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# Operative therapy of lower extremity varicose vein disease in women with pelvic congestion syndrome

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**Abstract**---Background: Approximately a third of women of fertile age suffer from chronic pelvic pain. 20% of gynecological encounters are associated with this exact problem. Within the structure of reasons of chronic pelvic pain pelvic vein incompetence (pelvic congestion syndrome) takes up to 30%, however, patients are correctly diagnosed only in 2–4% of the cases. Operative treatment helps solve the problem completely, but high disease reoccurrence and post-surgery complications rate remain relevant. Materials and Methods: 62 women with lower limb varicose vein disease aged from 22 to 48, including 20 women diagnosed with pelvic congestion, were examined and assigned into two groups (main group – 32, comparison group – 30). The main group was applied operative therapy based on the developed method of insufficient communicant vein dissection and, in case of pelvic

congestion, – surgical intervention aiming at its elimination. Assessment of the result was conducted through the determination of post-surgery complications and with the varicose vein disease severity (VCSS) method. The aim: To decrease the frequency of the lower limb varicose vein disease reoccurrence after operative therapy of the pathology. Results: General incidence of complications in the comparison group comprised 83.3% which affected 16 patients (53.3%). In the main group there occurred only 3 cases of complications in 3 patients (9.4%) ( $p < 0.001$ ). Analysis with the VCSS 6 months later revealed that the improvement dynamics in a sub-group of the comparison group with small pelvis veins congestion (SPVC) has abruptly slowed as compared to the main group. The difference of findings turned out to be statistically significant ( $p = 0.028$ ). In 12-month term VCSS measurements remained good for all the women except those with SPVC treated conventionally. Differences between the median values in the respective sub-groups reached 51.6% ( $p = 0.011$ ), Differences between the treatment performance indices for the ill in the main group and in the comparison group were statistically significant ( $p < 0.01$ ). Conclusion: The method, which we are offering, has allowed to lower the percentage of post-surgery complications and increase the effectiveness of the proposed therapy having lowered the cases of disease reoccurrence.

**Keywords**—lower limb varicose vein disease, phlebology, perioperianal reflux, phlebography.

## Introduction

Modern vascular treatment mechanisms are in changing and modernization. Nowadays the world is active which needs quick steps and resolutions [1]. Lower limb varicose vein disease is among the most widespread vascular conditions. Research data claim that varicose vein disease affects 25–30% of the population capable of working [2-5]. Despite the significant success phlebology has achieved, the issue of diagnostics and treatment of varicose vein disease has not lost its relevance until now [3,6-7].

In diagnostics and treatment of pelvic congestion syndrome there has recently been achieved certain progress. Diagnostic abilities have expanded due to high-technology research methods (tomographic, echography and Doppler sonography), nevertheless, the assessment criteria remain not standardized, moreover, they are not always clinically significant and wide application of these methods is restricted by their high cost [8].

Treatment approaches had been limited due to non-surgical treatment. However, pharmacotherapy is expedient only at the incipient stage of the disease and effectiveness of most phlebotropic preparations is questionable. Furthermore, extragenital pathology in female patients with pelvic congestion syndrome may

drastically constrain treatment possibilities, particularly hormonal preparation application [9].

Nowadays there exist all necessary prerequisites for timely detection of varicose vein disease and choice of optimal treatment depending on the stage, form of illness and the degree to which chronic venous insufficiency manifests itself. At the same time, operative therapy of varicose vein disease leaves a number of unsolved problems. Particularly, it concerns varicose vein disease reoccurrence after surgical intervention. This index serves as the main criterion of evaluation of treatment method effectiveness [10-12].

Pelvic varicose vein disease is a condition associated with varicose transformation of ovarian veins and in pelvic vein plexuses with development of pelvic congestion syndrome. The main manifestation of this pathological state is chronic pelvic pain [13-17]. Phlebologists name varicose vein disease with different terms: pelvic varicose disease, pelvic venous insufficiency, pelvic venous pathology, lower limb varicose vein disease, pelvic congestion syndrome. This diversity of terminology is the evidence of a unified view on etiology, patogeny, diagnostics and treatment of this disease. As a consequence of the absence of unified diagnostics criteria there occur mistakes in disease diagnostics and in choice of therapeutic approach [18-22].

