

ULTRASONIC AND RADIOLOGICAL PICTURE IN THE COMBINATION OF CHRONIC VENOUS INSUFFICIENCY AND OSTEOARTHRITIS OF THE KNEE JOINTS

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ABSTRACT

The article is devoted to the issues of radiation (ultrasound and X-ray) diagnostics in the combination of pathology of the veins of the lower extremities and osteoarthritis of the knee joints both before the start of treatment, and according to the results of conservative and surgical treatment.

Keywords: chronic venous insufficiency, osteoarthritis, ultrasound

INTRODUCTION

In Uzbekistan, the number of patients suffering from varicose veins of the lower extremities is steadily growing. Thus, according to E. G. Yablokov et al., more than 5 million people suffer from various forms of chronic venous insufficiency in Uzbekistan. According to G. D. Konstantinova, the approximate number of patients who require surgery is several million people. About 25% of men and 45% of women suffer from varicose veins, and the frequency of subjective complaints associated with chronic diseases of the veins of the lower extremities reaches 65%.

One of the most urgent problems of modern rheumatology and orthopedics is osteoarthritis. According to the Uzbek National Guidelines for Rheumatology, osteoarthritis is the most common joint disease in many populations. The first signs of osteoarthritis appear, as a rule, at the age of 30-40, among 50-year-olds the disease occurs in 18-28% of cases, among persons 60-65 years old - in 89%, and after 65 years - in 99% of cases.

For many years, the basis of the diagnostic process in the pathology of the veins of the lower extremities and in osteoarthritis of the knee joints was X-ray research methods. X-ray contrast phlebography for a long time remained the main instrumental method for assessing the condition of the veins of the lower extremities. However, despite

the high information content of the study, it had very serious drawbacks: the invasiveness and unsafety of radiopaque preparations, the thrombogenicity of most of them. In this regard, in accordance with the accepted Uzbek recommendations for the diagnosis and treatment of chronic diseases of the veins of the extremities, the only indication for the use of phlebography at present is the planning of surgery in patients with occlusion or aplasia of the iliac veins.

Radiography of the knee joint is still an important component of the diagnostic process. Ultrasound of the joints and other methods are used only to study the nature of the damage to all components of the joint, but not to assess the effectiveness of treatment, since they are not standardized for this.

However, to study the state of the knee joints and veins of the lower extremities during treatment, it may be necessary to perform the study repeatedly in one patient. Therefore, in this situation, a method should be used that has such qualities as high objectivity of the results obtained, low radiation exposure and non-invasiveness, ease of use and low cost. These criteria, in our opinion, are met by a combination of ultrasonography of the knee joints and triplex scanning of the veins of the lower extremities. We made an attempt to evaluate the possibilities of ultrasound research methods in the diagnosis and treatment of patients with a combination of varicose veins of the lower extremities and osteoarthritis of the knee joints.

MATERIAL AND RESEARCH METHODS

The study involved 120 patients suffering from varicose veins in combination with osteoarthritis of the knee, over the age of 40 years. The average age of the patients was 55.2 ± 0.86 years, the average duration of the disease was 10.5 ± 0.68 years. Among the patients, 90 (76.2%) were women, 30 (25.0%) were men. There were 75 (65.2%) employed, 28 (24.9%) were retired, and 17 (14.6%) patients were disabled of various groups.

The criteria for exclusion from the study were: age under 40 years, acute deep thrombophlebitis at the time of inclusion, arterial blood flow disorders with the disappearance of the pulse in more than one of the arteries of the foot, an active or healed trophic leg ulcer, a negative attitude of patients to follow medical recommendations and lack of confidence in strict adherence to recommendations for taking drugs, adherence to the regimen and ensuring adequate elastic compression.

The diagnosis of varicose veins was identified during the initial examination and confirmed by triplex scanning of the veins of the lower extremities. The studies were carried out according

to the standard method in the supine and standing position, with the performance of functional tests. The study required to evaluate:

Deep veins - patency, diameter, condition of the venous wall and valve function, coordinates of incompetent valves, in case of thrombosis - the level of thrombosis, collateral outflow tracts.

Saphenofemoral anastomosis - location, function of the ostial valve, diameter of the great saphenous vein (GSV), the presence of large tributaries, reflux along them.

The trunk of the great saphenous vein - its patency and diameter, the presence of a second trunk, the level of confluence of large tributaries.

Sapheno-popliteal anastomosis - location, function of the ostial valve, diameter of the small saphenous vein (SSV), the presence of tributaries, including the sural veins and the Giacomini vein.

The trunk of the small saphenous vein - its patency and diameter.

Perforating veins with incompetent valves - location, relation to the trunk of the great and small saphenous veins, diameter, patency.

The studies were carried out in the supine and standing position to assess the condition of the venous valves and reflux in the main veins. Tests were performed with breath holding, proximal and distal compression, Valsalva test. Reflux was assessed as pathological if the reflex index was higher. Triplex scanning of the veins of the lower extremities was performed in patients at inclusion in the study 6 and 12 months after the start of treatment. In the group of operated patients on the eve of the operation, a control study was necessarily carried out with marking of the main anatomical landmarks necessary during the operation.

