THE USE OF ELISA TO ASSESS THE INTENSITY OF THE IMMUNE RESPONSE IN PATIENTS IMMUNIZED WITH SARS-CoV-2

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Summary

During the examination for antibodies to proteins of the «thorns» and nucleocapsid zone in a group of self-reversing patients, the dependence of the formation of a stable immune response and the severity of the disease on the ability and rate of production of antibodies in those infected with SARS-CoV-2 to proteins of both virus zones was revealed.

Key words: *immune response, tension, SARS-CoV-2, immunoglobulins, Nc-protein, S-protein.*

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IS THE TECHNOLOGY USING PLASMA ENRICHED WITH PLATELETS AND WHITE BLOOD CELLS NECESSARY

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Summary

Background. Platelet and white blood cell rich plasma (PLRP) therapy is a newly developed method that uses autologous plasma to improve and accelerate bone healing.

Purpose. To determine the level of safety and effectiveness of the technique using plasma enriched with platelets and white blood cells.

Materials and methods. A search was performed using PUBMED, Cochrane, and web of Science databases. The search was performed using keywords with no language restrictions.

Relevance. Therapy in bone defects is a serious challenge for a trauma Clinician. Bone defects often develop with severe trauma or as a result of large volume resections as a result of pathologies such as tumors or bone infection.

Conclusion. Despite the existing advantages, the use of PLRP technology is not fully justified. It is necessary to perform many more high-quality clinical trials that will finally put an end to the effectiveness of the method.

Key words: *platelet-rich plasma, bone graft, bone repair.*

Introduction. The technology using platelet-and white blood cell-rich plasma (PLRP) is a recently developed technique that can speed up the regeneration of various tissues. This method uses a part of the blood in which the number of shaped elements containing a significant number of growth factors and angiogenic factors increases by means of the centrifugation process. Today, there is a significant interest in PRLP technology from researchers in various fields of medical science, including clinicians of operative traumatology. This is primarily due to the fact that autoplasma-based products are safe and easy to manufacture. Based on these attractive qualities of PLRP technology, its use in clinical traumatology can be a great acquisition for the entire healthcare system. The purpose of this review is to search for up-to-date data on the effect of PLRP on bone regeneration after various injuries. Therapy for bone defects is a challenge for a trauma Clinician. Bone defects often develop with severe trauma or as a result of large volume resections. For example, for pathologies such as bone tumors or infection of the bone [4]. Often in such cases, bone grafting is required, as there is a need to fill in the resulting defect. Today, autologous bone substitutes are considered the gold standard in the treatment of bone defects, as they have the necessary osteogenic properties, as well as significant safety [25]. It is known that autologous bone materials can be used in the treatment of non-fusion, large fragmented fractures and osteomyelitis. However, bone auto transplants often have disadvantages such as low availability, development of hematomas, risk of infection, violations at the site of sampling [15]. How it works? Bone tissue initially has the ability to regenerate after injuries, both after surgery and after various diseases leading to a bone defect. Bone restoration takes place with the participation of growth factors [21].

Recent studies have shown that using PRP together with a bone graft can improve the results of bone regeneration in the example of a rabbit model [9]. Other authors have shown that PRP together with an autologous sponge graft leads to significantly better bone regeneration compared to using only an autologous sponge graft for major defects in the experiment [7]. The work of Yamada et al., where the authors demonstrated in an experiment on dogs that the combination of mesenchymal stem cells together with PRLP allows for better bone regeneration. Consequently, the use of PRLP can accelerate regeneration due to the delivery of various growth factors and cytokines from α-granules contained in platelets [24]. Growth factors are also present in dense platelet granules that contain serotonin, histamine, and calcium [18].

It has already been proven that platelets have an important role in the initial healing of wounds, since bleeding leads to platelet activation, during which a significant amount of growth factors and cytokines necessary for healing are released [1]. It is known that from the formation of corns using autogenous bone and PR LP, to complete osteogenesis, PRLP shows good data in preclinical and clinical trials [10; 14]. Pro-inflammatory cytokines such as IL1, IL6 and TNF-alpha also have a significant effect on bone regeneration [3]. There is evidence that activation of TNF-α and IL-1 in bone injuries occurs at the stage of transition from chondrogenesis to osteogenesis during the formation of endochondria [11]. In a study on experimental animals (rats), TNF-α and IL-1β were shown to be able to recruit osteoblasts [20]. Also, a study using bone fragments in fractures in experimental animals showed the role of TNF-α in accelerating bone recovery after injury and showed that the use of PRLP can inhibit the release of IL-1 from macrophages [22]. In the works of foreign researchers, it was shown that the technology using platelet-rich plasma can change the natural way of healing of bone tissue. This mechanism is directly related to the increased concentration of growth factors that are released by activated platelets, which will improve the results of regeneration in tissues with low potential [16; 19; 6].

