

JUSTIFICATION OF THE USE OF AUTOPLASMA IN THE TREATMENT OF GENERALIZED PERIODONTAL DISEASES

Horodnov Yevhen

graduate student

O.O. Bogomolets National Medical University

Kyiv, Ukraine

Abstract: The article updates the theoretical analysis of scientific literature on the use of platelet-rich plasma in the treatment of generalized periodontal diseases in patients. By methods of comparison, generalization, and systematization of scientific literature, scientific studies on the use of platelet-enriched plasma in treatment were analyzed. Consider the technologies and effectiveness of plasma application in various fields of medicine.

Key words: platelet-enriched plasma, autoplasm, generalized periodontitis.

Among dental diseases, the problem of periodontal treatment is the most widespread not only in Ukraine, but also far beyond its borders. Diagnostics and comprehensive treatment of this type of disease not only have not lost their relevance, but on the contrary, have become even more acute. Its purpose is to reduce inflammatory processes in patients, eliminate the negative impact of the pathological process in the periodontal tissues on the body, reduce the risk of complications, as well as long-term maintenance of the achieved treatment result. Therefore, the standard complex treatment of such a disease includes not only a one-time visit, but also regular supportive therapy. An important direction in the treatment of periodontal diseases is the development and use of drugs and methods that combine safety and high biological activity in relation to body tissues [1].

Today, this can be the injection method of using platelet-rich plasma, rich in platelets. In modern conditions, platelet-enriched plasma is widely used in

various fields of medicine: surgery, dentistry, orthopedics, traumatology, cosmetology, dermatology. Plasma platelets contain dense granules with biologically active molecules that participate in biochemical and metabolic processes of the body, including inflammatory and regenerative reactions [3;9;15].

The analysis of scientific literature proves that the problems of periodontal treatment have been attracting the attention of researchers and practicing doctors in different countries for a long time.

In particular, studies conducted by a group of specialists under the leadership of Filardo G. et al. established a positive therapeutic effect from the use of PRR in the form of injections in the treatment of osteoarthritis [5].

According to W.Richter, when the concentration of platelets increases, the concentration of growth factors increases, namely: platelet growth factor (PDGF-aa, PDGF-bb, PDGF-ab), transforming growth factor (TGF-b1, TGF-b2), endothelial growth factor vessels (VEGF) [14].

A research group led by Li Q, et al., discovered the positive ability of PRF to induce osteoplastic differentiation and stimulate new bone formation [10].

Scientist Borie E, et al., and members of his scientific team conducted a literature analysis to determine the effectiveness of PRF application and concluded that the use of this material carries a number of advantages, both when used alone and in combination with other osteoplastic materials. Moreover, they recommended the widespread use of platelet autoplasm in general medicine [4].

Researchers A.Sanchez, P.Sheridan, L.Kupp showed that, in addition to growth factors, platelets secrete many other active biological compounds (for example, fibronectin, vitronectin, sphingosine 1-phosphate), which play an important role in the wound healing process [15].

Doctors Baeyens W., Glineur R., Evrard L., note in their work that platelet-rich fibrin and plasma are successfully used in various fields of medicine, especially in surgical dentistry and maxillofacial surgery. In addition, they emphasize that platelets contain insulin-like (IGF) and epithelial (EGF) growth

factors, which lead to increased bone graft density and accelerated regeneration in maxillofacial surgery [2].

Theoretical studies by Hartshorne J., Gluckman H., in their review of literary sources on PRF, indicate that the effect of the platelet drug is due to the unique interaction of fibrin and blood cells: platelets, leukocytes, stem cells and biologically active substances produced in the process of their interaction. The authors note the effect of this drug on tissue healing and regeneration, which includes proliferation, differentiation, synthesis of the extracellular matrix, chemotaxis and angiogenesis. They state that the deepening of theoretical knowledge and the development of technologies have led to an increase in the effectiveness of the use of PRF in periodontology, implantology and maxillofacial surgery [7].

The author team headed by Miron RJ, et al., in their article on the use of PRF in dental practice, focuses their attention, in particular, on the problems of regeneration of intraosseous and furcation defects, filling of post-extraction cells, sinus lifting, elimination of gingival recession and directed bone regeneration. The authors conclude that PRF is most often used for the treatment of periodontal disease and soft tissue repair, confirming its high efficacy. However, they insist on the need for further study of the effect of this drug on CT regeneration [12].

A group of scientists N.B.Kuznyak, M.P.Prodan, and S.I.Tryfanenko studied the effectiveness of using blood plasma enriched with platelets to optimize reparative osteogenesis after atypical tooth extraction. They describe in detail the method of obtaining the results, which is very important for the correct interpretation of the results. On the basis of their clinical and radiological studies, it was established that the addition of platelet-enriched plasma accelerates bone repair, prevents the occurrence of post-traumatic complications, and improves treatment results [9].

