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INFORMATIVENESS OF ARTHROSCOPIC EXAMINATION IN THE CLINICAL DIAGNOSTICS OF MONOGONARTHROSIS

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There are no specific clinical, radiological, and laboratory indicators of the early stages of knee osteoarthritis. The aim is to investigate the informativeness of diagnostic and therapeutic arthroscopy in the course of comprehensive examination of patients with monogonarthrosis. Materials: protocols of clinical, radiological and arthroscopic examination of 125 patients with acute monogonarthrosis. Methods: clinical, radiological and laboratory diagnostics with an emphasis on biological markers of blood inflammation (erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), monocyte/lymphocyte ratio (MLR), neutrophil/lymphocyte ratio (NLR), neutrophil/monocyte ratio (NMR)) and synovial fluid (biochemical analysis of blood, in particular, with the determination of the content of rheumatoid factor (RF)), diagnostic and therapeutic arthroscopy. According to ESR, CRP, and RF values patients were divided into the following groups: seronegative group A1 (56.8%) and seropositive group A2 (37.6%) with monogonarthrosis, group B (5.6%) with seropositive unspecified rheumatoid monoarthritis. The blood count in groups A1 and A2 was within normal limits. Biochemical analysis of synovial fluid revealed signs of inflammation in the form of an increased concentration of lactate dehydrogenase (in groups A2 and B $p<0.01$) and total protein ($p<0.001$ for all groups), a decrease in the glucose level ($p<0.001$ for groups A2 and B) compared to normal values. However, these findings are not specific to patients with knee osteoarthritis. Diagnostic and therapeutic arthroscopy with the examination and assessment of structural changes in the soft tissues of knee joints and determination of clinically significant damage and performance of treatment procedures in the amount necessary for a specific patient is the most informative in case of monogoarthrosis.

Key words: *monogonarthrosis, complete blood count, erythrocyte sedimentation rate, C-reactive protein, rheumatoid factor, arthroscopy.*

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Introduction. Diagnostics of monogonarthrosis is characterized by certain difficulties: damage to one joint, which is uncharacteristic of osteoarthritis, the development of typical clinical and radiological signs only at the terminal stages of the disease with irreversible deformation of the articular joints, the absence of specific laboratory biomarkers during the entire clinical course [1]. In the case of a combination of monogonarthrosis with synovitis, this additionally requires differential diagnosis with infectious arthritis, rheumatoid and gouty arthritis, etc. [2].

Physical, biochemical and microbiological analyses of synovial fluid [3] obtained during arthrocentesis are informative in the diagnostics and differential diagnostics of monogonarthrosis, but they have low specificity [4]. Laboratory analysis of synovial fluid and synovial biopsy during arthroscopy have greater diagnostic value [5, 6]. Diagnostic and therapeutic arthroscopy allows one to both obtain representative pathological tissue [7] and visually inspect joints in order to assess the state of their soft tissues and synovial proliferation [8].

In the modern literature on the problem of clinical diagnostics of osteoarthritis, including monoarticular damage, the results of studies of biomarkers of hyaluronic cartilage degradation are described both in the case of visualization on MRI scans [9] and according to the data of biochemical and immunological analyzes of blood serum [10]. Also, the importance of radiological and anatomical signs, mainly in the early stages of knee osteoarthritis, is studied separately [11]. There are individual contradictory professional works on the correlation of clinical and radiological manifestations of gonarthrosis [12, 13]. In the available literature there are almost no reports on the results of a comprehensive clinical and radiological examination of patients with monogonarthrosis, who underwent diagnostic and therapeutic arthroscopy. The diagnostic importance of arthroscopy has been proven, but the presence and nature of the relationship between the results of a standard examination of this category of patients and the data of laboratory analyses of synovial fluid and biopsies have not been studied.

The aim of the research is to study the informativeness of diagnostic arthroscopy in the course of comprehensive examination of patients with monogonarthrosis.

