

**ASPECTS OF RADIOLOGICAL DIAGNOSTICS OF VALVULAR
INSUFFICIENCY OF THE DEEP VEINS OF THE LOWER LIMBS**

Mardieva Gulshod Mamatmuradovna

Abstract: Doppler ultrasound of the venous system of the lower extremities was performed in 80 patients with a suspected presence of venous pathology. The leading clinical symptom of chronic venous insufficiency of the lower extremities is varicose veins, which in 95% of cases was represented by telangiectases and reticular veins with localization on the skin of the popliteal and posterior-inner surfaces of the lower leg. In the structure of chronic venous insufficiency, the pathology of the saphenous veins amounted to 78.8% and a third was represented by insufficiency of vein valves. Hemodynamically significant pathology of deep vein valves was observed only in 12.5% of patients. The main factor that determines the clinical symptoms and the development of chronic venous insufficiency of the lower extremities is the size of the lumen of the large saphenous vein. An increase in the elasticity index of the total femoral and popliteal veins above 1.37, the hypoplasia index of the great saphenous vein above 1.2, and also segmental venous reflux in a standing position lasting more than 0.5 seconds indicate a venous pathology.

Key words: valvular insufficiency; varicose veins; doppler ultrasound.

Introduction. Valvular insufficiency of the deep veins of the lower extremities with varicose veins in society is of great socio-economic importance due to the high prevalence, duration of treatment and loss of capacity for work. It arises as a result of structural or functional disorders of the venous system associated with impaired venous outflow from the lower extremities, and is manifested by a number of clinical syndromes and symptoms, the severity of which depends on the stage of the disease [1,4,6,8,9,10].

Epidemiological studies show that the frequency of occurrence of chronic venous insufficiency (CVI) of all classes in the population is from 7 to 51.4%; moreover, in women - 62.3%, in men - 21.8%. Such a high prevalence allows us to safely call CVI "a disease of civilization." The development of CVI is a time-consuming process, that is, if the disease is detected and treated in the early stages, it is possible to actually reduce the number of patients or to prolong the development of severe forms of the disease in time [1,3]. Based on this, a diagnosis of venous pathology should be developed in the early stages, before the addition of trophic disorders requiring long-term treatment and significant costs [2,4,5,7].

The purpose of the study is to improve the early diagnosis of valvular insufficiency of the deep veins of the lower extremities by ultrasound dopplerography.

Material and methods. The study was carried out on the basis of the X-ray radiology department of the 1st clinic of the Samarkand Medical University. The questioned patients underwent ultrasonic duplex angioscanning of the venous system of the lower extremities. USDG. Ultrasound examination of arteries and veins was performed in 80 patients using the SonoScape-S-50 apparatus using a linear multi-frequency sensor of 5-12 MHz. Used range of techniques: gray scale mode, tissue harmonic, spectral pulse Doppler, color Doppler and energy mapping.

The results of the study. The first stage of the study was an examination of patients.

Patients with skin manifestations and / or complaints of heaviness and fatigue in the legs were selected into the group with suspected presence of venous pathology of the lower extremities; convulsive contractions of the calf muscles at night. Risk factors for the onset of the disease include old age, pregnancy, overweight, and occupations associated with orthostasis.

Ultrasound examination was performed in the position of patients lying and standing. The presence or absence of retrograde blood discharge (pathological reflux) through the valves, superficial and deep veins was determined. The extent of the reflux in the segments of the vessels and its duration were recorded. Reflux was considered physiological with a duration of not more than 1.5 seconds in the horizontal position of the patient and not more than 0.5 seconds in the vertical position. To determine the viability of the valves and the presence of pathological reflux in the common femoral and large saphenous veins, a Valsalva test was performed. When examining the popliteal vein, deep veins of the lower leg and the small saphenous vein, proximal and distal compression tests were used. A targeted inspection of the valve flaps was not carried out, their viability was judged by the presence of reflux.

Of the patients who suspected venous pathology of the lower extremities, varicose veins were diagnosed in the vast majority (95%). Varicose veins were telangiectases and reticular expansion with localization on the skin of the legs and popliteal regions.

The study of the tonic-elastic properties of the venous wall is one of the important points in the diagnosis of the state of the venous system of the lower extremities and has important theoretical and practical value. When examining patients, we used a simple test to assess the tonic-elastic properties of the deep veins of the lower extremities based on color duplex angioscanning, namely the determination of the elasticity index (IE). IE was calculated as the ratio of the diameter of the vessel in the vertical position to the diameter in the horizontal position of the patient. The value of IE not exceeding 1.37 was taken as the normal value, which corresponded to the physiological elasticity of the venous wall.

