

**THE EFFECTIVENESS OF THE STROMAL VASCULAR  
FRACTION IN RHEUMATOLOGICAL PATIENTS IN THE COMPLEX  
TREATMENT OF AVASCULAR NECROSIS OF THE FEMORAL  
HEAD**

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**Annotation:** *Avascular necrosis of the femoral head (ANGBC) is a multifactorial disease affecting mainly young people, leading to the development of secondary severe osteoarthritis of the hip joints with subsequent disability (Lamb et al., 2019). The disease usually develops at the age of 35-55 years. There is no data on the prevalence of the disease in the general population. However, it has been noted that 10,000 to 50,000 new cases of the disease are diagnosed in the United States each year (Lafforgue, 2006). Only 20% of people develop ANGB over the age of 50. The ratio of men and women is 3:1, half of the patients have bilateral lesions. Approximately 5-18% of all hip replacement surgeries are performed for primary angiogenesis (Nevskaya et al., 2017).*

**Keywords:** *Avascular necrosis, rheumatological patients, SVF therapy.*

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**EFFICACY OF THE STROMAL-VASCULAR FRACTION IN RHEUMATOLOGICAL PATIENTS IN THE COMPLEX TREATMENT OF AVASCULAR NECROSIS OF THE FEMORAL HEAD**

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**Annotation: Purpose of the study.** *Avascular necrosis of the femoral head (ANGBC) is a multi - factorial disease that mainly affects young people, leading to the development of secondary severe osteoarthritis of the hip joints with subsequent disability (Lamb et al., 2019). The disease usually develops at the age of 35-55 years. Data on the prevalence of the disease in the general population are not provided. However, it has been noted that 10,000 to 50,000 new cases are diagnosed in the United States each year (Lafforgue, 2006). Only 20% of people with angioedema develop angioedema over the age of 50. The ratio of men to women is 3: 1, and half of the patients have a bilateral lesion. Approximately 5-18% of all эндопротезированию hip replacement surgeries are performed for primary angioedema (Nevskaya et al., 2017).*

**Key words:** *Avascular necrosis, rheumatological patients, SVF therapy.*

**РЕВМАТОЛОГИК БЕМОРЛАРДА СОН СУЙАГИ БОШЧАСИ АСЕПТИК НЕКРОЗИДА КОМПЛЕКС ДАВОЛАШДА СТРОМАЛ-ВАСКУЛЯР ФРАКСИЯСИНING SAMARADORLIGI.**

**ANNOTATSIYA: Tadqiqot maqsadi:** *Tadqiqot mavzusining dolzarbligi. Femur boshining avaskulyar nekrozi (AFH) ko'p omilli kasallik bo'lib, asosan yoshlarga ta'sir qiladi, bu esa keyingi nogironlik bilan birga son bo'g'imlarining ikkilamchi og'ir osteoartritining rivojlanishiga olib keladi (Lamb va boshq., 2019). Kasallik odatda 35 yoshdan 55 yoshgacha rivojlanadi. Umumiy aholi orasida kasallikning tarqalishi to'g'risida ma'lumotlar berilmagan. Shunga*

*qaramay, har yili Qo'shma Shtatlarda kasallikning 10 000 dan 50 000 gacha yangi holatlari aniqlanishi qayd etilgan (Lafforgue, 2006). 50 yoshdan keyin odamlarning atigi 20 foizida ANFH rivojlanadi. Erkaklar va ayollar nisbati 3: 1, bemorlarning yarmida ikki tomonlama lezyonlar mavjud. Barcha kestirib, almashtirish operatsiyalarining taxminan 5-18% birlamchi ANFH uchun amalga oshiriladi (Nevskaya va boshq., 2017).*

**Kalit soʻzlar:** *Avaskulyar nekroz, revmatologik bemorlar, SVF terapiyasi.*

**Relevance:** Avascular necrosis of the femoral head (ANGBC) is a multi-factorial disease affecting mainly young people, leading to the development of secondary severe osteoarthritis of the hip joints with subsequent disability (Lamb et al., 2019). The disease usually develops at the age of 35-55 years. Data on the prevalence of the disease in the general population are not provided. However, it has been noted that 10,000 to 50,000 new cases are diagnosed in the United States each year (Lafforgue, 2006). Only 20% of people with angioedema develop angioedema over the age of 50. The ratio of men to women is 3: 1, and half of the patients have a bilateral lesion. Approximately 5-18% of all эндопротезированиюhip replacement surgeries are performed for primary angioedema (Nevskaya et al., 2017).

There are two types of pathological osteonecrotic process: medullary and ethmocortical involving the joint. Medullary osteonecrosis develops when the blood supply to the bone marrow canal is disrupted, resulting in the death of trabecular bone cells. Latticocortical osteonecrosis involving the joint has a more severe course. The risk of vascular disorders is usually noted in the proximal femur, both the trabecular and subchondral bones die, and this area is not able to calcify, as in medullary necrosis (Lattorgue, 2006).