The object and methods of research. The object of research are protocols of clinical, radiological and arthroscopic examination of 125 patients (54 (43.2%) men; 71 (57.8%) women) who stayed in the "Intersono" medical center in Lviv with the diagnosis "Acute monogonarthrosis" in 2017-2019. The average age of the patients was 43.8±21.4 years (18-79 years).

This research was conducted in accordance with the principles of bioethics, set forth in the Declaration of Helsinki "Ethical Principles for Medical Research Involving Human Subjects" and the "Universal Declaration on Bioethics and Human Rights (UNESCO)" and was carried out after the approval there of by the Bioethics Committee of the Kharkiv National Medical University (protocol No. 8 as of October 3, 2018). Criteria for inclusion in the research: presence of monoarticular pain syndrome with or without monosynovitis; grade 1-2 knee osteoarthritis according to the Kellgren-Lawrence grading. Criteria for exclusion from the study: polyarthralgia; grade 3-4 knee

osteoarthritis according to the Kellgren-Lawrence grading; infectious joint diseases.

Research design: this diagnostic work is a prospective randomized study: patients with monogonarthrosis were selected for diagnostic arthroscopy randomly, regardless of age, sex, length of medical history, structural and functional changes in the soft tissues of knee joints.

Research methods: 1) clinical method with the study of the orthopedic status, including examination of contours and measurement of the amplitude of movements in both knee joints (KJ); 2) X-ray diagnostics (plain radiography of both KJ; magnetic resonance imaging (MRI); 3) diagnostic and therapeutic arthroscopy. Arthroscopy was performed using standard anterolateral and anteromedial portals, and in some cases posteromedial and posterolateral portals. Synovial biopsy specimens were taken from at least six joint sites, including the suprapatellar, supra-lateral and supra-medial recesses, intercondylar notch, and anterior and posterior compartments. A thorough diagnostic examination of joints was carried out, and, if necessary, appropriate treatment measures were taken (partial synovectomy, resection of the damaged part of the meniscus, removal of loose cartilaginous bodies, trephination of chondromalacia lesions, resection of Hoffa's fat pads and folds; treatment results are not included in this work); 4) laboratory diagnostics of blood (complete blood count (including monocyte/lymphocyte ratio (MLR), neutrophil/lymphocyte ratio (NLR), neutrophil/monocyte ratio (NMR), which can reflect the balance of the immune response [14, 15]), biochemical (C-reactive protein (CRP)) analyses); synovial fluid analysis (analyses of physical properties, biochemical analysis (total protein, lactate dehydrogenase, rheumatoid factor). C-reactive protein was used as a serological marker of inflammation, which is the most sensitive and accurate reflection of the acute stage of inflammation; its normal content does not exceed 5 mg/l [16]; 5) data processing was carried out using medical statistics methods with the help of "Statistica 7.0" software package and the standard Excel 2013 statistical analysis package. Credibility between different groups was examined using Fisher's exact test. Correlation analysis was performed using the Pearson method. Differences were considered probable in case of a significance level of $p<0.05$.

Results of research and their discussion. Based on the results of a comprehensive clinical and arthroscopic examination, two groups of patients were identified: group A (n=118; 94.4% (118/125)) with primary monogonarthrosis and group B (n=7; 5.6% (7/125)) with seropositive unspecified rheumatoid monoarthritis with hypertrophic synovitis. Patients from group B had an increased content of rheumatoid factor in synovial fluid ((33.5-63.5) IU/ml; an average of (38.5±8.8) IU/ml), compared to the normal value of up to 20 IU/ml). Patients from group B also had elevated serum CRP levels ((17.5-63.5) mg/l; an average of (27.3±6.3) IU/ml). Due to the fact that the number of patients in group B was insufficient to determine statistical regularities, the presence of statistical trends was traced for this group. The CRP level served as a marker for dividing group A into seronegative group A1 (n=71/125; 56.8%; CRP<5 mg/l) and seropositive group A2 (n=47/125; 37.6%; CRP>5 mg/l).