The numerical values of increased IE of total femoral (TFV) and popliteal veins (PV) ranged from 1.4 to 2.9, which was noted in 56 cases (70%). In most cases, IE of the total femoral and popliteal veins was in the range 1.4 - 1.8. The average indices of the elasticity index of deep veins for TFV were 1.7 ± 0.042 ; for PV - 1.6 ± 0.028 .

Of primary importance is not the immediate effect on the increasing load when taking a standing position, but the reaction to prolonged orthostasis. With many hours of orthostatic action on the venous wall with altered elastic properties, the corresponding deformation is not achieved instantly, but is formed gradually during the period of the load. In this case, it is not the increased, but the venous pressure, usual for a given patient, and its continuously acting fluctuations during movement that matters. The effect of repeated blood refluxes that occur when walking or straining leads to phase hypertension.

All examined patients who had a determination of IE were divided into the following two groups. The first group included patients, with increased IE there was both TFV and PV, which was previously regarded by us as a pronounced manifestation of connective tissue dysplasia, which affected the elasticity of the deep veins of the limb. This group was

conditionally called "dysplastic." Venous pathology presented in this group is shown in table 1.

Patients of the "dysplastic" group accounted for more than half (53.8%) of the entire pathology detected. More than half of them (27.5%) had a decrease in deep vein tone combined with pathology of the superficial venous system, and only 5% of cases revealed hemodynamically significant valve insufficiency of the femoral segment of the limb.

	↑ IE	↑ IE + Pathology of the saphenous veins	↑ IE + Pathology of the saphenous veins + deep vein valve failure	Total
Abs.	17	22	4	43
%	21,3	27,5	5,0	53,8

Table 1. Characteristics of the "dysplastic" group of patients.

An analysis of the numerical values of the elasticity indexes of the main femoral veins in the examined patients allowed us to identify violations of the venous tone of the limbs in the absence of an ultrasound picture of the pathology of the saphenous and deep veins in more than a third of the examined (40%). This confirms that the absence of hemodynamic disturbances detected during a standard duplex study does not exclude the presence of CVI, and only atony of the vein wall can be a sign of the initial stages of the disease (they are called phlebopathies, phlebostasis).

An increase in IE at the level of only one of the veins is probably a reflection of a lesser degree of severity of connective tissue dysplasia of the venous wall and leads to local hemodynamic disturbances. Another reason for local expansion of the deep veins of the lower extremities in orthostasis may be blood reflux, which occurs as a result of morphological valve defect during prolapse or agenesis of their valves, which is also evidence of a vicious intrauterine formation of connective tissue. In the future, the local expansion of the vein to other trunks occurs.

The second "non-dysplastic" group included all other patients for whom dysplastic changes in the deep vein wall were less pronounced or other mechanisms of venous pathology appeared (Table 2). The main pathogenetic mechanism of CVI development in this group was hydrostatic forces of a gravitational nature against a background of normal or minimally reduced venous tone. The pathology of superficial veins was present in all patients of this group, and in 8.8% of cases it was combined with insufficiency of valves of the deep veins of the thigh throughout.

	Pathology of the saphenous veins	Pathology of the saphenous veins + deep vein valve failure	Total

Abs.	30	7	37
%	37,5	8,8	46,3

Table 2. Characterization of the "non-dysplastic" group of patients.

Changes diagnosed in superficial veins in patients of both groups (valve insufficiency and / or expansion of the saphenous vein lumen) are characteristic of the superficial form of venous hypertension. It accounts for most of the pathology of superficial veins in varicose veins (85%). This form of venous hypertension is characterized by a slowly progressing course of the disease, local blood reflux through the saphenous veins with a partial loss of their contractile ability, a single lesion of communicative veins, and the absence of hemodynamically significant blood reflux in the deep veins. The reflux that develops when the patient is upright through the safeno-femoral and / or through the safeno-popliteal anastomosis causes valve insufficiency of the superficial veins.

The hydrodynamic effects of the muscle-venous pump on insufficient perforating veins play a lesser role in the development of superficial venous stasis. This is due to the fact that in the vast majority of patients in deep veins propulsive antegrade blood flow and intersegmental difference in the dynamics of venous pressure remain. The muscular-venous pump retains its main function - it reduces the amount of blood in the distal extremities during movement and, thereby, reduces the load on the valve apparatus of perforating veins. The clinical course of CVI remains compensated or subcompensated for a long time. Decompensation of venous outflow with the occurrence of trophic ulcers can be observed only in elderly and senile patients with heart failure.

The cause of the local expansion of the main veins of the femoral and popliteal segments of the limb may be different degrees of hypoplasia of the proximal sections of the vessel and indicates the possibility of the development of segmental lesions of the superficial veins without the action of high venous reflux through the safeno-femoral and safeno-popliteal anastomosis. Hypoplasia of the large saphenous vein (LSV) with varicose veins occurs 2 times more often than in healthy people, and in 68.8% of cases with proximal hypoplasia, the distal part of the vein is normal. Hypoplasia can be suspected by segmental extension of the LSV trunk and valve insufficiency within the lower third of the thigh and upper third of the lower leg.