Aseptic necrosis of the femoral head occurs due to impaired blood flow and necrosis of the bone marrow elements of the femoral head. Among the main risk factors are long-term use of glucocorticosteroids( corticosteroids), autoimmune diseases, alcoholism, smoking, injuries and surgical interventions on

the joint. There are also data on the effects of coagulopathies (thrombophilia and disseminated intravascular coagulation), pancreatitis, coagulation disorders, certain autoimmune diseases, systemic lupus erythematosus, ionizing radiation, sickle cell anemia, hyperlipidemia, fat embolism syndrome, hip dysplasia, chemotherapy and/or radiation therapy, organ transplantation, and chronic diseases on the development of the disease liver and metabolic diseases of bone tissue. However, according to various authors, approximately 40-50% of cases of angioedema are described as idiopathic without etiological factors. According to recent data, among the causes of idiopathic angioedema, a high value of angioedema is the result of genetic abnormalities. Another working hypothesis states that cell death occurs as a result of both increased intraosseous pressure and blood clotting disorders, in particular, thrombophilia in such patients is several times more common (Wang et al. 2019). Some authors suggest that ANGBC is the result of genetic abnormalities. Another working hypothesis states that cell death occurs as a result of both an increase in intraosseous pressure of the femoral head, leading to a deterioration in blood supply, and a mechanism similar to compartment syndrome (Lamb et al., 2019).

Angioedema is a complex orthopedic disease in which bone tissue dies due to insufficient blood supply. The therapeutic potential of the stromal-vascular fraction (SVF) in the treatment of angioedema has recently become the subject of intense interest. Derived from adipose tissue, SVF is a heterogeneous mixture of cells, including adipose - derived stem cells (ADCTS), endothelial progenitor cells, pericytes, and other cellular elements. These components of SVF, especially mesenchymal stem cells (MSCs), are known for their ability to differentiate into different cell types, such as osteoblasts, chondrocytes, and adipocytes (Andia et al., 2019; Ismail et al., 2020).

The mechanism of treatment of SVF in angioedema is primarily based on its regenerative and angiogenic properties, which can potentially enhance vascularization, promoting bone repair and regeneration. In addition, the anti-inflammatory and immunomodulatory properties of MSCs play a crucial role in

reducing inflammation and promoting healing of necrotic bone sites. Studies have shown that the introduction of MSCs into necrotic areas of the femoral head can alleviate symptoms and slow the progression of angioedema. Clinical trials support these findings, showing promising results in terms of pain relief, improved functionality, and slowing the necrotic process (Andia et al., 2019; Ismail et al., 2020).

Research on the effectiveness of SVF in rheumatology is a developing field, which reflects the potential of this treatment method in the treatment of various rheumatic diseases characterized by inflammation, degeneration and autoimmune processes. The composition of SVF has a unique regenerative and immunomodulatory potential, which makes it a promising therapeutic agent in rheumatology.

All of the above points to the relevance of the chosen topic of scientific research on the study of the most effective methods of treating patients with RA in Uzbekistan.

**Purpose of the study:** To evaluate the clinical and immunological efficacy of complex therapy with stromal-vascular fraction in the treatment of avascular necrosis of the femoral head in patients with rheumatological diseases.

**Research objectives:**

1. To study the prevalence and risk factors of avascular necrosis of the femoral head in patients with rheumatological diseases.
2. To study the clinical efficacy of complex therapy with stromal-vascular fraction on the background of aleandronic acid in the treatment of avascular necrosis of the femoral head in patients with rheumatological diseases.
3. To identify prognostic factors of an effective response to complex therapy with stromal-vascular fraction on the background of aleandronic acid in patients with rheumatological diseases.
4. To study the indicators of innate and adaptive immunity, with an assessment of the significance of the studied parameters in predicting the effectiveness of complex therapy with stromal-vascular fraction on the

background of aleandronic acid.

5. To develop an algorithm for effective complex treatment of avascular necrosis of the femoral head in patients with rheumatological diseases.

**Research materials:** the study will be conducted in the Department of Rheumatology of the Samara State Medical University Clinic No. 1 and the Samarkand branch of the Republican Center for Traumatology and Orthopedics.

**1-group (main) patients with angina pectoris.**

**2-group - (control) Practically healthy individuals.**

**Research methods:**

1. **Clinical studies** (симптомакомплекс symptom complex, history collection, questionnaires, assessment of functional and physical condition);

2. **Functional Testing** (DAS28, SDAI, CDAI, SF38, S-QoI, Harris Hip Score)

3. **X-ray examination** (radiography, MPT, CT);

4. **Immunological studies** (IL-1, IL-6, TNF- $\alpha$ , oxidative stress marker).

5. **Laboratory methods of research:** ADC, ANA, general and biochemical blood analysis, rheumaprobe.

**Scientific novelty of the study:** The proposed doctoral study represents a significant scientific achievement in the field of rheumatology and orthopedics. This study is innovative in its approach and focuses on the use стромальной of adipose-derived stromal vascular fraction (SVF) in the treatment of avascular necrosis of the femoral head (ANGBC) in patients with rheumatological diseases. The inclusion of SVF in complex therapy is a new concept, especially in the context of rheumatological diseases, and opens up new opportunities for therapeutic interventions.

**Practical significance**

A predictive regression model will be developed that selects the most effective therapy depending on demographic, clinical, and immunological parameters, as well as predicts the outcome of the most important disease criteria.

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