

CLINICAL AND DIAGNOSTIC ALGORITHM FOR ARTHROSCOPIC TREATMENT OF OSTEOARTHRITIS OF THE KNEE

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Abstract: *Purpose of current investigation was to improve the arthroscopy technique of patients with osteoarthritis of knee, by introduction of complex clinic and diagnostic algorithm. Materials and methods. The investigation was carried out on the basis of 218 patients data of the clinic of Sport traumatology department of Republican Scientific and practical medical Centre of Traumatology and Orthopedics during 2014-2018 yy. with osteoarthritis of knee of different degree (0-IV st.) by Kellgren and Lawrence classification. All patients were carried out 5 types arthroscopic operations depending on the stage o morphologic alteration, that based to development of clinic and diagnostic algorithm. Results were studied at nearest (3-6 months) and long term (6 months - year) periods. At postoperative period to patients medications, early rehabilitations and physiotherapy were recommended. In our data, in 96,5% were positive results. Conclusion. Arthroscopy with using of clinic and diagnostic algorithm is allowed to rise of share good results, to activate of patients and to begin of early rehabilitations at postoperative periods.*

Keywords: *osteoarthritis ofknee, arthroscopy, clinic and diagnostic algorithm.*

Relevance: Osteoarthritis (OA) is a heterogeneous disease in which articular cartilage, subchondral bone, ligaments, capsule, synovial membrane and periarticular muscles are involved in the pathological process. Such terminological definitions as "osteoarthrosis", "arthrosis", "osteoarthritis", "deforming arthrosis" are presented as synonyms in the X International Classification of Diseases (ICD 10) (Artroses: M15-M19) [3]

Degenerative-dystrophic diseases of the joints are one of the most common pathologies in the elderly. In the affected joints, lubrication of the articular cartilages worsens, their sliding and proper functioning are disturbed. Degenerative changes in articular tissues lead to defects in cartilage coating, especially in the loaded areas of articular surfaces [8].

Osteoarthritis occurs in 54.5% of patients with degenerative-dystrophic lesions of the joints. OA is one of the main causes of disablement, which in 6.5% of cases lead to disability. [1]

Their characteristic features are constant pain, changes in articular function, reduced quality of life. The incidence of OA clearly correlates with age and reaches 50% in people over 65 years of age. [4,6,7,9]

Treatment of osteoarthritis of the knee joint is one of the most pressing problems of orthopedics. The last decades have been characterized by the introduction of arthroscopic

techniques into the knee joint surgery, which greatly expanded the possibilities of diagnosing and treating osteoarthritis [2]

The importance of arthroscopy in the treatment of osteoarthritis of the knee is currently increasing. There is still no comprehensive clinical diagnostic algorithm that would have indications and contraindications in the treatment of osteoarthritis of the knee joint.

Objective: To improve the results of arthroscopic treatment of patients with osteoarthritis of the knee joint, through the introduction of a comprehensive clinical diagnostic algorithm.

Materials and methods

218 patients treated in 2014–2018 from the Department of Sports Traumatology of Republican Specialized Centre of Traumatology and Orthopedics, underwent arthroscopic treatment with osteoarthritis of the knee joint at various degrees. The age of patients ranged from 40 to 80 years. 156 (71.6%) were women and 62 (28.4%) were men. In the diagnosis of osteoarthritis of the knee joint, clinical, radiographic, goniometric, MRI and X-ray densitometric studies were performed. Clinical studies included: clarifying complaints, collecting history, examination, palpation of the damaged area, determining the range of motion in the joint. We used the Kellgren and Lawrence classifications to determine the degree of osteoarthritis [7]. In this classification there are 5 degrees from 0 to IV degree. 0 and IV degree was not included in our study. We believe that with IV degree of osteoarthritis arthroscopy is not effective. In 0 degree of osteoarthritis, if no structural changes are identified, can be treated conservatively. In our study, the following degrees of osteoarthritis were determined in patients: grade I - 19 patients (8.7%), grade II - 104 patients (47.7%), grade III - 95 patients (43.6%). In 158 (72.4%) patients, osteoarthritis was accompanied by synovitis.

All 218 patients underwent arthroscopic diagnostic and simultaneous treatment. Knee arthroscopy was performed with a KARL STORZ arthroscope (Germany). 0.9% saline was used in the operating environment. The operations were performed under the general and spinal anesthesia. Arthroscopy was performed with standard antromedial and antrolateral approaches. If necessary, additional access was used. Arthroscopy was carried out using standard research methods. In the process of arthroscopic intervention, cruciate ligaments, the integrity and thickness of the capsule, the state of hyaline cartilage, damage of menisci, degenerative-dystrophic changes, the presence and amount of free fluid in the joint cavity and its character, the state of synovial folds were investigated. In synovitis, when the synovial membrane is hypertrophied, debridement is performed. If a free osteochondral fragment is detected in the chamber of the knee joint, it is removed from the joint with a special arthroscopic clamp. With limited movements in the joint, the patella is mobilized with arthroscopic scissors. A damaged or degeneratively altered posterior horn of the medial meniscus is resected. The edges of the meniscus align with shaver. Foci of chondromalacia in the joints are treated with shaver. It is drilled with $\varnothing = 2$ mm with the spokes tunnel the chondromal center of the femoral or tibial bone through the articular surfaces towards the bone marrow canal. Moreover, the perforation of the tunnels on the femoral and tibial bones is performed at a distance of at least 5 mm from each other. Based on clinical complaints, goniometric, x-ray, MRI, x-ray densitometric analysis, we developed a clinical diagnostic algorithm for the treatment of OA of the knee joint. (1 table)