The diagnosis of osteoarthritis was detected on the basis of an examination by a rheumatologist or orthopedist, patients underwent arthrosonography of the knee joints, radiography of the knee joints. Arthrosonography of the knee joint was performed according to the standard technique. The study included a series of scans: sagittal above and below the patella and along the posterior surface of the joint to assess the presence of effusion and the condition of the capsule, anterior horizontal and posterior horizontal through the femoral condyles to study articular cartilage, osteophytes. Baker's cyst was a frequent finding in the study in the posterior sections.

Ultrasound examination of the knee joint was performed at enrollment 6 and 12 months after the start of treatment. X-ray studies were performed according to the standard technique in two projections. When

evaluating the results of the study, radiological criteria for arthrosis Kellgren-Lawrence were accepted:

Stage 1 - suspicion of joint space narrowing, initial osteophytes.

Stage 2 - narrowing of the joint space, obvious osteophytes.

Stage 3 - narrowing of the joint space, moderate but numerous osteophytosis, slight deformity of the epiphyses.

4th stage - a significant narrowing of the joint space, pronounced osteophytosis and deformation of the epiphyses.

X-ray studies were performed on patients at inclusion in the study and 12 months after its start.

The severity of chronic venous insufficiency was assessed by the CEAP scale, the severity of manifestations of gonarthrosis was assessed by the total Lequesne index and the WOMAC functional index, VAS, and the need for non-steroidal anti-inflammatory drugs was assessed. In order to assess overweight, the body mass index was determined. After inclusion in the study, osteoarthritis therapy included the use of non-steroidal anti-inflammatory drugs, disease-modifying drugs (chondroitin sulfate, glucosamine sulfate at a dose of 500 mg 2 times a day for up to 6 months). This therapy throughout the study was fully consistent with the treatment of osteoarthritis, which patients received before inclusion in the study.

Treatment of varicose veins included surgical treatment and conservative therapy. Surgical treatment included crossotomy, stripping of the trunk of the great saphenous vein, suprafascial ligation of incompetent perforating veins.

Conservative therapy meant prescribing venotonics to patients in standard courses of 2 months, 2 times a year. Also, patients received recommendations on a regimen with limited time spent in a vertical position, the use of compression stockings (preference was given to stockings or tights of the 2nd functional class).

After inclusion in the study, patients remained under the dynamic supervision of a cardiovascular surgeon for a year. Examinations were carried out after 1, 3, 6 months and one year after inclusion in the study. At the first and second examinations, the data of the total Lequesne index and the functional WOMAC index, VAS were evaluated, after 6 and 12 months, ultrasound or radiography of the knee joints was also performed, patients were examined by a rheumatologist or orthopedist.

Statistical processing of the results was carried out using a Pentium Core i3 processor using the Microsoft Excel statistical software package, Statistica 6.0. The average values $[M \pm m]$, the

significance of the average values were determined by the Student's test (t), the Mann-Whitney test for small samples.

RESULTS AND DISCUSSION

During the study, 68 patients were operated on, or 58% of those included in the study (group 1). Conservative therapy was carried out in 55 (47%) patients (group 2). Within a year after inclusion in the study, 50 (43.2%) operated patients and 32 (27.7%) patients who received conservative therapy were observed. The rest of the patients are currently at different periods after inclusion in the study (Table 1).

At the beginning of the study, the severity of manifestations of chronic venous insufficiency was assessed according to the international classification of chronic diseases of the veins of the lower extremities (CEAP system). Patients of the second (55.2%) and third (30.2%) stages prevailed. Patients in stage 0 (no clinical manifestations), as well as in stages 5 and 6 (healed or active ulcer) were not included in the study.

Table 1. Number of patients at different stages of the study

Group of patients	Inspection through	Inspection through	Inspection through	Inspection through
Group 1	65 (56,3 %)	56 (48,1 %)	53 (44,5%)	47 (40,5%)
Group 2	49 (42,5 %)	40 (33,2 %)	39 (32,9 %)	29 (25,7 %)
Total	110 (95 %)	99 (86,4 %)	90 (76,4 %)	79 (67,3%)

During dynamic observation, a decrease in the manifestations of chronic venous insufficiency was noted. A recurrence of varicose veins was recorded a year later in 2 out of 53 examined operated patients, which amounted to 4.1%. There was not a single patient who developed a trophic ulcer of the leg or progressed the manifestations and an increase in the stage of chronic venous insufficiency during the treatment.

The results of triplex scanning of the veins of the lower extremities at the beginning of the study are shown in Table. 2.

Table 2. The results of triplex scanning of the veins of the lower extremities before the start of the study

Group of patients	Leakage of the ostial valve and/or valves of the GSV trunk	Leakage of the ostial valve and/or valves of the SSV trunk	Presence of incompetent perforating veins
Operated	68 (100 %)	7 (7,7 %)	62 (91,7 %)

Non-operated	52 (65 %)	5 (13,7 %)	48 (95,1 %)
Total	120 (94,8 %)	12 (10,3 %)	108 (92,1 %)

From Table. Table 2 shows that almost all patients had incompetence of the ostial valve of the saphenofemoral fistula and valves of the trunk of the great saphenous vein in combination with the presence of incompetent perforating veins. The number of incompetent perforating veins in patients ranged from 1 to 5, with an average of 3.7 ± 0.8 .

