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# PREVENTION OF PULMONARY ARTERY THROMBOEMBOLISM DURING HIP ENDOPROSTHETICS

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**Summary**

*Among various forms of arthrosis of the hip joint, dysplastic accounts for more than 60%. This pathology is characterized not only by wide distribution, but also by its early manifestation and progressive course. Hip joint surgery (HJS) is associated with a high risk of deep vein thrombosis of the lower extremities and subsequent thromboembolism into the vessels of the pulmonary circulation. Therefore, the prevention of possible complications continues to be a priority in traumatology and orthopedics.*

**Key words**

*Dysplastic coxarthrosis, low molecular weight heparin, hip arthroplasty.*

**Relevance:** Among the various forms of arthrosis of the hip joint, dysplastic accounts for more than 60%. This pathology is characterized not only by wide distribution, but also by its early manifestation and progressive course. Dramatically reducing the ability to work, complicating family relationships, and the whole lifestyle of the patient, coxarthrosis, has not only a medical, but also a social aspect. [2]. Coxarthrosis in the overall structure of articular pathology occupy the second place after gonarthrosis in the incidence rate and the first in terms of temporary and permanent disability [3]. The proportion of people with disabilities due to coxarthrosis of various origins is 20–30% of the number of joints incapable of diseases [12,13]. The low efficiency of conservative procedures is the reason for the expansion of indications for early surgical treatment. Creating the initial stability of the endoprosthesis, which implies contact with the bone bed over a long distance, ensuring an adequate distribution of the forces acting under load, makes endoprosthetics of a dysplastically modified TS a difficult task. If in the treatment of patients with coxarthrosis of idiopathic, post-traumatic genesis, approaches to hip joint replacement are more or less standardized, then with dysplastic coxarthrosis, the surgeon has to look for an individual solution every time. However, with an increase in the number of these interventions, a significant number of complications were revealed, which prompted leading orthopedists to

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investigate this problem and to develop ways to prevent possible negative consequences of the operation [4]. That is why the vast majority of scientific publications on joint replacement arthroplasty published in recent years are devoted to errors and surgical complications, the frequency of which varies from 7 to 30% [6,7]. The early postoperative surgical complications of hip replacement include dislocation of the endoprosthesis head, in second place suppuration of the postoperative wound, and third periprosthetic fractures [5]. To diagnose deep vein thromboembolism of the lower extremity, ultrasound duplex scanning (DS) is widely used using the color Doppler mode of blood flow mapping [14]. The sensitivity and specificity of the method in the diagnosis of proximal thrombosis is high and reaches 98-100%. The deep veins of the lower leg are a difficult site to study. Difficulties in the study of the veins of the lower leg, primarily due to their anatomical features. However, careful scanning in various planes using color, energy mapping, the -flow mode allows visualization of the leg veins in approximately 90% of cases. The purpose of this Hip Joint Surgery (HJS) is associated with a high risk of deep vein thrombosis of the lower extremities and subsequent thromboembolism into the vessels of the pulmonary circulation. The frequency of this complication varies, according to the literature, from 3.4 to 60%. The pronounced spread of numbers is explained by the use of various methods of laboratory diagnosis of thrombophilic conditions [1]. It was shown that after general surgery, deep vein thrombosis of the lower extremities occurs in 29% of cases, after urological - in 38%, and after severe orthopedic interventions - in 50% or more, while on the basis of clinical symptoms it is only diagnosed in 3% [8,9,10,11], notes that without prophylactic therapy, this complication can develop in 35-60% of patients, and in 2-16% with symptoms of pulmonary embolism (pulmonary embolism), and in 2-3, 4% are fatal. Thus, intraoperative and early postoperative complications of endoprosthetics represent a serious problem in the rehabilitation of patients with TBS pathology. Treatment of already developed complications requires large economic costs, often leads to a decrease in the effectiveness of surgical intervention and is not always effective. Therefore, the prevention of possible complications continues to be a priority in traumatology and orthopedics.

**The purpose of our study:** Improving the results of hip replacement in patients with dysplastic coxarthrosis by optimizing the prevention of early complications.

**Materials and methods:** We have been in the department of the consequences of injuries and orthopedics of Bukhara regional multidisciplinary medical center

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and Republican Scientific Center for Emergency Medicine Bukhara branch from 2022 to 2024. 167 operations were performed to replace the hip joint with artificial implants in patients with varying degrees of dysplastic coxarthrosis. Men were 70 (42%), women 97 (58%). When distributing patients by age, it turned out: from 26-40 years old 23 people, aged 41 to 60 years old 123 patients, 61-80 years old 21 patients. The average age at the time of the operation was 47 years (minimum - 26, maximum - 80). 14 patients underwent bilateral EPTBS. As you can see, the main contingent of patients corresponded to the most working age. Examinations were performed general clinical examination. Laboratory examination (hemoglobin, red blood cells, white blood cells, platelets on a hematological analyzer, ESR) and biochemical (calcium, total bilirubin, urea, creatinine, ACT, ALT, alkaline phosphatase, total protein, blood sugar on a Mindray BC-2800 biochemical analyzer) analyzes, coagulography (IPT, fibrinogen, blood coagulation). Also, special orthopedic methods for the study of TBS and lower limb (measurement of the range of motion in the joint, circumference of the thigh and lower leg, limb length, gait estimation, use of additional means of support, etc.). Mandatory research methods were X-ray analysis of TBS in the anteroposterior and axial projections both before and after the operation. To assess the condition of individual elements of the joint, their mutual orientation, the presence and localization of bone defects, the degree of osteoporosis, and as a consequence of this choice of arthroplasty option, patients underwent computed or magnetic resonance imaging. All patients underwent pre- and postoperative ultrasound duplex angioscanning with color coding of blood flow on a Mindray ultrasound machine (DC -7).

