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PLATELET AUTOPLASMA IN THE TREATMENT OF OSTEOARTHRITIS

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Annatation: *Use of thrombocytic autoplasma in treatment of gonarthrosis and coxarthrosis Based on technology «Plasmolifting» was proposed injection treatment of gonarthrosis and coxarthrosis. Technology «Plasmolifting» is a method of stimulating tissue regeneration using autoplasma with platelets. In platelets there are growth factors which are the high-activity biological stimulants of regenerative processes. The use of thrombocytic autoplasma in treatment of gonarthrosis and coxarthrosis with this technology is simple, obtainable and does not require sophisticated equipment, is safe and effective, reduces pain syndrome, improves joint mobility, stimulates the recovery of cartilage, bone and soft tissue of the joint, extends the period of remission*

Key words: *autoplasma, thrombocytes, growth factors, stimulation of regeneration processes, gonarthrosis*

Osteoarthritis (OA) is a chronic progressive joint disease characterized by degeneration of articular cartilage with subsequent changes in the subchondral bone and the development of marginal osteophytes, which leads to loss of cartilage and concomitant damage to other components of the joint (synovial membrane, ligaments). The initial radiographic signs of osteoarthritis occur in most people over 65 years of age and in about 80% of people over 75 years of age. Although the development of OA does not affect the life prognosis, the disease is one of the main causes of premature disability and disability, as well as chronic pain syndrome, which reduces the quality of life of elderly and senile people [1,2].

The methods of treatment of OA are drugs that must be administered orally or in the form of injections. Chondroprotectors are considered to be the most effective means used in the treatment of OA today in the form of injections. They can be mainly on an animal basis, the raw materials for this group are marine invertebrates and some species of salmonid fish, or on a vegetable basis, which are isolated components of some types of soybeans and avocados.

And although chondroprotectors are a complex of glucosamine and chondroitin sulfates, which provides joint cells (chondrocytes and chondroblasts) with the opportunity to synthesize proteoglycans from ready—made molecules, the composition of the drug is still foreign to the body, which can make it difficult to embed the molecule into the biochemical processes of the cell, and if you consider that a larger percentage of

chondrocytes and chondroblasts are already If they are destroyed, then the provision of "building material" by cells cannot start the processes of joint restoration. In addition, they require long-term administration, at least 4-8 weeks, and do not provide rapid pain relief [1,2].

Among other injection techniques, it is necessary to mention corticosteroids. Corticosteroids are good because they quickly suppress pain and inflammation in synovitis (swelling and swelling) of the joint. However, prolonged use of corticosteroids leads to the destruction of joint tissues and the body's addiction to them. Another method, considered by some authors to have an effect on the pathogenetic links of the ongoing processes, is injections of hyaluronic acid. Hyaluronic acid is also a structural unit of these tissues, it is part of the synovial fluid and for some time is able to replenish the missing lubricant in the joint, but these injections are very expensive, allergic reactions are possible, long courses of injections are required, which means that again the problem of injury and infection of the joint, and the effects last no more than 3 months [1,2].

As a new and safe biological stimulator acting on the entire chain of regeneration and on all tissues at the same time: bone, cartilage, ligaments, muscles — we offer intra- and periarticular infiltration of tissues using platelet autoplasm (TAP).

Such close interest in autoplasm is primarily due to the fact that platelets contain numerous growth factors and cytokines that promote the regeneration of damaged tissues.

More than 30 growth factors have been identified in platelet alpha granules, which are able to influence the recovery processes of all joint tissues simultaneously: bone, cartilage, ligamentous apparatus and muscles. Of these, the most important are: platelet growth factor (PDGF) — stimulates chemotaxis, fibroblast mitogenesis, collagen synthesis; vascular endothelial growth factor (PDEGF) — has a stimulating effect on endothelial cells; transforming growth factor (TGF-li).