Based on the results of the study of the orthopedic status, it was established that proportional contours of the compromised knee joints prevailed in patients with monogonarthrosis – 92/125 (73.6%) of cases, while swelling of knee joints was observed in all patients with rheumatoid monoarthritis. There was a certain difference in the frequency of smoothed KJ contours in patients from groups A1 and A2: 17/71 (24%) and 16/47 (34%), respectively. A similar trend regarding clinical changes in the orthopedic status with the proportional increase of the number of biochemical markers of inflammation was also revealed based on the results of the study of the amplitude of movements in the affected KJ. The range of movements was on average (81.43±9.09)º in the seronegative group A1; (74.28±11.21)º in the seropositive group A2; (70.51±9.84)º in group B with seropositive rheumatoid arthritis.

Table 1 – Statistical parameters of laboratory values of blood of patients with monogonarthrosis

Criteria	Patient groups		
	A1	A2	B
Red blood cells; 10^{12}/l	4.9 ± 0.1	4.8 ± 0.2	4.6 ± 0.1
Hemoglobin; g/l	138.6 ± 1.7 **	132.5 ± 5.9	125.6 ± 3.2
Platelets; 10^9/l	229.0 ± 5.5 **	250.5 ± 22.3	299.3 ± 24.1
White blood cells; 10^9/l	6.4 ± 0.2	7.4 ± 0.6	7.5 ± 0.5
Band neutrophils; %	4.3 ± 0.4	4.3 ±1.0	5.3 ± 0.9
Segmented neutrophils; %	56.6 ± 1.0	56.8 ± 3.8	60.1 ± 2.6
Lymphocytes; %	31.9 ± 1.1	32.3 ± 2.8	28.3 ± 2.5
Monocytes; %	5.1 ± 0.3	5.4 ± 1.0	4.7 ± 0.5
Eosinophils; %	1.9 ± 0.2	1.3 ± 0.6	1.6 ± 0.4
Basophils; %	0.2 ± 0.1	0.1 ± 0.1	0.2 ± 0.1
Erythrocyte sedimentation rate; mm/hour	12.6 ± 1.1 ***	20.0 ± 4.5 **	30.9 ±3.5
Monocytes/lymphocytes	0.16 ± 0.09	0.17 ± 0.10	0.18 ± 0.08
Neutrophils/lymphocytes	1.97 ± 0.62	2.12 ± 0.58	2.28 ± 0.74
Neutrophils/monocytes	11.32 ± 2.04	11.5 ± 2.13	12.8 ± 3.83
C-reactive protein; mg/l	1.8 ± 0.5 ***	12.0 ± 2.2	14.7 ± 0.2

Notes: significant intergroup difference: * – p<0.05; ** – p<0.01; *** – p<0.001.

When evaluating the results of the complete blood count, it was found that the number of almost all formed elements was on average within normal limits. At the same time, it was noted that the amount of hemoglobin and the number of platelets in group A1 were significantly higher (p=0.0057; p=0.0061; p=0.026 respectively) compared to groups A2 and B. As for erythrocyte sedimentation rate (ESR), average normal values were observed only in group A1. In groups A2 and B, a significant increase in ESR was observed ((20.0±4.5) mm/h, p=0.0054 and (30.9±3.5) mm/h, p=0.00070, respectively) compared to group A1. MLR values were almost identical in the studied groups **(table 1)**.

The situation was different when analyzing the neutrophil/lymphocyte ratio and neutrophil/monocyte ratio. In groups A2 and B, there was an increase in the NLR value compared to group A1, and the NLR values in these groups (A2 and B) exceeded the threshold value of ≥ 2.1, which indicates a high risk of disease progression [17, 18]. As for NMR, its value was also the largest in group

B and slightly differed from values obtained in groups A1 and A2 **(table 1)**.

CRP value was within normal limits only in group A1; as for patients from groups A2 and B, there was a significant increase in CRP (p=0.00062 and p=0.00058, respectively) – **table 1**.