**The stages of the study of measuring the parameters of the hemostasis system were as follows:**

1. The study of the influence of the start time of anticoagulant prophylaxis on the parameters and dynamics of the hemostatic system. In 42 patients, low molecular weight heparin was prescribed 12 hours before surgery, 64 patients 6-12 hours after hip replacement.
2. The study of the dynamics of changes in the hemostatic system on the first and tenth days after total hip replacement, including in patients with different somatic status.
3. Analysis of the dynamics of the data of ultrasound duplex angioscanning (UDD) before and on the 6-12th day after hip replacement in groups with preoperative and postoperative heparins.

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4. A comparative analysis of the results of ultrasonic duplex angioscanning in the diagnosis of venous thrombosis of the lower extremities.

Statistical processing of the material was carried out using the parametric method of calculating Student's criterion (the probability of error p <0.05 was estimated as significant, p <0.01 - very significant and p <0.001 - the most significant). The widespread introduction of endoprosthetics in everyday practice drew attention to the possible complications associated with the operation, and to their timely diagnosis. The most dangerous among them are deep vein thrombosis of the lower extremities, followed by pulmonary embolism. The frequency of this complication in the absence of thromboprophylaxis in orthopedic practice varies from 3.4 to 60%, which makes it one of the most pressing problems in traumatology and orthopedics. As for the rational pharmacotherapy of pulmonary embolism with EPTBS, there are still many unexplored aspects. Prevention of thromboembolic complications during joint replacement is the rule that applies to every patient. In orthopedic practice, various prescription regimens for low molecular weight heparins are used: in Europe, the drug is administered 8-12 hours before surgery, in North America and the USA after the intervention. Prevention of pulmonary embolism during surgical and other invasive procedures, "which indicate that the first dose of LMWH should be administered before surgery. But today there is no evidence base for the benefits of this or that method of prevention of pulmonary embolism and DVT. Moreover, there is a strict requirement for the postoperative administration of low molecular weight heparins, including enoxaparin sodium, when using regional anesthesia due to the possible development of epidural hematomas. All operated patients underwent a comparative assessment of the features of hemostasis against the background of the onset of thromboprophylaxis of enoxaparin sodium before and after surgery. In both groups, the state of venous blood flow of the lower extremities was studied in patients both before the operation and in the early postoperative period (6-12th day after hip joint replacement). 89 patients with preoperative prescription (enoxaparin sodium at a dose of 4000 mU s / c 12 hours before surgery) and 78 patients with postoperative (enoxaparin sodium at a dose of 4000 mU s / c 4-12 hours after surgery) were examined. Of great interest to us were the data of ultrasonic duplex angioscanning with color coding of blood flow. As a result of preoperative examination, 13.27% (23) of the patients in the group with preoperative prescription of low molecular weight heparins and 15.5% (26) of the group with postoperative prescription were diagnosed with chronic thrombotic changes in the system of veins of the lower extremities. 2/3 of these patients did not have any

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somatic pathology and pronounced changes in the hemostatic system. In 7 cases in the preoperations - and in 11 in the after operations - groups local changes in the venous system were revealed (slight overlap of thrombotic masses in the sines of the valves of the saphenous vein and / or local thickening of the popliteal vein wall, proximal deep femoral vein). The timely appointment of anti-inflammatory and antiplatelet therapy prevented the development of clinically significant thrombosis. On control ultrasound duplex examinations of the veins of the lower extremities one month after the operation, signs of good recanalization of the popliteal, subcutaneous femoral, deep femoral, common femoral and externally iliac veins were determined. Thus, without preoperative UDD examination of patients, we cannot exclude the presence of chronic vein thrombosis of the lower extremities and accordingly subsequently adequately assess the dynamics of their condition. In our study, no patient with long-standing thrombotic overlays in the veins of the lower extremities showed a progression of the process. Moreover, in five patients with pre- and in patients with postoperative administration of low molecular weight heparins, an improvement in recanalization of chronic blood clots after hip joint replacement was observed. Thus, the use of enoxaparin sodium in a prophylactic dose of 4000 IU in the postoperative period allows you to objectively reduce the frequency of venous thrombosis of the lower extremities. From our point of view, ultrasonic duplex angioscanning should be a mandatory study before hip replacement in order to identify the pathology of the venous system (chronic thrombosis) and in dynamics to assess the adequacy of anticoagulant prophylaxis. The presence of a chronic thrombus in the veins of the lower extremities is not an obstacle for arthroplasty, does not increase the risk of thromboembolic complications, and does not serve as an indication for increasing the dose of anticoagulants. If the patient has a weakened somatic status, especially a combination of pathology of the cardiovascular system and metabolic and endocrine disorders, preference should be given to the preoperative administration of low molecular weight heparins. In patients with the highest risk of thromboembolic complications (history of arterial and venous thromboses), the administration of low molecular weight heparins should be combined with the administration of freshly frozen plasma in order to increase the depot of natural anticoagulants. If there are contraindications for the introduction of low molecular weight heparins (hemorrhagic stroke, peptic ulcer complicated by bleeding, myelodysplastic syndrome) and in somatically healthy individuals, their postoperative administration is recommended.

**Conclusions:**

1. In patients with damage to the hip joint and the presence of a combined somatic pathology, it is preferable to use the scheme of preoperative initiation of thromboprophylaxis with low molecular weight heparins.

2. The method of duplex ultrasound examination before and after hip joint arthroplasty allows minimizing the risk of developing early postoperative complications of pulmonary embolism, which positively affects the treatment results.

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