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BIOCHEMICAL STUDIES OF GINGIVAL LIQUID OF PATIENTS WITH PERFORATION OF HARD TOOTH TISSUES

The work is dedicated to researching the biochemical components of gingival liquid of patients with perforations of hard dental tissues. The paper presented new data on the concentration inflammation and antiinflammation interleukins of gingival liquid before treatment and after 6 and 12 months of treatment. Clearly shows the impact of different methods of treatment in groups to concentration of interleukins of gingival liquid.

Keywords: perforations of hard dental tissues, gingival liquid, interleukins.

The wide range of modern medicines, tools, methods of endodontic treatment, the percentage of unfavorable outcomes of conservative treatment of perforation of hard tooth tissues continues to be actual [1, 5].

The appearance of perforation of hard tooth tissues leads to the development of chronic forms of periodontitis. Asymptomatic, prolonged inflammatory process, which leads to the removal of the tooth.

Among the other components of the gingival fluid, cytokines play a particularly important role. Cytokines include proteins produced primarily by activated cells of the immune system. By means of cytokines, the nature, depth, duration of inflammation and immune response of the body are regulated. Acting locally, they provide interaction of cells of the immune system. Determination of the level of cytokines in the gingival fluid serves as an indicator of the activity of the inflammatory process and local immunity of the oral cavity. To study the severity of the inflammatory process and the dynamics of treatment effectiveness, patients are assessed for the level of pro-inflammatory interleukin-1β (IL-1β), interleukin-6 (IL-6) and antiinflammatory interleukin-4 (IL-4) and transforming growth factor β1 (TGF-1).

Many authors [2–4, 6] are similar in opinion that the most dangerous in the treatment of perforation of hard tissues of the tooth is pushing through the wide perforation of the filling material in the periodontal tissue. To create a periodontal matrix, a variety of materials were used: from metal foil, gypsum and glass ionomer cements to calcium hydroxide and absorbable collagen. Despite some successes, these materials did not meet the requirements: they were not biocompatible or had an irritating effect on periodontal tissue, contributing to aggravation of the inflammatory process.

Based on the foregoing, we set ourselves the goal of increasing the efficiency of dental treatment with hard tissue perforation, studying the level of pro- and antiinflammatory cytokines of the gingival fluid and determining the possibility of using these cytokines as a marker of the effectiveness of the treatment.

Objects and methods

To achieve this goal, we developed a new method for treating the perforation of hard tooth tissues [7] using a platelet-rich autoimmune as a periodontal matrix, followed by sealing the perforation channel with calcium-aluminosilicate cement.

In order to study the effectiveness of treatment, the method proposed by us was used to treat and follow up 62 patients diagnosed with focal puncture of hard tooth tissues. Depending on the method of treatment, patients were divided into 2 groups: primary and control.

The main group included 33 (53.2%) patients who were treated with our proposed method – placement as a periodontal matrix of platelet-rich autoimmunity with subsequent filling of the perforation channel with calcium-aluminosilicate cement Trioxident (Vladmyva, Russia). The control group consisted of 29 (46.7%) patients who only had a perforation filling with the indicated calcium-aluminosilicate cement. In all patients of both groups, complications of perforation in the form of various forms of chronic periodontitis were observed in the initial status. So the main group included 16 people with chronic granulating and 17 people with chronic granulomatous periodontitis. The control group consisted of 15 patients with chronic granulating and 14 patients with chronic granulomatous periodontitis.

Results of the study

Before treatment, the main group of SIP proinflammatory cytokines IL-1β was 171.30%, and IL-6 was 438.28% compared with the control group, where IL-1β was 167.22% ($p>0.05$) , And IL-6 was 463.45% ($p>0.05$).

This level of the standardized proinflammatory cytokine standard before the treatment indicated a

marked progression of the disease in the perforation area. Hyperproduction of proinflammatory cytokines in the gingival fluid of patients was due, most likely, to an increase in their synthesis when stimulating the proliferation of producer cells by pathogenic microorganisms and the insufficient effectiveness of the corresponding inhibitors. This manifested itself in the increased synthesis and release into the gingival fluid of a significant amount of IL-1β and IL-6, which potentiate the action of each other and inhibit the production of anti-inflammatory IL-4.

In our studies, we detected a pronounced expression of proinflammatory cytokines as compared to antiinflammatory cytokines-IL-4 and TGF-β1. The level of antiinflammatory cytokines in the perforation area before treatment was significantly lower than the level in the healthy tooth region. In the main group of SPS, the level of antiinflammatory cytokines before treatment for IL-4 was – 46.24% and the level of TGF-1 – 42.39%. In the control group, the level of IL-4 was – 52.15%, and the level of TGF-β1 was – 47.36%.

The existing imbalance towards the proinflammatory link apparently determined the severity of the inflammatory changes during the period of clinical activation of the inflammatory-destructive processes in the periodontal tissues and showed that the defense mechanisms in the oral cavity weaken due to a decrease in the activity of humoral immunity.

