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INFLUENCE OF GONARTHROSIS ON THE COURSE AND EFFECTIVENESS OF TREATMENT OF VARICOSE VEINS

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Summary. Relevance. Gonarthrosis (GA) in patients with varicose veins of the lower extremities (VVNK) is more common than in the general population, and degenerative changes in the knee joints worsen the course of this vascular pathology.

Objective: to evaluate the effect of HA on the course and effectiveness of surgical methods for the treatment of CVLE, to identify prognostic criteria.

Materials and methods. There were 310 patients under observation (73 men and 237 women aged 29–72 years), 16% of whom had previously suffered phlebothrombosis, and the frequency of II, III, IV, V and VI classes of venous insufficiency was 10, 14, 37, 16 and 23 %. Endovenous laser coagulation was performed in 263 patients, 39 - traditional phlebectomy or perforator ligation.

Results. HA was diagnosed in 18% of patients with SMV of the legs, more often in men of older age groups with involvement of the great saphenous vein with its near-mouth expansion and a combination with arteriosclerosis of the vessels of the lower extremities, which is accompanied by more pronounced classes of venous insufficiency, while clinical laboratory manifestations of varicose veins are influenced by the stage of the disease, changes in the horns of the menisci, the presence and severity of subchondral sclerosis, osteocystosis, synovitis, Baker's cysts, intra-articular bodies of Steidi and Goff, and the effectiveness of the results of therapeutic surgical measures in patients with GA is worse, with complete occlusion of the vein a month after endovenous laser ablation is observed 2.5 times less often, and the number of complications is 7 times more often, which is determined by subchondral sclerosis, osteousurs, Baker's cysts and Hoff's intraarticular bodies.

Conclusions. The presence of HA is a risk factor for a more severe course of varicose veins of the legs, a negative prognostic factor in relation to the effectiveness of surgical treatment of this disease and the number of complications.

Key words: varicose veins; veins; gonarthrosis; flow; treatment

Introduction. Varicose vein disease (VVD) affects 10-15% of the population, with a prevalence of 25% in some regions and an average annual increase of 2%. There are close links between DVT of the shins and gonarthrosis (GA), mutually aggravating the course of each other. Every second patient with GA has signs of lower limb VBBB, which is a prognostic criterion with regard to the intensity of arthralgia, functional insufficiency of knee joints and severity of reactive synovitis. In addition, in orthopedic practice, the presence of VBBB in patients suffering from GA is considered a risk factor for thromboembolic complications during surgeries on the knee joints. In turn, the relative immobility of patients with HA and VBBB of the legs contributes to the development and progression of trophic skin ulcerations of the shins. At the same time, the peculiarities of the course of lower limb varicosity against the background of HA and its influence on the results of surgical methods of treatment of IBS patients have not been determined. In this regard, the aim and objectives of the investigation were to study the impact of comorbid GA on the nature of leg varicose veins and the efficiency of treatment measures of such patients in different terms after surgical intervention, to define prognostic criteria.

Materials and Methods. 310 patients with lower limb VBI aged from 29 to 72 years (mean age 51.0 ± 0.5 years) were under observation. Among these patients, the male to female ratio was 1 : 3. All patients underwent radiological examination (MultixCompact-Siemens) and sonography of joints (SONOSCAPE S50), ultrasound of vessels (SonoScape-S40), echocardiography, biomicroscopy of conjunctival vessels (HaagStreit-Bern-900 slit lamp, Switzerland). In the past 14.9% of patients underwent phlebectomy, 16.2% had phlebothrombosis. Endovenous (endovascular) laser coagulation (EVLC) was performed in 87.1% of patients, and classical Babcock phlebectomy or perforator ligation was performed in 12.9%. The great saphenous vein was operated on in 76.5% of

all examined patients, 23.5% - in the small vein, stubbling was detected in 17.2% cases, nonuniform trunk course - in 7.3%. According to CEAP (Clinical Etiology Anatomy Pathophysiology) classification, the ratio of C2, C3, C4, C5, and C6 classes of IVC was 1 : 1 : 4 : 2 : 2. Background drug therapy consisted of diosmin, Liothromb 1000 gel, antiaggregant clopidogrel, in phlebothrombosis we used rivaroxaban and/or low molecular weight heparins (Cibor, Clexane), and in cases of chronic lymphovenous insufficiency - Cyclo 3 Fort or Lymphomyosot. GA was diagnosed in 54 (17.9%) IAP patients, who were included in the 1st (main) group, and the remaining 248 (82.1%) were included in the 2nd (control) group. The ratio of males to females in group 1 was 1 : 1.5 and in group 2 was 1 : 3.7 ($x2= 8.91$; $p = 0.003$). The age of patients with GA was 10 years older ($t = 8.66$; $p < 0.001$). Blood parameters of the vasoconstrictor thromboxane A2 (TxA2) and vasodilator prostacyclin (PgI2), which reflect vascular endothelial function, were studied by enzyme immunoassay, and rheological physico-chemical properties of venous blood serum were assessed by interphase tensiometry (PAT2-Sinterface, Germany). Surface viscosity (SV), elasticity (SE), relaxation (SR), tension (ST) and viscoelasticity modulus (VE) were determined, rheological and surfactant indices (RI, SI) were calculated. Statistical processing of the results was performed using computerized variation, nonparametric, correlation, single (ANOVA), and multivariate (ANOVA/MANOVA) analysis of variance (Microsoft Excel and Statistica StatSoft, USA). We assessed mean values (M), their standard errors (m) and deviations (SD), Pearson (r) and Kendall nonparametric correlation coefficients, Brown-Forsyth (BF) and Wilcoxon-Rao (WR) criteria of variance, Student's (t) and McNemar-Fisher differences, statistical significance (p).