Expediency of surgical intervention with varicose transformation and superficial venous line valve insufficiency is not doubted by surgeons. At the same time, presence of pudendal, gluteal or lateral thigh varicose veins combined with gonadal, parametrial, uterine vein distensibility evokes legitimate questions in a clinician: will extirpation of perineum and lower limb veins not hinder venous drainage in the lesser pelvis and not cause a disease reoccurrence; should any intervention in the intrapelvic veins be carried out and which will be the succession of treatment procedures when there is a combination of pelvic vein and lower limb vein pathologies; is it possible to resort to vulvar vein obliteration [23-25].

***The main aim.*** To reduce the lower limb varicose vein reoccurrence frequency in women with pelvic congestion syndrome.

### **Materials and Methods**

The result of the analysis of operative therapy of 62 ill with chronic venous insufficiency (classes 3–4–5 by international CEAP Classification) was conducted. All the surgical interventions were carried out in a university hospital of the Semey Medical University in 2017–2019. Age of the patients: 22–48; the average age of the ill  $38 \pm 3.2$  years.

All the patients were divided into 2 groups depending on an operating method that has been introduced.

- The first group (the main one) — 32 patients — 51.6%. Dissection of incompetent communicating veins of the lower extremities was performed according to the proposed experimental method of the clinic. Selective dissection of the no-functional communicating vein was performed with the

isolation and preservation of the artery accompanying the communicating vein. In 12 cases (37.5%), this condition was accompanied by a syndrome of venous congestion of the small pelvis.

- The second group consisted of 30 (48.4%) patients who underwent the procedure by the traditional method. Among this group, pelvic venous congestion syndrome was detected in 10 cases (33.3%).

In order to establish a diagnosis and choose a treatment mode a diagnostic complex including 3 stages has been designed.

- ✓ I stage: clinical examination with a completion of functional venous tests: general clinical examination of the ill, standard laboratory assessment methods. Functional venous tests were carried out according to the classical methods of detection of blood reflux, its localization, communicant vein state, deep vein patency (Figure 1.).

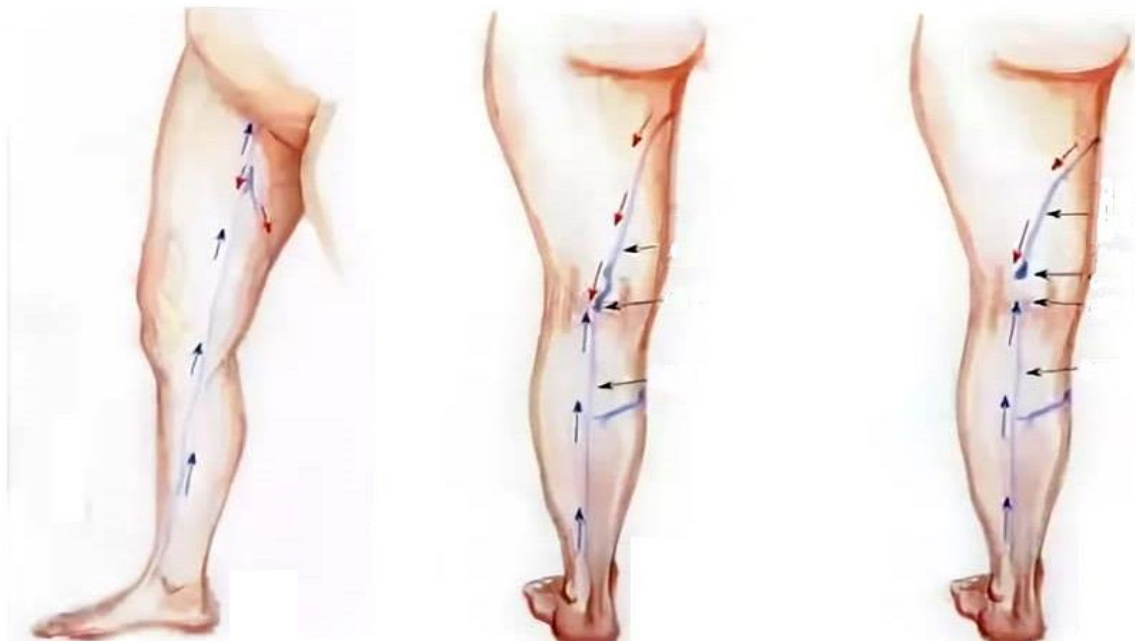


Figure 1. identification of blood reflux, localization, state of communicating veins and marking .