The latter is a large group of proteins, some of them and morphogenic proteins modulate cellular proliferation and differentiation of poorly differentiated cells into osteoblasts, increase the synthesis of the extracellular matrix of bone and inhibit its degradation and other growth factors [3;p.18.,4;p.15.,5;p.200.,6;p.57-61.,7;p.63-67]. It is possible to obtain high-quality plasma enriched with platelets only by observing the plasma production technology and using specialized test tubes.

Russian scientists D.M.N. R.R. Akhmerov and Ph.D. R.F. Zarudiy created an injectable form of platelet autoplasm in 2003. At the same time, the name of the technique was coined — «PlasmoliftingTM». and special test tubes for the «PlasmoliftingTM» method were developed. These test tubes make it possible to obtain plasma with a therapeutic platelet content. The lower part of the tube is filled with an adsorption gel, which during centrifugation adsorbs erythrocytes and low molecular weight fatty acids.

The gel does not affect the properties of plasma and allows you to obtain a high degree of purification plasma, it stabilizes the erythrocyte-leukocyte clot well. To prevent

blood clotting in the upper and middle parts of the test tube, finely dispersed sodium heparin of a high degree of purification was applied to the walls, allowed for the reverse administration of plasma in vivo. This anticoagulant is safe because sodium ions are part of the internal environment of the body, and heparin in the body is synthesized by mast cells. As is known, sodium heparin is a direct anticoagulant and regulator of many biochemical and physiological processes occurring in a living organism [8].

The production of «PlasmoliftihgTM» test tubes allowed the active application of this technique in cosmetology to treat photodermatosis, hair loss, acne, skin rejuvenation and nutrition. Later, the technique became widespread in dentistry, orthopedics and traumatology, gynecology, urology, and sports medicine.

Today, using the «PlasmoliftihgTM» technique, doctors are opening up new opportunities in the treatment of such complex and long-term pathology as deforming OA of I-II severity.

An early injectable form of autoplasm was used in the relief of pain syndrome of the large trochanter; the use of a gel form of platelet-rich plasma mixed with Collapse in bone defects during open and closed osteosynthesis was proposed, as well as a number of other works [9,12]. It should be noted that the authors of these studies differ in the method of plasma preparation, obtaining it in some works in gel form, and in others in liquid form, but calling it one concept "platelet-rich plasma". They talk about obtaining autoplasm, but they do not specify the equipment, i.e. the tubes and centrifuges used, which as a result may lead to undesirable consequences or lack of effect when injected into the patient's tissues.

We also propose the PlasmoliftingTM method with the developed technology for obtaining autoplasm with therapeutic platelet content, due to specialized Plasmolifting tubes and the proposed centrifugation method for a specific centrifuge.

The purpose of this study is to study the effect of platelet autoplasm on the degree of improvement of clinical indicators on the Womac scale in patients diagnosed with deforming osteoarthritis of the knee and hip joints of I-II severity.

MATERIALS AND METHODS

62 people aged 45 to 70 years with a diagnosis of coxarthrosis and gonarthrosis of I-II severity were under observation. The diagnosis of patients with OA of the knee and hip joints is made in accordance with international recommendations. The exclusion criteria from the study were the 3rd and 4th stages of deforming OA, radiologically confirmed acute stage (signs of exudative synovitis of the joints), injections of GCS during the previous 9 months, coagulopathy, mental illness. Criteria for inclusion in the study: the presence of deforming OA of the knee and hip joints, the patient's consent to local treatment.

In order to study the effectiveness of the use of autotromboplasm, all patients were divided into 2 groups. The first group of patients (10 people) received basic treatment

(nonsteroidal anti-inflammatory drugs, physiotherapy, chondroprotectors, glucocorticoids), and the second group of patients (52 people) received injections of platelet autoplasm in addition to basic treatment.