Results. Wilcoxon-Rao multivariate analysis of variance showed that the presence of HA in patients affected the integral clinical signs of VBB ($WR = 7.27$; $p < 0.001$). In representatives of the main group, there was 2.1 times more often a vena cava dilation, 27% more often involvement of the great saphenous vein, and 4.2 times more often arteriosclerosis of the leg vessels. Manifest synovitis occurred in 79,6% of the number of HA patients, in 14,8%, 48,2% and 37% of cases respectively. Osteophytosis was detected in 85.2% of cases, subchondral sclerosis in 83.3%, osteocystosis in

38.9%, epiphyseal osteoporosis in 31.5%, and ligamentosis in 35.2%, 37% had osteouzures, 87% had meniscus horn changes, 33.3% had Baker cysts, 57.4% had intraarticular chondromic bodies, 35.2% had Steidi bodies, and 16.7% had Goff bodies. Patients with GA appeared to have a higher integral grade of IAP (x2=346.52; p < 0.001), and C6 grade was established 6 times more frequently. We identified parameters of the course of GA, which, according to Brown-Forsyth and Kendall analysis, were simultaneously directly related to clinical and laboratory parameters of IAP. Subchondral sclerosis was found to affect the course of the affected vein trunk and its vestibular dilation (BF = 4.15, p = 0.047; = +0.253, p = 0.007), meniscus changes affected vein diameter (BF = 4.30, p = 0.002; = +0.220, p = 0.038), osteocystosis affected phlebothrombosis (BF = 6.33, p = 0.015; = +0.329, p < 0.001), from Baker's cysts - leg arteriosclerosis (BF = 6.03, p = 0.018; = +0.322, p = 0.001), from Steidi and Goff intraarticular bodies - SI (respectively BF = 2.57, p = 0.014; = +0.201, p = 0.032, and BF = 13.19, p = 0.002; = +0.365, p = 0.021), from GA stage the ratio of vasoconstrictor TxA2 to vasodilator prostacyclin (BF = 4.86, p = 0.017; = +0.342, p = 0.035). EVLC was performed in 74.1% of the patients with GA and in 89.9% of the control group. Crossectomy was 3.2 times more frequently performed in the main group (2 = 3.99; p = 0.046). In HA, EVLc was performed with a mean larger vein diameter by 33% (t = 6.12; p < 0.001), with a stripping rate greater by 10% (t = 2.31; p = 0.022), and with energy per vessel intima area less by 29% (t = 4.80; p < 0.001). Against the background of HA, rivaroxaban (2 = 37.99; p < 0.001) was used 8.7 times more frequently in the complex of treatment measures and low molecular weight heparins (2 = 29.96; p < 0.001) 3.4 times more frequently, but cyclo 3 fort and lymphomyosot 2.2 times less frequently (2 = 11.63; p = 0.001). It should be noted that the presence of GA had no effect on treatment outcomes two weeks after surgery, but according to Brown-Forsyth analysis of variance, it had an effect 4 weeks and 6 months later, and this was true for all surgical interventions in general (BF = 9.20, p < 0.001, and BF = 5.19, p = 0.006) and EVLK in particular (BF = 9.64, p < 0.001, and BF = 8.37, p = 0.004). As evidenced by the McNemar-Fisher analysis, patients in the main group had worse outcomes both after 2 weeks of postoperative follow-up (2=402.66; p < 0.001), and after 4 weeks (2= 136.45; p < 0.001), and after 24 weeks (2= 144.78; p < 0.001). At the