- ✓ II stage: diagnosis of pathological vein reflux with the help of noninvasive diagnostics techniques: ultrasonic Doppler examination, color duplex angiography (Figure 2.).

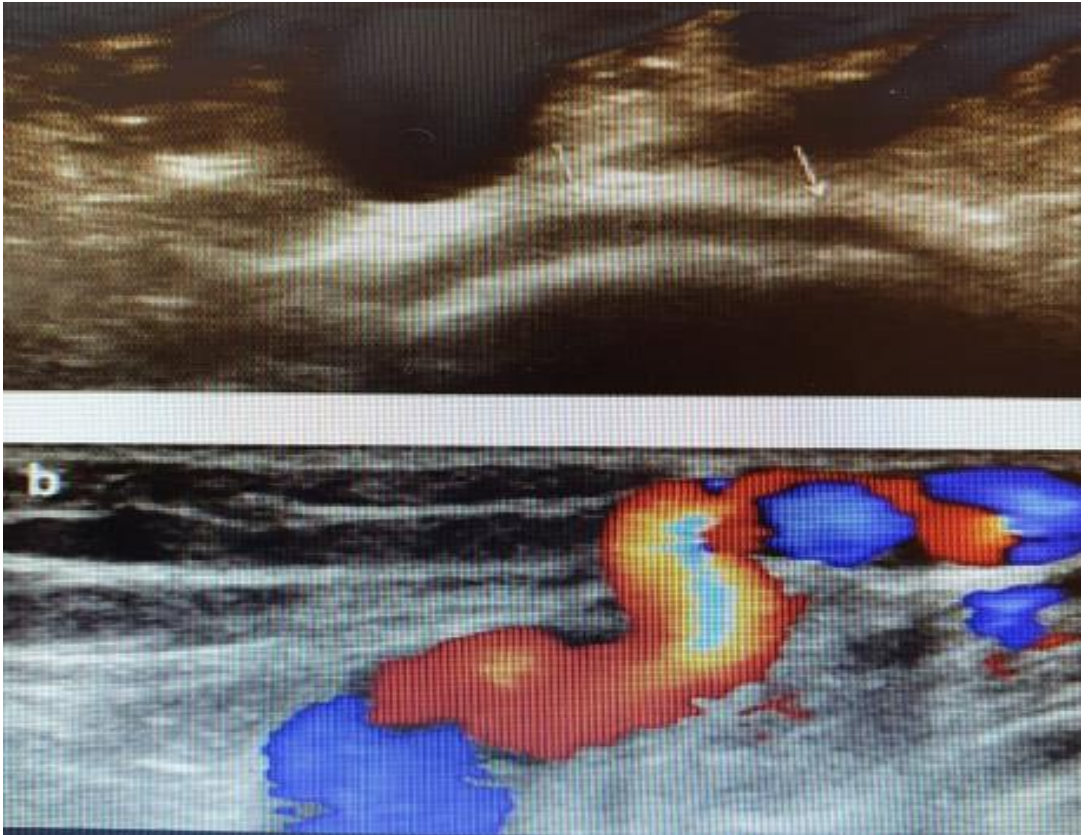


Figure 2. is an ultrasound Doppler ultrasonography of the lower limb veins. The arrow indicates communicating vein failure with pathological reflux.

- ✓ III stage: in questionable cases contrast phlebography was employed (Figure 3).