When examining the vessels of the lower extremities, it was found that the diameter of the LSV in the lower third of the thigh exceeds the diameter in the upper third in the presence of a wealthy safenofemoral anastomosis. The hypoplasia index (IG) in this group averaged 1.4 ± 0.23 , on the basis of which hypoplasia of the proximal LSV on the hip was diagnosed. The results of UZDG suggest that the expansion of the superficial venous system with the presence of pathological blood refluxes was present in patients of both groups and amounted to 78.8% of the total pathology detected. Hemodynamically significant insufficiency of LSV valves throughout, as well as a combination of this pathology with insufficiency of valves of the small saphenous vein (SSV) were detected in 36.3% of cases. Isolated hip valve insufficiency in the femur and SSV was present in 13.8 and 3.8 percent of cases, respectively.

Thus, the leading clinical symptom of chronic venous insufficiency of the lower extremities is varicose veins, which in 95% of cases are represented by telangiectases and reticular veins with localization on the skin of the popliteal and posterior-inner surfaces of the lower leg. In the structure of chronic venous insufficiency, the pathology of the saphenous veins is 78.8% and is represented by insufficiency of the valves LSV and SSV throughout the third. Only 12.5% of patients have hemodynamically significant pathology of deep vein valves. For patients with varicose veins, an increase in IE of deep veins is characteristic, the average value of which for the total femoral vein was 1.7, for the popliteal - 1.6. The main factor that determines the clinical symptoms and the development of chronic venous insufficiency of the lower extremities is the size of the lumen of the LSV.

Conclusions. Early diagnosis of valvular insufficiency of the deep veins of the lower extremities in case of varicose veins, including examination at the first stage, examination of complaints and at the second stage of ultrasound examination with assessment of IE and IG, allows to determine the necessary volume of treatment and preventive measures in a timely manner and ensure complete control of the disease symptoms at the initial stages of its development. An increase in IE of the total femoral and popliteal veins above 1.37, IG of a large saphenous vein above 1.2, and also segmental venous reflux in a standing position lasting more than 0.5 seconds indicate venous pathology.

Patients with pain in the legs, in which the venous pathology of the lower extremities is excluded, require further examination by a neurologist, rheumatologist, orthopedist and endocrinologist.

References:

1. Askarova N.R., Abdurakhmonova Yu.M. To the assessment of the state of the venous system of the lower extremities // *Problems of Biology and Medicine*. - 2019, - №. 1,1 (109). - P. 8-9.
2. Klimova E.A. Chronic venous insufficiency and methods of its treatment [Electronic resource] / E.A. Klimova // *Russian Medical Journal*. - 2009. - № 12. - P. 828. Access mode: http://www.rmj.ru/articles/khirurgiya/sites/default/files/mmi2009_12_828.pdf.
3. Babazhanov A.S., Toirov A.S., Alimov Zh.I., Ametov E.T. Prevention of recanalization of the saphenous vein during endovascular laser coagulation // *Modern technologies: current issues, achievements and innovations*. – 2018. - P. 72-74.
4. Mardieva G.M., Askarova N.R., Abdurakhmonova Yu.M., Giyasova N.K. Diagnosis of the state of the venous system of the lower extremities by ultrasound dopplerography // *Problems of Biology and Medicine*. - 2019, - №. 2 (109). - P. 63-66.
5. *Phlebology: A guide for doctors* / V. S. Saveliev [et al.]; under the editorship of V.S. Saveliev. - M.: Medicine, 2011. - 664 p.
6. Yusupov Sh.A., Mardieva G.M., Askarova N.R. Doppler ultrasound of chronic venous insufficiency of the lower extremities // *Zdobutki klinichnii i eksperimentalnoy i medicine*. - 2017, - №. 2. - P. 97-100.
7. Deep axial reflux, an important contributor to skin changes or ulcer in chronic venous disease / G. Danielsson [et al.] // *J. Vasc. Surg.* - 2013. - Vol. 38, № 6. - P. 1336-1341.

8. Gillet J. L. Clinical presentation and venous severity scoring of patients with extended deep axial venous reflux / J. L. Gillet, M. R. Perrin, F. A. Allaert // J. Vasc. Surg. 2016. - Vol. 44, № 3. - P. 588-594.
9. Ivashkevich V.M. Early diagnosis, prevention and treatment of chronic venous insufficiency of the lower extremities / V.M. Ivashkevich // Medical news. - 2015. - № 2. - P. 56–59.
10. Standards for diagnosis and treatment. Treatment of chronic venous insufficiency of the lower extremities. Part 1. Pathophysiology and economic aspects // Serce i Sudini. - 2010. - № 2. - P. 14-21.