The NLR can reflect the balance of the immune response [19], and if its value is ≥ 2.1, it is considered a predictor of an adverse course of knee osteoarthritis with a specificity of 77% and a sensitivity of 50% [17], which is inversely proportional to the severity of pathological radiological changes [17, 18, 20]. Some authors note an increase in MLR and NMR in patients with grade 3-4 knee osteoarthrosis according to the Kellgren-Lawrence grading [14, 15, 18-20] and believe that it is possible to consider these indicators as risk factors for the progression of inflammation [21, 22] and the development of structural and functional changes in knee joints [18-20].

The mechanism of the increase in the MLR level in case of knee osteoarthritis has not been completely clarified. Monocytes and lymphocytes are key cells of innate and adaptive immunity, whereas MLR is an indicator of immune disease progression [23]. An increase in MLR may be associated with an increase in the number of monocytes due to their mediated activation during inflammation and/or a decrease in the number of lymphocytes due to their accumulation at the site of inflammation [21, 24].

An increase in the ESR is observed in case of any inflammatory process and is associated with a concomitant increase in the concentration of fibrinogen in blood serum, which leads to erythrocyte sedimentation [16]. As a reagent of the acute phase, ESR is a biomarker of inflammation; its value may be normal in the first 24 hours of the pathological process, but will remain elevated for several days until excess fibrinogen is removed from the serum [25]. In the literature, information on ESR value in patients with knee osteoarthritis is contradictory. Some authors believe that this category of patients has a normal ESR value [16]. However, the majority of specialists claim that there is an increased level of ESR, mainly in patients with grade 3-4 knee osteoarthritis according to the Kellgren-Lawrence grading [14, 15, 26], in the presence of joint swelling with the "ballottement" of the patella [26].

ESR value and CRP concentration are the most studied laboratory markers of inflammation. These values are high in case of rheumatoid arthritis and relatively elevated in case of knee osteoarthritis [27]. A recent study of the level of high-sensitivity CRP (HCRP) for the purpose of immunoassay [28] revealed that the value of this indicator was elevated, which indicates a slight inflammation in this category of patients [29]. CRP does not correlate with age [30], however, there is a direct relationship between HCRP and knee joint swelling [21]. However, no significant difference was found between elevated levels of HCRP in patients with grade 2, 3, and 4 knee osteoarthrosis according to the Kellgren-Lawrence grading. It is believed that the HCRP value can be a predictor of the progression of osteoarthritis in the early stages [31].

Table 2 – Statistical parameters of physical properties and biochemical indicators of synovial fluid of patients with monogonarthrosis

Criteria	Patient groups		
	A1	A2	B
Physical properties			
Color	n; %		
- light yellow	48; 68%	22; 47%	1
- dark yellow	13; 18%	12; 26%	2
- dark yellow with blood impurities	8; 11%	10; 21%	2
- red hemolyzed	2; 3%	3; 6%	2
Transparency	n; %		
- transparent	62; 87%	32; 68%	4
- turbid	9; 13%	15; 32%	3
pH (N-7.5)	7.429 ± 0.03	7.431± 0.04	7.414± 0.02
Biochemical indicators (M±m)			
Lactate dehydrogenase; (N-320-330 units/l)	439.3 ± 78.7	438.1 ± 38.5 **	436.5 ± 42.4
Total protein; (N-15 g/l)	38.4 ± 2.2 ***	37.9 ± 1.3 ***	37.5 ± 1.7
Glucose; (N-5,5 mmol/l)	5.1 ± 0.4	4.8 ± 0.2 ***	4.8 ± 0.4 ***
Rheumatoid factor; (N- up to 20 IU/ml)	-	-	38.5 ± 8.8

Notes: significant difference from normal values: * – p<0.05; ** – p<0.01; *** – p<0.001.

The results of diagnostic arthroscopy, which was performed in case of all 125 patients, were evaluated in the following three areas: physical properties of synovial fluid, biochemical analysis of synovial fluid (SF) and direct assessment ad oculōs of the structural and functional state of the soft tissues of knee joints.

The light yellow color, characteristic of the SF of an intact joint [32], was observed mainly in group A1 (48/71; 68%) and in almost half of patients from group A2 (22/47; 47%).