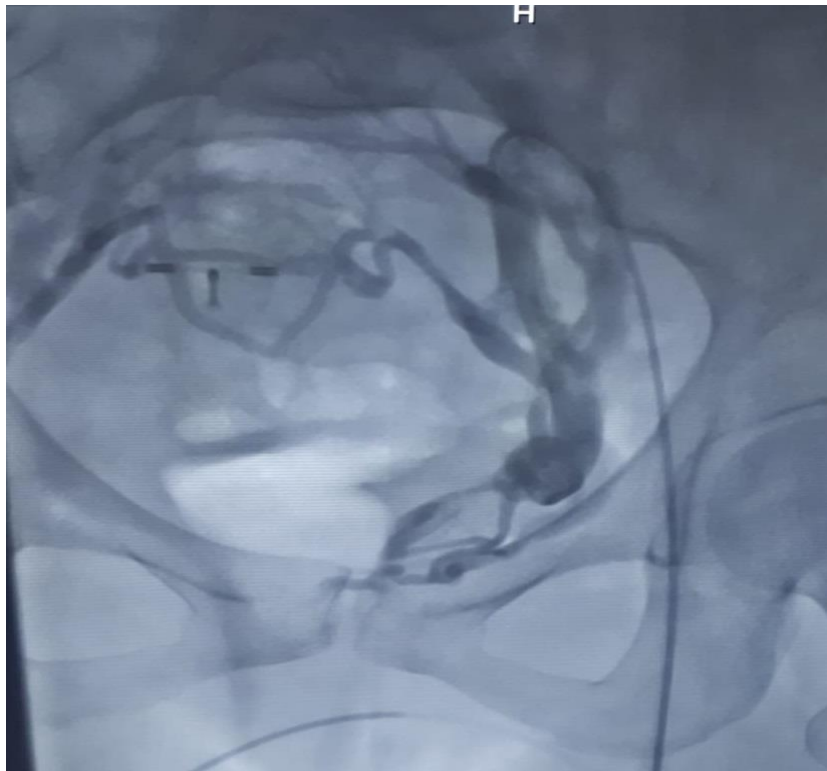
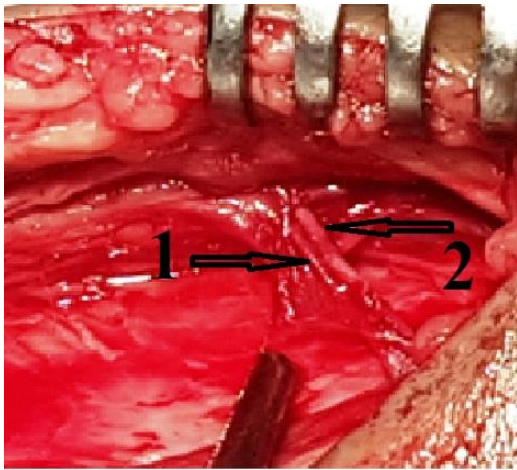


Figure 3 - phlebography where there are pelvic varicose veins, which is the cause of reflux and recurrence of varicose veins of the lower extremities.

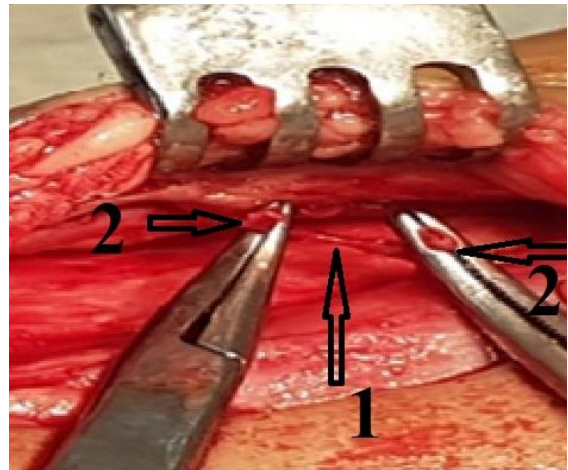
#### **Technique of surgical intervention in the main group**

Surgical approach to the correction of chronic venous insufficiency of the lower limbs in the main group included selective desecation of the insufficient communicating vein with separation and preservation of the artery accompanying the communicating vein (Figures 4, 5, 6).

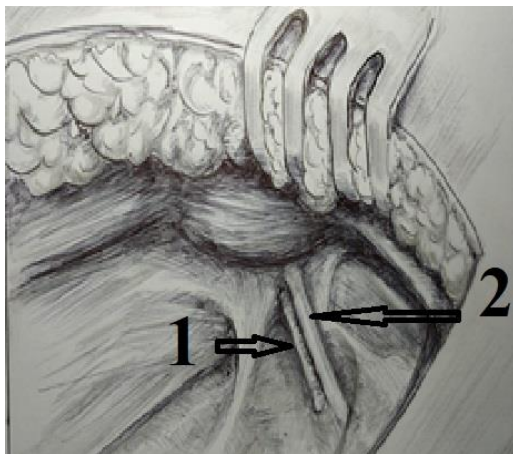
The operation was performed under aseptic conditions in the operating room under general anesthesia (endotracheal anesthesia). After an incompetent perforating vein was detected, a small incision of 5-6 cm was made in its projection. Then above or subfascially, we find the incompetent communicating veins, we separate the adventitial layer of the vein visually in the form of an "open shirt", we bypass the vein with a dissector and perform two ligatures, tie the vein and cross it with scissors between ligatures with preservation of blood flow in the artery.