All patients before and after treatment were examined using the WOMAC index (according to the scales "Pain", "Stiffness", "Functional activity"), the normalized value of the WOMAC index and the test "time of passage of 15 meters" [1;p.8., 2;p.176]. The study of these parameters was carried out before the start of therapy and at the time of 1-3, 6 months and 1 year after the treatment.

TAP was obtained by taking blood into specialized tubes "PlasmoliftingTM" (8 ml). The centrifugation mode is 4000 rpm for 5 minutes, using a PE-6910 Plasma Lifting centrifuge (Uzbekistan).

Platelet plasma injections were performed intra- and paraarticularly 3.5 ± 0.5 ml in the area of one joint with an interval of 2-3 weeks, a course of 3-4 procedures 1 time per year.

Statistical processing of the results included the determination of the average values of the standard deviation, the Student's t-test was calculated, and the level of differences $p<0.05$ was considered reliable.

The results of treatment of patients diagnosed with deforming osteoarthritis of I and II severity at the following dates: before treatment, 1 month after the start of treatment, 3 months, 6 months, 1 year are presented in the table.

From the above results, it can be seen that in the first month after the start of treatment in both groups, the indicators of assessment of "Pain", "Stiffness", "Functional activity", the total WOMAC index and the "Time of passage of 15 meters" decrease. Thus, the indicator of "Pain" with standard therapy before treatment was 216.6±12.22 units, after a month it decreased significantly and amounted to 181.34±8.23 units, after 3 months the indicator of "Pain" also decreases to 160.45±7.43 units, reliably, after another 6 months to 155.76±6.75 units. units are already insufficient, and a year later there is an increase in the index to 163.11± 5.94 usl. units, although unreliable relative to the indicator of 6 months.

In the second group of patients, where the plasmolifting method was used in complex therapy before treatment, the "Pain" index was 217.23±11.82 units, and 1 month after treatment 178.34±7.94 units. Then there is a more pronounced decrease in the "Pain" index for 3 months to 134.71±6.56 units and for 6 months — 105.49±5.28 units. and the indicator continues to decrease by the year to 70.12±4.55 units.

When analyzing the "Stiffness" index in the first group at the first registration, it amounted to 74.26±9.23 units, at the time of 1 month it decreased significantly to 61.78±5.57 units, after 3 months it decreased unreliably to 54.93±3.39 and after 6 months it also decreased significantly to 49.73±4.51 units. units, and a year later there was an increase in the indicator to 59.38± 3.12 units.

In the second group of patients before treatment, this indicator was 75.96±8.34 units, then after 1 month there was a significant decrease in the indicator of 56.72±4.33 units and a more pronounced decrease in the indicator at 3 months — 41.89±5.45 and 6 months — 32.59±3.75 units, then the indicator did not significantly change 28.03±2.32 standard units.

Indicator	Type of treatment	Before treatment (conl. units)	1 month (standard units)	3 months (standard units)	6 months (standard units)	After treatment in 1 year (усл. ед.)
pain	Basic	216,6±12,22	181,34±8,23*	160,45±7,43*	155,76±6,75	163,11±5,94
	TAP Therapy	217,23+11,82	178,34±7,94*	134,71±6,56*	105,49±5,28*	70,12±4,55*
Stiffness	Basic	74,26±9,23	61,78±5,57*	54,93±3,39	49,73±4,51	59,38±3,12
	TAP Therapy	75,96±8,34	56,72±4,33*	41,89±5,45*	32,59±3,75*	28,03±2,32
Functional activity	Basic	734,8±18,36	673,52±15,83*	570,56±10,68*	562,78±12,19	577,9±11,37
	TAP	732,8±14,26	624,37±12,29*	549,17±12,89*	325,87±10,51*	261,2±9,39*
The total WOMAC index	Basic	1025,66±39,81	916,64±29,63*	785,94±21,5*	768,27±23,45	800,39±20,43*
	TAP Therapy	1025,99±34,42	859,43±24,56*	725,77±24,91*	463,95±19,54*	359,35±16,26*
Travel time of 15 meters (sec)	Basic	43,28±2,43	37,48±2,58	32,96±1,21	29,28±2,96	34,4±2,57
	TAP Therapy	44,67±2,43	36,94±1,39*	24,74±1,49*	21,78±1,96	18,44±0,89