We have conducted 5 types of arthroscopic surgery in 218 patients with knee OA. The first type of operation — local debridement with meniscectomies was performed in 1– and 5 cases (on a table 1.) in 35 (16%) patients, the second type of operation — local debridement with subchondral tunneling was performed on 2,6,7 and 10 cases (on a table 1) in 41 (18.8%) patients, the third type of operation - partial debridement standard of subchondral tunneling was carried out 2,3,6,7,9 and 10 cases (according to the table 1) in 58

(26,6%) patients, the fourth type of operation is shown in table 3, 4,7,8 and 11, full debridement with standard subchondral tunneling in 53 (25.2%) patients, the fifth type of operation is given (in the table 1) 4,7,8,11 and 12, complete debridement with deep subchondral tunneling in 31 (13.4%) patients.

This operation allows you to simultaneously solve several problems, including improving nutrition and remodeling of cartilage tissue and reduces pressure in the subchondral zone, and increases bone density, improves the arthro-kinematics of the knee-femoral and femoral-tibial joint, normalizes the regulation of synovial fluid formation(1 – table).

1- table

Clinical and diagnostic algorithm for arthroscopic treatment of osteoarthritis of the knee joint

Clinical examination		Goniometry	X-ray	MRI	X-ray densitometry		Arthroscopic locale		Arthroscopic Locale		Arthroscopic Locale		Arthroscopic Locale	
Complaints	Amplitude of movement of the knee ⁰				Densitometric indicators T – Score:		Debridement Subchondral tunneling		Partial arthroscopic debris subchondral tunneling		Full debridement standard subchondral tunneling		Full debridement deep subchondral tunneling	
					Norm	Osteopenia, Osteoporosis	Number of tunnels	Number of tunnels	Number of tunnels	Number of tunnels				
Pain in the knee joint	130 ⁰ 180-0-50	Gonarthrosis I degree.	Chondromalacia -0 Meniscopathy with damage	> - 0.9		+	-	-	-	-	-	-	-	
					From -1 to -2.4 - 2,5>	+	-	-	-	-	-	-	-	
Local pain in the knee joint	110 ⁰ 175-0-65	Gonarthrosis I degree	Chondromalacia I - II degree. Meniscus infection, Meniscopathy with damage	> - 0.9		-	-	+	-	+	-	-	-	
					From -1 to -2.4 - 2,5>	-	+	-	+	-	-	-	-	
Common, diffuse pain in the knee joint	130 ⁰ - 110 ⁰ 175-0-65	Gonarthrosis I degree	Chondromalacia II - III degree meniscopathy with damage, synovitis	> - 0.9		-	-	-	+	-	+	-	-	
					From -1 to -2.4 - 2,5>	-	-	-	+	-	+	-	-	

Results and its discussion

The study included patients with osteoarthritis of the knee at various degrees. This disease is most common in elderly patients, and the presence of secondary diseases

affects the outcome of the surgery. In all 5 types of performed operation excellent and good results were achieved. After operation, pain at rest has disappeared the next day. From the next day, patients were prescribed a dose load on the operated leg, followed by a gradually increasing of the load. In for 3-5 days after surgery, development of the joint has begun. After 10 days, full load was allowed on the operated limbs. Full flexion was allowed after 2 weeks. In all patients, the function of the knee joint was restored, the amplitude of movement increased, the discomfort in the joint decreased and disappeared. In all patients after surgery, no somatic changes were observed. The closest (from 3 to 6 months) and remote (from 6 months to 1 year) results were analyzed in all patients. In 194 patients, the pain at rest in the knee joint disappeared completely, in 24 patients pain remained with the load. After surgery, four patients had synovitis with arthralgia for up to 6 months. The condition of these patients has improved after the conservative treatment with active therapeutic exercise (exercise therapy). Effective results were obtained in 191 patients within 3-6 months, while 214 patients received good results from 6 months to 1 year. This is based on the long duration of treatment in some patients. During the period of rehabilitation treatment, walking with orthopedic unloading of the joint and subsequent, gradually increasing load to the leg is recommended. In the postoperative period, patients are recommended medication, early rehabilitation and physiotherapy.

According to our data, the department of Sports trauma at the Republican Centre of Traumatology and orthopaedics achieved 96.5% of the effect simultaneously from arthroscopic techniques of local, partial, extended debridement, standard and deep subchondral tunneling with osteoarthritis of the knee joint at different stages.

Conclusion:

1. The introduction of a clinical diagnostic algorithm for the arthroscopic treatment of osteoarthritis of the knee joint has made it possible to obtain good results through selective intervention.
2. Arthroscopic treatment using the clinical diagnostic algorithm allows activating patients and starting the rehabilitation measures in the post-operative period.

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