Altered SF in patients with arthritis or mixed arthritis (dark yellow and dark yellow with blood impurities) [32] occurred in almost a third of our patients from group A1 (a total of 24/71; 29%) and in almost half of patients from group A2 (a total of 22/47; 47%). Red hemolyzed SF, which is characteristic of acute and subacute post-traumatic period [32], was registered in single cases in groups A1 and A2 **(table 2)**.

In groups A1 and A2, synovial fluid was mainly transparent; its turbidity was detected in 13% (9/71) and 32% (15/47) of cases, respectively. As for group B, distribution of the types of synovial fluid in terms of color and transparency was almost uniform. The change in synovial fluid pH was insignificant **(table 2)**.

Biochemical studies of synovial fluid demonstrated changes characteristic of the inflammatory process: increased concentration of lactate dehydrogenase (in groups A2 and B p=0.0058; p=0.0064, respectively) and total protein (p=0.00056 for A1; p=0.00061 for A2 and B), a decrease in the glucose level (p=0.00072 for groups A2 and B) compared to normal values. A significant increase in the level of the rheumatoid factor was observed only in group B **(table 2)**.

Analysis of the relationships between orthopedic status data and laboratory values of blood and synovial fluid was conducted for each of the groups of patients. The results of the correlation analysis in group A1 revealed that there was only a significant direct moderate relationship between hemoglobin concentration and ESR (r=0.523; p<0.05). Such a result looks quite natu-

Table 3 – The results of diagnostic arthroscopy of patients with monogonarthrosis

Parameters	Patient groups		
	A	A2	B
Degenerative meniscus injury			
- medial meniscus	17; 23.9%	11; 23.4%	-
- lateral meniscus	4; 5.6%	2; 4.3%	-
- two menisci	46; 64.8%	29; 61.7%	7; 100%
Dysplastic discoid meniscus	2; 2.8%	-	-
Hypertrophy of the medial patellar / infrapatellar fold	61; 85.9%	46; 97.9%	7; 100%
Hypertrophy of Hoffa's fat pads	63; 88.7%	45; 95.7%	7; 100%
Indurations of recesses	49; 69.0%	41; 87.2%	7; 100%
Partial anterior cruciate ligament tear	41; 57.7%	39; 83.0%	1; 14.3%
Villous synovitis	46; 64.8%	45; 95.7%	-
Hypertrophic villous synovitis	-	-	7; 100%
Chondromalacia of articular surfaces	49; 69.0%	36; 76.6%	5; 71.3%
Loose cartilaginous body	1; 1.4%	5; 10.6%	-

ral, taking into account that the studied indicators were within normal limits. In group A2, the strongest were: the relationships between hemoglobin and ESR (r= -0.844; p<0.001), number of erythrocytes (r=0.791; p<0.001) and platelets (r= -0.733; p<0.001); direct correlation between the concentration of erythrocytes and leukocytes (r=0.712; p<0.001). There were also moderate correlations between ESR and the content of erythrocytes (r= -0.654; p<0.01) and platelets (r=0.573; p<0.05), as well as the concentration of lactate dehydrogenase in the synovial fluid (r=0.631; p<0.05) and total protein (r = 0.612; p<0.05).

Features of the physical properties and biochemical analysis of SF (with the exception of the rheumatoid factor) observed in the studied patients are not specific to a certain disease, but reflect general pathological changes inherent in inflammatory arthropathies [33]. Moreover, normal CF parameters – light yellow color and transparency – can be preserved in patients with arthritis and ankylosing spondylitis [34]. Rheumatoid factor is a biochemical marker of specific inflammation [35]; the detected increase in the content thereof made it possible to separate a group of patients with rheumatoid monoarthritis of the knee joint. Therefore, CF analysis is considered to be an auxiliary means for the examination of patients with arthritis and synovitis [36].

Direct assessment of the condition of the soft tissues of the joint during arthroscopy is the most informative diagnostic procedure for patients with knee osteoarthritis. Under these conditions, the studied patients were diagnosed with structural damage to almost all intra-articular elements in all groups of patients **(table 3)**. A significant advantage of diagnostic and therapeutic arthroscopy is the possibility of determining clinically significant damage and performing treatment procedures which a specific patient needs.