The indicator of "Functional activity" in the first group first amounted to 734.8±18.36 units, then after 1 month the indicator decreased significantly to 673.52±15.83 units, then there was a more pronounced decrease in this indicator for a period of 3 months 570.56±10.68 units and slightly for a period of 6 months — 562.78±12.19 units. units, and an increase for up to a year of 577.9±11.37 conl. units. In the second group of patients, at the first stage of the examination, the indicator of "Functional activity" was 732.8±14.26 units, then on the 1st it significantly increased to 624.37±12.29 units, on the third to 549.17±12.89 units. and it continued to decrease more sharply in the 6th month - to 325.87±10.51 units, then a year later the indicator was 261.2±9.39 units.

The total WOMAC index in the first group changed as follows: at the first stage it amounted to 1025.66±39.81 units, at the period of 1 month it decreases significantly to 916.64±29.63 units, then after 3 months the indicator also decreases to 785.94±21.5 units and to 768.27±23.45 units. units after 6 months, and after a year a pronounced increase to 800.39± 20.43 conl. units. And in the second group, this index changed as follows: at the first stage, it amounted to 1025.99±34.42 units, then significantly decreased after 1 month to 859.43±24.56 units. units, also significantly continues to decrease for a period of 3 months — 725.77±24.91 units and more pronounced for a period of 6 months - 463.95±19.54 units and up to 359.35±16.26 units for a period of 12 months.

The indicator "Time of passage of 15 meters" changed as follows: in the first group at the first term it was 43.28±2.43 seconds, after 1 month 37.48±2.58 seconds, after 3 months it was 32.96±1.21 seconds, after 6 months it did not change — 29.28±2.96 seconds. and deteriorated after 1 year to 34.4±2.57 seconds. In the second group, this indicator was 44.67±2.43 seconds at the first registration, after 1 month it decreased significantly to 36.94±1.39 seconds, after 3 months it decreased more pronounced and significantly to 24.74±1.49 seconds, after 6 months — to 21.78± 1.96 seconds. and it is 18.44±0.89 seconds per year.

DISCUSSION

Conducting an intergroup comparison, it can be noted that all indicators in the first and third months of treatment decrease in both groups, although in the group with the use of TAP, the decrease in indicators is more pronounced. And after 6 months in the second group of patients, the indicators continue to decrease as intensively, while in the first group the indicators do not change and there is an increase in all parameters after a year. Such dynamics of indicators indicates that TAP has a prolonged effect and is able to enhance the effect of standard therapy.

As a result, in the group of patients where platelet autoplasm was used, after a year there was an improvement in the indicator of "Pain" by 67.73%; the indicator of "Stiffness" — 63%; "Functional activity" — 64.36%; the total WOMAC index — 64.98% and the "Time of passage of 15 meters" — 58.72%. In the first group, changes in these indicators after a year were not so pronounced: the indicator of "Pain" by 24.7%, "Stiffness" — 20.04%, "Functional activity" — 21.36%, the total WOMAC index — 21.97% and "Time to walk 15 meters" — 20.52%.

CONCLUSIONS:

Thus, based on our research, the use of TAP in the complex therapy of deforming OA exceeds the effectiveness of standard therapy by an average of 42.04%, which usually gives a good therapeutic effect only during the first 3-6 months. These studies allow us to expand the scope of TAP for the complex therapy of OA of large joints of I-II severity, which is manifested by a decrease in pain syndrome, an increase in the volume of movements in the joint, an improvement in the musculoskeletal function of the lower and upper extremities, and an elongation of the period of remission of the disease.

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