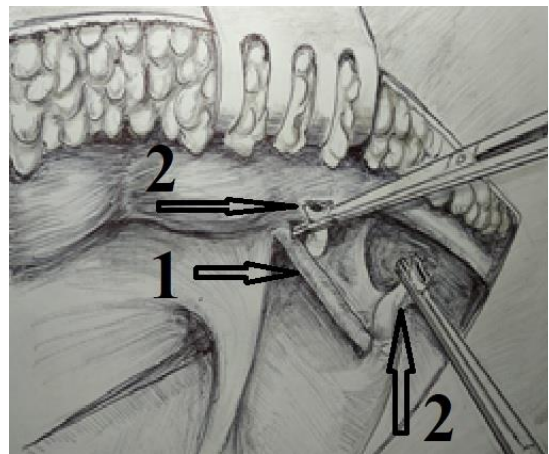
(a) 1. Arteries accompanying the communicating vein  
2. The incompetent communicating vein



(b) 1. Preserved artery accompanying the communicating vein  
2. Dissection of the failed communicating vein



(a) 1. Arteries accompanying the communicating vein  
2. The incompetent communicating vein



(b) 1. Preserved artery accompanying the communicating vein  
2. Dissection of the failed communicating vein

Figure 4 - Dissection of an incompetent communicating vein with preservation of the accompanying artery.

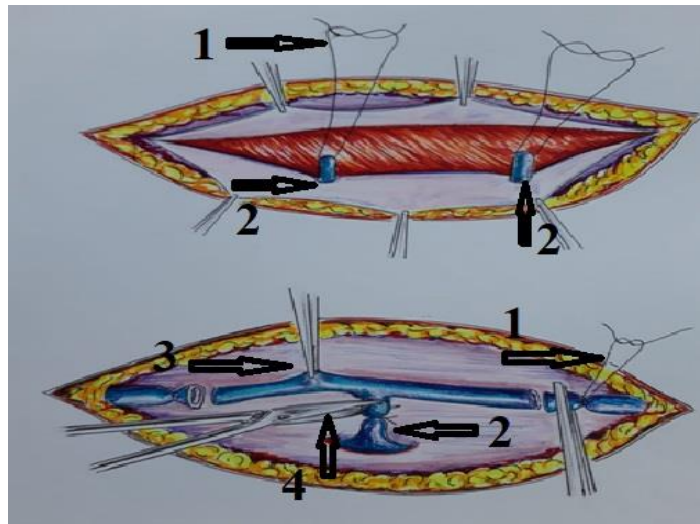


Figure 5 - Dissection of an incompetent communicating vein with preservation of the accompanying artery. 1. - Ligature. 2 - Insolvent communicant vein. 3 - Forceps. 4-Scissors.