There is also evidence that the use of PRP increases the yield of bioactive mediators in the defect area. Growth factors released by platelets include platelet growth factor (PDGF) [12] transforming growth factor (TGF-) beta, epidermal platelet growth factor (PDEGF), platelet angiogenesis factor (PDAF [5] insulin-like growth factor (IGF-1) and platelet factor 4 (PF-4) [2] the most well-known growth factors include PDGF, TGF-βeta1 and beta 2, as well as IGF-1. Other growth factors present in platelet granules are vascular endothelial growth factors (VEGF) and endothelial growth factors (EGF) [17; 13]. Thus, the PRLP-based technology can provide good prospects for the tasks of bone transplantation.

Conclusion. A well-known advantage of PRP technology as a method for treating bone defects is that the technique is safe from toxicity and infection, since only autologous materials are used. For example, it is impossible to transmit diseases such as HIV or viral hepatitis. The existing difficulty in manufacturing PRLP is eliminated by technical equipment. However, with the existing advantages, the use of PRP technology is not fully justified. It is necessary to perform many more high-quality clinical trials that will finally put an end to the effectiveness of the method.

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ТРОМБОЦИТТЕР МЕН ЛЕЙКОЦИТТЕРМЕН БАЙЫТЫЛҒАН ПЛАЗМАНЫ ҚОЛДАНУ ТЕХНОЛОГИЯСЫ ҚАЖЕТ ПЕ

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Түйінді

Кіріспе. Тромбоциттер мен лейкоциттермен байытылған плазма терапиясы (PRP) – сүйектердің сауығуын жақсарту және жеделдету үшін аутологиялық плазманы қолданатын заманауи әдіс.

Мақсаты. Әдістеменің қауіпсіздігі мен тиімділігі деңгейін анықтау үшін тромбоциттер мен лейкоциттермен байытылған плазма қолданылады.

Материалдар мен әдістер. Іздеу PUBMED, Cochrane және Web of Science дерекқорларын қолдану арқылы жүргізілді. Іздеу тілдік шектеулерсіз негізгі сөздер бойынша жүргізілді.

Өзектілігі. Сүйек ақауларын емдеу травматолог үшін маңызды мәселе болып табылады. Сүйек ақаулары көбінесе ауыр жарақатпен немесе ісіктер немесе сүйек инфекциясы сияқты патологиялардың нәтижесінде үлкен көлемді резекциялар нәтижесінде дамиды.

Қорытынды. Қолданыстағы артықшылықтарға қарамастан, PRP технологиясын қолдану толығымен ақталмайды. Әдістің тиімділігіне кедергі келтіретін көптеген сапалы клиникалық зерттеулер жүргізу қажет.

Кілт сөздер: *тромбоциттермен байытылған плазма, сүйек трансплантаты, сүйектерді қалпына келтіру, графттар.*

НЕОБХОДИМА ЛИ ТЕХНОЛОГИЯ С ИСПОЛЬЗОВАНИЕМ ПЛАЗМЫ, ОБОГАЩЕННОЙ ТРОМБОЦИТАМИ И ЛЕЙКОЦИТАМИ

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Аннотация

Введение. Терапия обогащенной тромбоцитами и лейкоцитами плазмой (PRP) - это современный метод, который использует аутологичную плазму для улучшения и ускорения заживления костей.

Цель. Для определения уровня безопасности и эффективности методики используют плазму, обогащенную тромбоцитами и лейкоцитами.

Материалы и методы. Поиск проводился с использованием баз данных PubMed, Cochrane и Web of Science. Поиск осуществлялся по ключевым словам без языковых ограничений.

Актуальность. Терапия костных дефектов является серьезной проблемой для врача-травматолога. Костные дефекты часто развиваются при тяжелой травме или в результате больших объемных резекций в результате таких патологий, как опухоли или костная инфекция.

Вывод. Несмотря на существующие преимущества, использование технологии PRP не является полностью оправданным. Необходимо провести еще много качественных клинических испытаний, которые окончательно поставят крест на эффективности метода.

Ключевые слова: *обогащенная тромбоцитами плазма, костный трансплантат, восстановление костей, графты.*