same time the complications of the operative intervention (phlebitis, deep vein thrombosis, paresthesias, hematomas, seromas, skin hyperpigmentations) were 7,3 times more frequent (2= 24,36; p < 0,001) in VBB patients with HA - 20,4 and 2,8 % of patients respectively. It should be emphasized that 1 month after EVLC in the 1st group the absence of vein occlusion was 5 times more frequent and complete occlusion 2.8 times less frequent (2= 94,67; p < 0.001). In patients in the main group, vascular endothelial function parameters (TxA2 and PgI2) were 17.80 ± 1.23 ng/mL and 34.90 ± 1.41 ng/mL, respectively, and venous blood rheological properties parameters were: SV, 13.30 ± 0.74 mN/m, SE, 36.6 mN/m, VE, 20.00 ± 2.13 mN/m, RI, 40.00 ± 4.10%, SR, 141.20 ± 14.37 s, ST, 43.00 ± 1.33 mN/m, and SI, 1.140 ± 0.049 o e., did not differ significantly from similar values in the control group (Fig. 1). In patients with HA, the treatment results correlated with the use of diosmin preparations (= +0.222; p = 0.044), and in group 2, with the administration of cyclo3fort and lymphomyosot (= +0.366; p < 0.001). The effectiveness of the performed EVLC was found to be dependent on the baseline RI parameter, as demonstrated by Brown-Forsyth analysis of variance (BF = 3.62; p = 0.045), nonparametric Kendall correlation (= -0.388; p = 0.043) and parametric Pearson (r = -0.432; p = 0.045; Figure 2). In this regard, we consider the RI < 20% as a rognostic criterion for the outcome of subsequent EVLc in lower extremity VBI patients with comorbid GA.Six months after EVLc was performed, treatment efficacy was negatively associated with the presence of Baker cysts in patients (BF = 5.38, p = 0.044; = -0.237, p = 0.039). This clinical sign of GA is a risk factor for unsatisfactory results of laser vein ablation in the long-term follow-up. In addition to the above, inverse correlations of EVLC efficacy in GA with the presence and severity of subchondral sclerosis (= -0.231; p = 0.036), osteousuria (= -0.230; p = 0.037) and intraarticular Goff bodies (= -0.280; p = 0.011) were established.

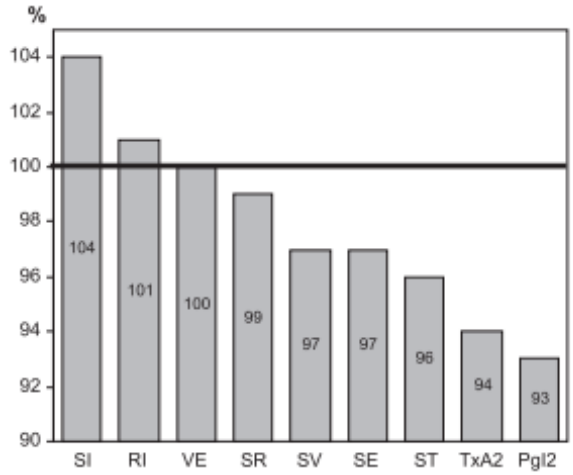

Figure 1. Differences in vascular and rheological blood parameters in patients with CHB of the main and control groups, which are taken as 99%.

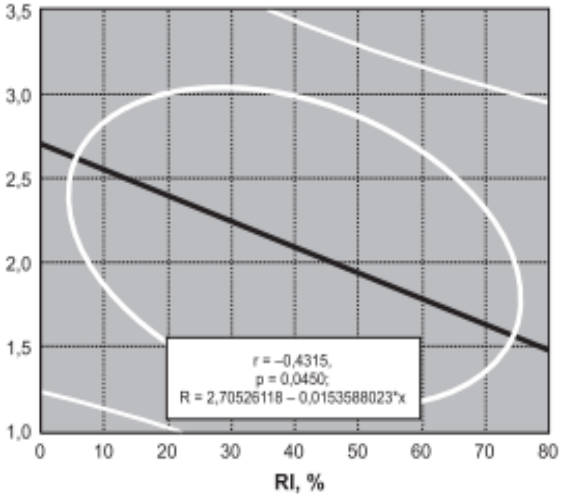

Figure 2. Inverse Pearson correlation and regression relationships of EVLc efficacy in main group patients with baseline venous blood RI

Conclusions

1. HA is diagnosed in 18% of patients with leg VBBB, more often in older men with involvement of the great saphenous vein, with its near-osteal dilation and combination with arteriosclerosis of lower limb vessels.

2. In VBBB GA is accompanied by more pronounced classes of venous insufficiency, with clinical and laboratory manifestations of varicosity being influenced by the stage of the disease, changes of meniscus horns, presence and degree of severity of subchondral sclerosis, osteocystosis, synovitis, Baker cysts, intraarticular Steidi and Goff bodies.

3. the efficacy of therapeutic surgical outcomes in GA patients is worse, with complete vein occlusion 2.8 times less frequent 1 month after EVLC and 7.3 times more complications as determined by subchondral sclerosis, osteoinositis, Baker cysts, and intraarticular Goff bodies.

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