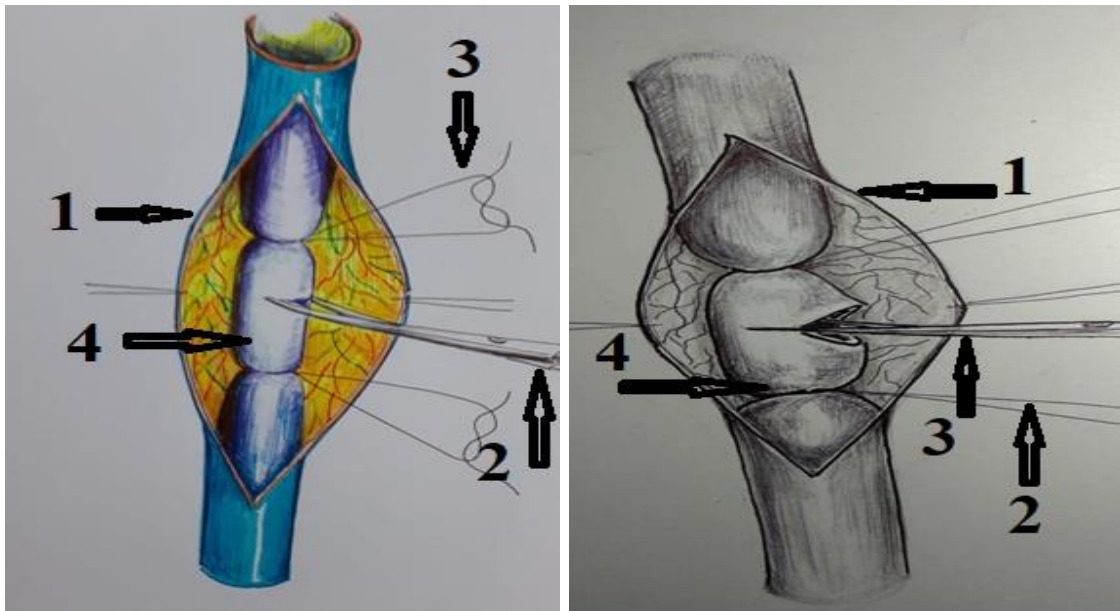


Figure 6 - Dissection of an incompetent communicating vein with preservation of the accompanying artery. 1 - Adventitial layer of the vein in the form of an "open shirt". 2-Scissors. 3- Ligatures. 4-vein.

***Surgical correction of pelvioperianal reflux***

Surgical correction of pelvioperianal reflux in 6 (50%) patients was performed through phlebectomy in perineum and on a thigh. Varicose veins of these localizations were maximally mobilized before they “entered” soft tissues of the pelvic area (vulva, perineum, gluteal area).

***Surgery on gonadal veins***

Open extraperitoneal resection of the left gonadal vein in 3 (25%) patients was conducted with endotracheal anesthesia, approaching from the left iliac area. After a skin incision of 5–6 cm was made, aponeurosis of the abdominal external oblique muscle was exposed, then the muscle mass was parted by blunt dissection and thus a retroperitoneal access was formed. While the left gonadal vein was being mobilized and resected, proximal and distal segments of a distal vessel were intersected and ligated. The incisional wound was sutured layer by layer with interrupted stitches.

***Lesser pelvis vein embolization***

Lesser pelvis vein embolization was considered to be an alternative to perineal phlebectomy. In order to assess how effective this therapeutic method is for the patients with combined pelvic and lower limb vein transformation—5 (41.6%)—the method of vulvar varicose vein disease with a help of a “Siemens” angiograph and application of synthetic emboli was used.

The research helped assess the frequency of early complications after surgical intervention, varicose vein disease reoccurrence and severity of its course according to the russified varicose vein disease severity (VCSS) inquirer [26].

***Statistical analysis***

Degree of frequency indices difference was determined with the help of two-tailed Fisher’s exact test (t). Comparison of the indices of VCSS was carried out in compliance with Mann-Whitney test. The analysis was conducted with the SPSS 20.0 software package.  $T < 0.05$ ,  $p < 0.05$  were accepted as a criteria for statistical significance.

***Results***

According to our data, 12 (19.3%) ill suffered from lower limb chronic venous insufficiency combined with pelvic congestion syndrome. Clinically they manifested in coital and postcoital pains—7 cases (58.3%), heaviness and discomfort in the hypogastrium—8 (66.6%), vulvar varicose vein disease—3 (25%). Asymptomatic course of the disease was observed in 4 female patients (30%). Clinical manifestation of pelvioperianal reflux was observed in varicose veins of the externalia, perineum, lateral and inner surface of the thigh. This localization of varicose veins was discovered in 4 (30%) patients.

Dissections of an incompetent communicant vein were carried out according to an experimentally developed method of the clinic of Semey Medical University (Figure 1).

The patients who were administered traditional operative therapy, experienced the following complications at the early post-surgery stage:

- subcutaneous haematoma—8(19%);
- ecchymoses 3(7%);
- limb swelling 12(28%);
- skin necrosis 2(4.7%).

After the experimental method developed by the clinic of Semey Medical University was used, post-surgery complications were observed more rarely:

- subcutaneous haematoma—2(4.7%);
- limb swelling 1(2.3%);
- skin necrosis and ecchymoses were not observed.