In the study after 6 and 12 months after the start of treatment, the results are shown in table. 3.

Data on the study in the dynamics of the state of the small saphenous vein are not informative and cannot be used for comparison, since out of 7 patients who had damage to the small saphenous vein and received conservative therapy, 4 are within the first 6 months of the study. With an adequately performed operation, one of the main reasons for the recurrence of varicose veins may be newly emerged incompetent perforating veins in place of previously incompetent ones. Dynamic triplex scanning allows you to assess this problem and provide all the necessary information to solve it.

Table 3

The results of triplex scanning of the veins of the lower extremities during the study

Group of patients	Leakage of the ostial valve and/or valves of the GSV trunk		Osteal valve failure and / or valves of the MPV trunk		Presence of incompetent perforating veins	
	6 months	12 months	6 months	12 months	6 months	12 months
Operated	0 (0 %)	0 (0 %)	0 (0 %)	0 (0 %)	0 (0 %)	2 (4,1)
Non-operated	35 (93,9 %)	28 (93,5 %)	5 (8 %)	4 (9,7 %)	35 (97,3 %)	33 (100 %)
Total	35 (35,4 %)	27 (36,3 %)	4 (3,3 %)	4 (3,8 %)	32 (39,6 %)	34 (41,3 %)

In patients receiving conservative therapy, it is not advisable to repeat triplex scanning over time more than once a year to assess the state of deep veins. The reason is that the doctor does not receive any new diagnostic information from this study and the study does not have any influence on the solution of medical problems.



According to the ultrasound examination of the knee joints, we assessed the following parameters: the presence of effusion in the knee joints, the thickness of the cartilage of the knee joint, and the size of the osteophytes. The results are shown in table. 4.

Table 4

The frequency of occurrence of synovitis in patients during treatment

Group of patients	Before treatment	Across 6 months	Across 12 months
Operated	32 (47,7 %)	21 (38,9 %)	16 (32,7 %)
Non-operated	23 (49,0 %)	16 (43,2 %)	11 (35,5 %)
Total	55 (48,3 %)	37 (40,7 %)	27 (33,8 %)

Thus, it can be seen from the obtained data that the incidence of synovitis of the knee joints in patients before the start of treatment and during its process significantly differ. This coincides with the data of T. V. Sokolova that the presence and severity of synovitis in osteoarthritis correlate with the height of venous pressure measured using Doppler ultrasound.

In table. 5 shows data on the state of the cartilage of the knee joint and the size of osteophytes during treatment.

It can be seen that both groups of patients showed a positive dynamics of the thickness of the cartilage of the knee joint.

Table 5

Cartilage thickness (mm) and size of osteophytes (mm) in patients during treatment

Group of patients	Before treatment		Across 6 months		Across 12 months	
	Cartilage	osteophytes	Cartilage	osteophytes	Cartilage	osteophytes
Group 1	1,50 ± 0,29	2,93 ± 1,2	1,5 ± 0,3	2,84 ± 1,2	1,84 ± 0,31	2,64 ± 1,2
Group 2	1,38 ± 0,38	3,2 ± 1,1	1,44 ± 0,31	3,36 ± 1,2	1,22 ± 0,41	3,45 ± 1,3
Total	1,40 ± 0,39	2,80 ± 1,2	1,56 ± 0,42	2,78 ± 1,2	1,51 ± 0,45	2,69 ± 1,1

As for the size of osteophytes, the treatment process showed no negative dynamics in both groups of patients, which may also indicate a slowdown in the pathological process.

CONCLUSIONS

Triplex scanning of the veins of the lower extremities and ultrasound of the knee joints are the methods of choice in assessing the condition of patients with combined lesions of the veins of the lower extremities and osteoarthritis of the knee joints. The use of triplex scanning of the veins of the lower extremities in dynamics after surgical treatment makes it possible to assess the state of perforating veins, the appearance of new perforating veins with incompetent valves. In patients receiving conservative therapy, the use of triplex scanning in dynamics makes sense one year after the start of treatment to assess the condition of the deep veins of the lower extremities. Ultrasound examination of the knee joints provides reliable information about the state of the cartilage of the knee joint, the presence of synovitis. The use of ultrasound examination of the knee joint in dynamics in patients receiving conservative therapy or undergoing surgical treatment for varicose veins allows assessing the dynamics of the articular process. In the course of treatment, against the background of the elimination of chronic venous insufficiency, a decrease in the number of patients with synovitis was noted. In the group of patients receiving conservative therapy, and in the group of operated patients, positive dynamics of the thickness of the cartilage of the knee joint was noted 6 and 12 months after the start of treatment. Also, during the treatment, there was no negative dynamics in the form of an increase in the size of osteophytes.

Elimination of manifestations of chronic venous insufficiency leads to positive dynamics in the course of osteoarthritis of the knee joints.

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