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APPLICATION OF PLASMOLIFTING IN TRAUMATOLOGY AND ITS EFFECT ON REPARATIVE REGENERATION

G'afforov Azamat Uyg'unovich
Bukhara State Medical Instititute

Abstract: . One of the new technologies for local stimulation of the fracture zone is Platelet Rich Plasma (PRP) therapy, which is an English word that means saturated platelet-rich plasma (PRP). In a specific case, the specialist carefully examines the patient, determines the causes of movements and other symptoms. Usually, up to 5-7 procedures are required at intervals of 3-5 days. During the procedure, from 10 ml to 50 ml of blood is taken from the patient, and its volume is determined individually. The blood is spun in a centrifuge at high speed and plasma is separated, which contains 3-5 times more platelets than normal blood. These platelets contain many growth factors and biologically active proteins, and the effect of TBP- therapy can be seen after the first injection. Pain is reduced, normal mobility is restored, and after a full course, endurance improves, which is maintained for a very long time.
Key words: Platelet Rich Plasma (PRP), platelet-rich plasma (PRP), endosteum, bone marrow cells, mesenchymal cells.

Bone tissue regeneration occurs as follows: bone tissue leads to proliferation of periosteal cambial layer cells, differentiation of endosteum, bone marrow cells and mesenchymal cells. Platelet-rich plasma contains three main platelet granules: α-granules, dense granules and lysosomal granules, which contain a number of biologically active substances that regulate tissue repair mechanisms, cell proliferation, differentiation, angiogenesis, as well as immunomodulation and remodeling. The role of growth factors in the process of reparative regeneration is considered important, and platelet granules contain more than 30 active substances that affect growth factors. According to the authors, platelet-rich plasma contains 6 factors with different biological effects.

These include the following:

1. EGF - a factor that affects epidermal and epithelial proliferation, accelerates the healing of skin wounds, and stimulates angiogenesis.
2. PDGF - platelet-derived growth factor. Activation of smooth muscle fibroblasts and myocytes, stimulation of the synthesis of granulation tissue, collagen and bone matrix morphogenetic proteins, stimulation of angiogenesis.
3. VEGF is a factor that affects the vascular endothelium, stimulating the growth of new cavernous vessels.
4. TGF-β is a transforming growth factor. Regulates bone tissue metabolism, stimulates the synthesis of interstitial matrix proteins.
5. IGF- insulin-like growth factor. Stimulates bone cell proliferation, activates angiogenesis, and stimulates muscle tissue adhesion.
6. FGF is a fibroblast growth factor. It stimulates angiogenesis and fibroblast proliferation, and improves muscle tissue healing.

Reparative regeneration Yu.G. Shaposhnikov on this into 4 phases It is divided .

The first phase is the phase of acute circulatory disorders. In this case, after fractures, the normal arterial and venous blood circulation of the bone tissue is disrupted, the proximal and distal parts are not

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connected by a single intraosseous vascular system. Compensatory redistribution of blood flow is observed, and two separate intraosseous blood pools are formed (Proximal and distal).

This phase is characterized by tissue hypoxia in the fracture area, capillary dilation and increased permeability, and edema. For optimal reparative regeneration and bone healing, there must be contact between the bone fragments, and the function of the TBP is to provide this contact. Bone tissue regeneration begins immediately after the formation of a blood plasma clot, in which platelets actively participate . The processes of differentiation and proliferation of osteogenic cells are associated with the hematoma [2.4.6.8.10.12.14.16].

The second phase is the disorganization of cell and tissue structures. In this phase, the death of differentiated cells occurs, and tissue breakdown products accumulate. In this phase, platelet-rich plasma washes the fracture site, locally eliminating inflammatory processes and creating conditions for epithelial proliferation. As a result of this process, the vascular bed expands and new arteriovenous shunts are formed. This granulation tissue subsequently serves to restore microcirculation in the damaged area. In addition, TBP also contains VEGF, a factor that affects the vascular endothelium and stimulates the growth of new cavernous vessels. The third phase - the proliferation phase - after the structural disorganization of cells and tissues, the proliferation phase begins. Sometimes these processes take place in parallel in different areas of the bone. Through granulation tissue, "building materials" such as protein, collagen, trace elements, and immature cambial cells are delivered to the damaged area, which, under conditions of improved microcirculation, fills the damaged area with immature skeletal tissue and forms interfracture fibro-tissue regeneration. PDGF is a factor that affects platelet growth factor. Smooth Activation of muscle fibroblasts and myocytes, stimulation of the synthesis of granulation tissue, collagen and bone matrix morphogenetic proteins, and stimulation of angiogenesis are observed.

The fourth phase - differentiation - this phase of reparative regeneration occurs with the restoration of microcirculation in the damaged area . Immature cell elements are covered with osteoblasts (or transformed into osteoblasts), forming bone tissue around themselves. IGF - insulin-like growth factor . Stimulation of bone cell proliferation, activation of angiogenesis and stimulation of muscle tissue adhesion. The fibrous-tissue regenerate is replaced by bone, and ossification of the bone matrix occurs. Gradually, the process of reparative regeneration subsides with the formation of interosseous adhesions [1.3.5.7.9.11.13.15.17].

According to the authors, it has been proven that TBP therapy has an effect on all phases of reparative regeneration of cellular tissue , including catabolism of tissue structure, proliferation of cell elements, regeneration of bone tissue. The TBP therapy method appeared in the middle of the last century. Since then, it has been well studied. Numerous studies have proven its effectiveness in reducing pain, inflammation, improving tissue regeneration, and restoring joint and muscle function [11.13.15.16.17].

The main feature of plasma therapy is that it is prepared from the patient's own blood, therefore it does not cause allergic reactions and is safe for the body. The advantages of TBP therapy are that the restoration of damaged tissues occurs as naturally as possible, this process is painless, general and local anesthesia are not used. The positive effect appears very quickly, often it can be seen after the first procedure. Autoplasma therapy is perfectly combined with other treatment methods in traumatology and orthopedics, namely: massage, medical gymnastics, physiotherapy, medications. There is no rehabilitation period for patients. After the procedure, they can immediately go home and engage in work. There is no risk of infection, since the patient's own plasma is used. During the procedure, the doctor uses a set of disposable instruments. The biological effect of TBP on tissues is that growth factors help accelerate regeneration processes, increase cell proliferation and form connective tissue fibers. Stimulates reparative regeneration in bone fractures, helps to accelerate the recovery of tendon and muscle injuries. The method has minimal contraindications. It is not used in cancer, decompensated diabetes, allergies to

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anticoagulants, inflammatory skin diseases.

Conclusion. In patients with diaphyseal comminuted fractures of the tibia, the use of autoplasma enriched with platelets in the defects between the fractures, simultaneously with surgical treatment, provides contact between the bone fragments for the fusion of bone fragments, stimulates the growth of new cavernous vessels, stimulates the synthesis of collagen and bone matrix morphogenetic proteins of granulation tissue, and helps to optimize osteogenesis processes by restoring blood circulation in the fracture area. The authors also used plasmolifting in small intraarticular fractures. Scientists also used small intraarticular fractures, usually removing bone spurs. The authors used platelet-rich autoplasma to promote bone healing and spare patients from having to undergo major endoprosthetic surgery when bone healing failed.

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