According to the results of research by Vovk V., Vovk Yu., Deltsova O., it was determined that platelet-enriched blood plasma added to the calcium-phosphate biomaterial Calcibone causes accelerated formation of mature bone

tissue in hollow bone defects, which justifies its osteoinductive properties. The authors also established that the rates of bone formation during osteoplasty of defects with the participation of a calcium-phosphate carrier and platelet-enriched blood plasma are faster per month than in areas where only calcium-phosphate biomaterial was used. They believe that the results of their experimental study provide grounds for recommending calcium-phosphate biomaterial with platelet-enriched blood plasma for transplantation into bone defects characterized by weak osteoregenerative potential [16].

Authors A.Makhmutova, A.Nasibullin and R.Ahmerov claim that the treatment of chronic catarrhal gingivitis and periodontitis of I - II severity with the use of autoplasm rich in platelets allows to reduce the frequency of exacerbations and prolong periodontal disease remission. They note that as a result of the use of autoplasm rich in platelets, it was possible to eliminate inflammatory processes in the periodontium, prevent the reduction of bone tissue, increase local immunity, and eliminate the imbalance of the microflora of the oral cavity [11].

The scientific results of the research conducted by Horytska K. prove the effectiveness of the use of platelet-enriched plasma to optimize osteogenesis in traumatic fractures of the lower jaw, qualitatively new treatment results were obtained, which testify to the activation and optimization of osteogenesis with full restoration of damaged bone tissue [8].

Research by scientists Filipskii A., Horytska K., Gott M., the use of fibrin enriched with platelets, obtained according to the classical method under the condition of centrifugation on an EVA-20 centrifuge (Hettich, Germany) for 12 minutes. at a speed of 2600 rpm, did not record any reactions of incompatibility or insensitivity of the body to the introduction of the material due to its absolute biocompatibility. In this work, the researchers confirmed the low cost of manufacturing fibrin enriched with platelets, compared to other osteoplastic materials, the undeniable technological simplicity and the possibility of obtaining the required amount directly in the operating room. They recommended fibrin

enriched with platelets for augmentation of bone cavities of the jaws after removal of odontogenic cysts of various sizes, in particular medium and large ones [6].

The authors R.Ahmerov, V.Guseva, B. Semenov in their work convincingly prove the effectiveness of the use of autoplasm for the treatment of chronic periodontitis. Researchers have established that platelets contain dense granules with biologically active molecules. They participate in biochemical and metabolic processes of the body, including inflammatory and regenerative reactions. Platelet autoplasmic growth factors differ from recombinant growth factors in that autoplasm modulates and regulates the function of primary, secondary, and tertiary growth factors, thereby affecting all stages of regeneration simultaneously, while recombinant growth factors are responsible for a separate mechanism of regeneration. [13].

Scientists G.Biloklytska, O.Kopchak studied the clinical effectiveness of the use of platelet autoplasm in the treatment of patients with generalized periodontal disease with accompanying cardiovascular pathology, changes in the functional activity of platelets and their concentration ability when receiving PRP preparations. The obtained results showed that the complex treatment of periodontal disease in the group to which the plasma lifting method was added led to the best therapeutic effect: activation of natural processes of tissue recovery took place, inflammation of the gums decreased, new capillaries were formed, blood supply and metabolism improved, and local the immunity of the oral cavity increased [3].

Summarizing the above, we can state that the study of the effect of platelet plasma on periodontal tissues, the course and effectiveness of its application to achieve a sustainable positive effect is relevant and attracts the attention of a fairly wide range of both domestic and foreign specialists. On this basis, it can be argued that plasma enriched with platelets is widely used in various fields of medicine: surgery, orthopedics, traumatology, cosmetology, dermatology, dentistry, etc.

The analysis of scientific developments makes it possible to state that the use of autoplasm has now firmly taken its place in global clinical practice.

Considering the universal mechanism of its action, it is used in various fields of medicine and the potential of its use has not yet been exhausted.

The authors of the absolute majority of works believe that the use of platelet plasma has a number of advantages: it is simple, effective, and has a low cost. In addition, platelets containing growth factors are not mutagens, so they cannot cause the development of tumors. From this follows the possibility of shortening the treatment time and stabilizing the obtained result for a longer period under the conditions of inclusion in the complex therapy of platelet autoplasm.

Experts state that the availability of the method and its effectiveness are promising for its wider use in dentistry. This makes it possible to more effectively treat generalized periodontal disease, relieve bleeding gums, eliminate tooth mobility, bad breath, and restore chewing function.

