЖНЕНИЙ ПРИ ОПЕРАТИВНЫХ ВМЕШАТЕЛЬСТВАХ
НА ПАРОДОНТЕ У БОЛЬНЫХ САХАРНЫМ ДИАБЕТОМ 2 ТИПА**

Гударьян А. А., Перцева Н. О., Шандыба С. И., Ширинкин С. В., Чередник Д.А.

*ДЗ «Днепропетровская медицинская академия МЗ Украины», Днепр, Украина
borisovadi@ukr.net*

В статье приведены результаты комплексного лечения и профилактики воспалительных осложнений при оперативных вмешательствах на пародонте у 64 больных генерализованным пародонтитом I–II степени тяжести при сахарном диабете 2 типа.

Цель исследования — совершенствование методов комплексного лечения и профилактики послеоперационных осложнений, возникающих на этапе регенерации тканей пародонта у больных генерализованным пародонтитом и сахарным диабетом 2 типа.

Обнаружено, что вероятность развития воспалительных осложнений после хирургического лечения напрямую зависит от наличия в пародонтальных тканях пародонтопатогенных бактерий, снижение биоцидной функции слизистой оболочки полости рта и дисбаланса в цитокиновой системе. Разработана программа медикаментозного сопровождения хирургических операций с направленной регенерации тканей пародонта, заключающийся в антибактериальной и иммунокорректирующей терапии в сочетании с местным воздействием на патологический очаг системой HELBO.

Применение отдельных компонентов предложенного лечебно-диагностического комплекса проводилось и ранее как украинскими исследователями, так и зарубежными авторами, но такого комплексного воздействия на основные этиологические факторы и патогенетические механизмы генерализованного пародонтита на фоне сахарного диабета 2 типа в настоящее время не применялось. Предложенный комплекс лечебно-профилактических мероприятий обеспечивает быструю блокировку воспалительных осложнений в ближайшем и отдаленном послеоперационном периоде, потенцирует более полноценное восстановление дефектов костных структур у больных генерализованным пародонтитом и сахарным диабетом 2 типа.

Ключевые слова: генерализованный пародонтит, сахарный диабет 2 типа, лоскутные операции, направленная регенерация костной ткани, HELBO-терапия.