The method developed by us reduced the severity of the inflammatory process, and positively influenced the cytokine profile of the gingival fluid. After 6 months. After treatment in patients of the main group, there was a significant decrease in the level of IL-1β to an index of 72.4% ($p>0.05$) and IL-6 to 258.85% ($p<0.05$) compared to the control group, where IL-1β was 90.20%, and IL-6 was 319.67%. The level of IL-4 in the basis of the group was significantly lower – 5.47% ($p<0.01$) than the indicator in the control group and – 21.24%. The TGF-β1 index in the main group was 15.19%, and the control group – 25.52% ($p<0.05$).

Based on these results, it can be said that the use of automebranna rich in platelets during the treatment carried out had a more rapid restorative effect on the spectrum of cytokines. After 6 months of observation in the main group, we noted a significantly high level of IL-4 and TGF-β1 in the gingival fluid compared to the control subgroups. This trend can be explained by the additional introduction of inflammatory tromocyte growth factors that inhibit the synthesis of proinflammatory cytokines. Evidently, therefore, in patients who were using automembranes, even in the inflammatory focus, there was a less pronounced violation of the cytokine profile and the SNP index was significantly lower in comparison with the control group.

After 12 months. After the treatment, there were no significant differences in the indices of the cytokines studied between the groups. In the main group, the level of IL-1β – 4.32% ($p>0.05$), IL-6 – 2.81% ($p>0.05$), IL-4 – 2.21% ($p>0.05$), TGF-1 – 0.36% ($p>0.05$). In the control group, the indices were IL-1β – 0.92%, IL-6 –14.33%, IL-4 – 10.12%, TGF-β1 – 2.38%.

Conclusions

The study of the level of pro- and antiinflammatory cytokines of the gingival fluid before treatment in all patients characterized the indices of pronounced inflammatory process of periodontal tissues. The use of an autologous platelet membrane as a biological barrier in combination with cement «Trioxident» for sealing the perforation canal in the vast majority of cases (87.25%) reduced the level of proinflammatory and increased the level of antiinflammatory interleukins in the gingival already at 6 months of follow-up. This fact, combined with the radiographic method, confirmed the elimination of the pathological process and the effectiveness of the treatment performed earlier in comparison with the traditional method. Elimination of the inflammatory process and preservation of the functional integrity of the tooth is perspective for using of this method of treatment in practical public health.

Literature

1. Borovskiy E. V. Clinical and radiological assessment of the effectiveness of dental treatment with complications of caries / E. V. Borovsky, N. G. Khubutia // Clinical stomatology. – 2006. – No. 2. – P. 6–9.

2. Gofung E.M. Therapeutic dentistry / E. M.Гофунг, Д. А. Entin. – M., Medicine, 1938. – 485 p.

3. Nikolicin A. K. Practical endodontics of a practical doctor / A. K. Nikolicin. – Poltava : Дивосвіт, 2007. – 155 p.

4. Troup M. Endodontics Manual for General Practitioners / M. Trow, J. Debelian ; per. with the English A. Ostrovsky, G. Dazhaev. – Moscow, St. Petersburg, K. Almaty, Vilnius: «Azbuka» Publishing House, 2005. – 70 p.

5. Khomenko L. A. Practical endodontics. Tools, materials and methods / Bidenko, L. A. Khomenko. – Moscow : The Book Plus, 2002. – 216 p.

6. Aguirre R. Evaluation of the repair of mechanical furcation perforations using amalgam, gutta-percha, or indium foil / R. Aguirre, M. E. El Deeb // AAE – Iune. – 1986. – Vol.12. – P.6.

7. Ukraine Patent 55926 IPC-2011.01 A61K 02/06; 5/00 A61S Method of treatment of chronic periodontitis perforated mizhkorenevoho / E. I. Fate, YE. M. Riabokon ; Number u 2010 08557 ; appl. 07/08/10 ; publ. 27.12.10, Bull. Number 24.

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БІОХІМІЧНІ ДОСЛІДЖЕННЯ ЯСЕННОЇ РІДИНИ ПАЦІЄНТІВ З ПЕРФОРАЦІЄЮ ТВЕРДИХ ТКАНИН

Стаття присвячена дослідженню біохімічних компонентів ясенної рідини у хворих з перфорацією твердих тканин зуба. У роботі наведені нові дані щодо концентрації про- та протизапальних інтерлейкінів ясенної рідини до лікування, а також через 6 та 12 міс після проведеного лікування. Чітко показано вплив різних методів лікування у групах дослідження на концентрацію інтерлейкінів ясенної рідини.

Ключові слова: перфорація твердих тканин зубів, ясенна рідина, інтерлейкіни.

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БИОХИМИЧЕСКИЕ ИССЛЕДОВАНИЯ ДЕСНЕВОЙ ЖИДКОСТИ ПАЦИЕНТОВ С ПЕРФОРАЦИЕЙ ТВЕРДЫХ ТКАНЕЙ

Статья посвящена исследованию биохимических компонентов десневой жидкости у больных с перфорацией твердых тканей зуба. В работе представлены новые данные о концентрации про- и противовоспалительных интерлейкинов десневой жидкости до лечения, а также через 6 и 12 мес после проведенного лечения. Четко показано влияние разных методов лечения в группах наблюдения на концентрацию интерлейкинов десневой жидкости.

Ключевые слова: перфорация твердых тканей зуба, десневая жидкость, интерлейкины.