At the same time, it should be noted that in modern scientific literature, the issue of the use of autoplasm for the complex treatment of generalized periodontal diseases in patients with manifestations of anxiety is not reflected. In the author's opinion, the issue of the objectivity of evaluating the results of such treatment, highlighting the problems of planning and researching all stages of its implementation, increasing the effectiveness of combining this technique with other complex approaches to the treatment and prevention of generalized periodontal diseases in patients with anxiety symptoms requires in-depth development and more detailed study.

REFERENCES

1. Antonenko M.Yu. Scientific substantiation of the modern periodontal disease prevention strategy in Ukraine Kyiv: National. honey. University named after O.O. Bogomolets, Poltava: Ukr. honey. stomatol. Acad. Ministry of Health of Ukraine; 2012. 41 p.

2. Baeyens, W. The use of platelet concentrates: platelet-rich plasma (PRP) and platelet-rich fibrin (PRF) in bone reconstruction prior to dental implant surgery / W. Baeyens, R. Glineur, L. Evrard //Service de Stomatologic et de

Chirurgie Maxillofacial Hospital Erasme, Bruxelles. Rev Med Brux. - 2010 - Vol. 31(6). - P. 521-527.

3. Biloklytska GF, Kopchak OV. Evaluation of the clinical effectiveness of the modified method of treatment of inflammatory-dystrophic diseases of periodontal tissues using an injection form of platelet autoplasm. Coll. of science works Kyiv: NMAPO named after P.L. Shupyka; 2015; 24(1), p. 482-488.

4. Borie E, Oliví GD, Orsi IA, Garlet K, Weber B, Beltran V, et al. Platelet-rich fibrin application in dentistry: a literature review. Int J Clin Exp Med 2015;8(5):7922-9.

5. Filardo G, Kon E, Matteo B, Marino A, Sessa A, Merli ML, et al. Leukocyte-poor PRP application for the treatment of knee osteoarthritis Joints. 2013;1(3):112-20.

6. Filipisky AV, Horytska KV, Got MM. Long-term results of the use of platelet-enriched fibrin in the replacement of large post-cystic cavities in the lower jaw. Dentistry news. 2014; 4:8–13.

7. Hartshorne J, Gluckman HA. Comprehensive clinical review of Platelet Rich Fibrin (PRF) and its role in promoting tissue healing and regeneration in dentistry. Part II: Preparation, optimization, handling and application, benefits and limitations of PRF. International Dentistry. African Edition. 2016; 6(5):34-51.

8. Horytska KV. Use of platelet-rich plasma to optimize reparative osteogenesis in traumatic mandibular fractures [abstract]. Lviv: LNMU named after Danylo Halytskyi; 2009. 20 p.

9. Kuznyak NB, Prodan MP, Tryfanenko SI. Effectiveness of the use of platelet-rich blood plasma to optimize reparative osteogenesis after atypical tooth extraction. Clinical and experimental pathology. 2013. 12/2(44):103-5.

10. Li Q, Pan S, Dangaria SJ, Gopinathan G, Kolokythas A, Chu S, et al. Platelet-Rich Fibrin Promotes Periodontal Regeneration and Enhances Alveolar Bone Augmentation BioMed Research International. Volume 2013; Article ID 638043, 13pages Available from: <http://dx.doi.org/10.1155/2013/638043>

11. Makhmutova A.F. Comprehensive restorative treatment of periodontal diseases using platelet-rich plasma / O.F. Makhmutova, T.M. Tsyganova// *Alternative medicine*, 2009. No. 2 (17). - P. 13-21
12. Miron RJ, Zucchelli G, Pikos MA, Salama M, Lee S, GuillemetteV, et al. Use of platelet-rich fibrin in regenerative dentistry: a systematic review. *Clin Oral Invest*. 2017; 21:1913–27.
13. Plasmolifting - ANIMALS - a new method of treatment in veterinary medicine / V.A. Guseva, B.S. Semenov, R.R. Ahmerov, T.Sh. Kuznetsova // *Materials II Inter. the wind VETinstanbul Group Congress*, 2015. - P. 168.
14. Richter, W. Alternativen und Visionen zur Verbesserung der Knorpelregeneration / W. Richter // *Trauma Berufskrankh.* – 2002. - Vol. 4. - P. 100-103.
15. Sanchez, A.R. Is platelet-rich plasma the perfect enhancement factor? A current review / A.R. Sanchez, P.J. Sheridan, L.I. Kupp // *Int J Oral Maxillofac Implants.* – 2003. - Vol. 18 - P. 93-103.
16. YuV Vovk, VYU Vovk, OI Deltsova. Experimental study of reparative osteogenesis of bone defects filled with calcium-phosphate biomaterial in combination with platelet-rich blood plasma. *Dentistry news*. 2009;1:53-63.