Medical arthroscopic intervention was required in the following cases:

- degenerative damage to the menisci (to a medial meniscus in a total of 22.4% (28/125) of cases, to a lateral meniscus in a total of 4.8% (6/125) cases and to both menisci in a total of 65.6% (82/125) of observed patients) in the form of resection of the damaged areas of the meniscus;

- hypertrophy of the medial patellar / infrapatellar fold (a total of 91.2% (114/125)) and hypertrophy of Hoffa's fat pads (a total of 92.0% (115/125)) with the use of resection of Hoffa's fat pads and folds;

- villous (a total of 72.8% (91/125)) and hypertrophic villous synovitis (a total of 5.6% (7/125)) in the form of partial synovectomy;

- chondromalacia of articular surfaces (a total of 72.0% (90/125)) by means of trephination of chondromalacia lesions;

- loose cartilaginous bodies (a total of 4.8% (6/125)) with the removal thereof.

Therefore, diagnostic and therapeutic arthroscopy is the most informative diagnostic procedure for patients with knee osteoarthritis. It is most appropriate to use arthroscopy in case of patients with early stages of gonarthrosis [37, 38].

Conclusions.

1. The results of research of biological markers of general inflammation, ESR and CRP in the blood, as well as the marker of specific inflammation, the rheumatoid factor in the synovial fluid, made it possible to divide the patients into the following groups: seronegative (group A1; 56.8% (71/125)) and seropositive (group A2; 37.6%; 47/125) monogonarthrosis, as well as seropositive unspecified rheumatoid monoarthritis (group B; 5.6% (7/125)).

2. The number of blood cells in patients from groups A1 and A2, which was determined according to the results of complete blood count, was within normal limits. The neutrophil/lymphocyte ratio – which exceeded the threshold value of NLR≥2.1 in groups A2 and B can be indicative of a high risk of disease progression – turned out to be the most informative.

3. Biochemical analysis of synovial fluid of patients with monogonarthrosis revealed signs of inflammation in the form of an increased concentration of lactate dehydrogenase (in groups A2 and B p<0.01) and total protein (p<0.001 for all groups), a decrease in the glucose level (p<0.001 for groups A2 and B) compared to normal values.

4. Diagnostic and therapeutic arthroscopy with the examination and assessment of structural changes in the soft tissues of knee joints allowed us to determine clinically significant damage and perform treatment procedures necessary for a specific patient.

Prospects of further research. As for the further research, it is expedient to carry out comprehensive clinical and radiological, laboratory and arthroscopic examination of patients with monogonarthrosis in two separate groups: with joint swelling and with normal contours of affected knee joints.

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ІНФОРМАТИВНІСТЬ АРТРОСКОПІЧНОГО ДОСЛІДЖЕННЯ У КЛІНІЧНІЙ ДІАГНОСТИЦІ МОНОГОНАРТРОЗУ

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Резюме. Клінічні й рентгенологічні симптоми, лабораторні показники крові та синовіальної рідини є неспецифічними для діагностики остеоартрозу колінного суглоба, особливо на ранніх стадіях. Необхідний пошук інформативних діагностичних ознак гонартрозу.

Об'єкт дослідження – протоколи клініко-рентгенологічного та артроскопічного обстеження 125 пацієнтів з моногонартрозом у стадії загострення.

Методи дослідження: клінічний з вивченням ортопедичного статусу; рентгенологічний; лабораторна діагностика з акцентом на біологічні маркери запалення крові (швидкість осідання еритроцитів (ШОЕ); С-реактивний білок (СРБ); відношення кількості моноцити/лімфоцити (ВМЛ), відношення кількості нейтрофіли/лімфоцити (ВНЛ), відношення кількості нейтрофіли/моноцити (ВНМ)) та синовіальної рідини (біохімічний аналіз з визначенням у тому числі вмісту ревматоїдного фактору), діагностично-лікувальна артроскопія.

Результати дослідження біологічних маркерів загального запалення ШОЕ та СРБ у крові, а також маркеру специфічнго запалення ревматоїдному фактору у синовіальній рідині дозволили розподілити пацієнтів на наступні групи: серонегативний (група А1; 56,8% (71/125)) й серопозитивний (група А2; 37,6%; 47/125) моногонартроз, а також серопозитивний неуточнений ревматоїдний моноартрит (група В; 5,6% (7/125)). Концентрація формених елементів крові за даними загального клінічного аналізу у групах пацієнтів А1 та А2 була у межах норми. Найбільш інформативним на нашому матеріалі виявилося відношення кількості нейтрофілів до кількості лімфоцитів, яке у групах А2 та В перевищувало порогове значення ВНЛ≥2,1 і таким чином могло служити предиктором несприятливого перебігу захворювання. Біохімічний аналіз синовіальної рідини хворих на моногонартроз продемонстрував ознаки загального запалення у вигляді підвищеної концентрації лактатдегідрогенази (у групах А2 та В $p<0,01$) та загального протеїну ($p<0,001$ для усіх груп), зниження рівня глюкози ($p<0,001$ для груп А2 і В) порівняно з нормальними показниками.

Проведення діагностично-лікувальної артроскопії з оглядом та оцінкою структурних змін м'якотканинних елементів колінного суглоба дозволило визначити клінічно значимі пошкодження та виконати лікувальні процедури в обсязі, необхідному для конкретного хворого.

Ключові слова: моногонартроз, клінічний аналіз крові, швидкість осідання еритроцитів, С-реактивний білок, ревматоїдний фактор, артроскопія.

INFORMATIVENESS OF ARTHROSCOPIC EXAMINATION IN THE CLINICAL DIAGNOSTICS OF MONOGONARTHROSIS

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Abstract. Clinical and X-ray symptoms, laboratory indicators of blood and synovial fluid are non-specific for the diagnosis of the knee joint osteoarthritis, especially in the early stages. It is necessary to search for informative diagnostic signs of gonarthrosis.

The object of the research is the clinical, radiological and arthroscopic examination protocols of 125 patients with monogonarthrosis in the acute stage.

Research methods: clinical with the study of orthopedic status; radiological; laboratory diagnostics with an emphasis on biological markers of inflammation of blood (erythrocyte sedimentation rate (ESR); C-reactive protein (CRP); monocyte/lymphocyte ratio (MLR), neutrophil/lymphocyte ratio (NLR), neutrophil/monocyte ratio (NMR)) and synovial fluid (biochemical analysis with determination including the concentration of rheumatoid factor), diagnostic arthroscopy.

The results of the research of the biological markers of general inflammation, ESR and CRP in the blood, as well as the specific inflammation marker rheumatoid factor in the synovial fluid, made it possible to divide patients into the following groups: seronegative (group A1; 56.8% (71/125)) and seropositive (group A2; 37.6%; 47/125) monogonarthrosis, as well as seropositive unspecified rheumatoid monoarthritis (group B; 5.6% (7/125)). The concentration of formed blood elements according to the general clinical analysis in patient groups A1 and A2 was within normal limits. The most informative in our material was the ratio of the number of neutrophils to the number of lymphocytes, which in groups A2 and B exceeded the threshold value of NLR≥2.1 and thus could serve as a predictor of the severe course of the disease. Biochemical analysis of the synovial fluid of patients with monogonarthrosis showed signs of general inflammation in the form of an increased concentration of lactate dehydrogenase (in groups A2 and B $p<0.01$) and total protein ($p<0.001$ for all groups), a decrease in the level of glucose ($p<0.001$ for groups A2 and B) compared to normal indicators. However, these findings are not specific to patients with knee osteoarthritis.

Diagnostic arthroscopy with examination and assessment of structural changes in the soft tissue elements of the knee joint, determination of clinically significant damage and performance of medical procedures in the amount necessary for an every patient is the most informative for monogoarthrosis.

Key words: monogonarthrosis, clinical blood analysis, erythrocyte sedimentation rate, C-reactive protein, rheumatoid factor, arthroscopy.

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