Table 1 presents the analysis results on varicose vein disease severity obtained with a VCSS inquirer depending on a group of the examined and duration of the post-surgery period.

Before the surgery no significant differences between the groups, according to the results of the VCSS inquirer, were detected. One observes a slightly higher intensity of symptomatology when SPVC is present. No significant differences at the 1 month examination were observed either.

However, in 6 months there was discovered a tendency to improvement of indices in all the sub-groups, although it was practically uniform in the sub-groups of the main and comparison groups without SPVC. Dynamics in the sub-group of the comparison group with SPVC abruptly stopped compared to the main group. The differences of the indices turned out to be significant ( $p=0.028$ ).

Later dynamics had been improving, at least, until 12 months after the surgery for all except the women with SPVC who were treated traditionally. In this case a tendency to growth has been observed, which evidenced deterioration of functional state of the lower limb venous system. Differences between the median values in respective groups reached 51.6% ( $p=0.011$ ).

Study of the results of the conducted surgical interventions in a long term showed satisfactory results for both observational groups. In the control group long-term outcomes were studied only for 22 out of 30 operated patients (66.6%). The following results were obtained:

- excellent — 5 patients (22.7%);
- good — 9 patients (40.9%);
- satisfactory — 3 patients (13.6%);
- unsatisfactory — 5 patients (22.7%).

Yet, long-term outcomes for the patients of the experimental group were studied in 30 out of 32 cases (93.8%):

- excellent — 18 patients (93.8%);
- good — 9 patients (30%);
- satisfactory — 3 patients (10%);

Differences in result outcomes of the patients of the control and experimental groups were statistically significant ( $p < 0.001$ ).

## **Discussion**

Operative treatment of lower limb varicose vein is often based on complex traumatic surgeries with a high post-surgery complication risk. Respectively, contemporary phlebology often faces numerous unsolved problems, both in diagnostics and in operative therapy of lower limb chronic venous insufficiency. Generally accepted tactics of operative therapy stipulates that vertical and horizontal refluxes, which are the main ethiopathogenetic factor of subcutaneous vein varicose transformation development, are eliminated.

Surgical removal of the great saphenous vein, its sclerotherapy, radio or laser ablation of the vein lumen and tributaries, as well as stipulates upper reflux elimination. Disconnection of superficial and deep venous systems stipulates elimination of the lower reflux and is carried out through dissection of incompetent communicant veins according to Kokketh or Linton or according to their modification (ligation; clipping; coagulation; sclerotherapy) [4, 11].

All the methods are performed disregarding morphofunctional interrelation of the elements, incompetent communicant veins, which contribute to histotrophic nutrition in the area of trophic changes.

According to A. I. Golovinskiy's data, arteries, supplying blood to artery and vein walls, join creating along the wall of the vessels para-articular and para-venous beds, which participate in collateral circulation. During selective arteriography of a shin Karpenko et al. discovered a net of thin arteries in an ulcer area. Studying perforators, Poyarkov discovered that each of them contained two or three venous and one or two arterial trunks [25, 27–28].

The method of lower limb incompetent communicant vein dissection offered by us surmises selective dissection of incompetent vessels with detachment and

preservation of the artery accompanying the communicant vein [29-30]. The use of the proposed method makes it possible to eliminate horizontal reflux as the main factor of venous hypertension and blood stasis in the zone of trophic disorders. The accompanying artery and nerves are preserved. Passing in the vein adventitious layer. The method prevents feeding and innervation disturbances in the basin of the incompetent communicating vein, thus preventing early postoperative complications in the form of marginal necrosis of the skin flap of the trophic disturbance zone.

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### **Conclusions.**

1. The proposed experimental method of operative therapy of lower limb varicose veins with selective dissection of an incompetent communicant vein and detachment and preservation of an accompanying artery prevents development of haematomas, reduces post-surgery swelling and skin necrosis in the area of intervention.

Reduction of early post-surgery period complications improves the quality of life of operated patients.

2. Perineal phlebectomy is necessary when there are varicose vein conglomerations on externalia if their diameter, according to US-angiostaging, exceeds 5 mm.
3. Lesser pelvis vein embolization is expedient as a method of surgical therapy in patients with pelvic congestion. Its reoccurrence, according to our data, amounts to 11.3%.
4. Combines application of the developed method of communicant vein dissection with elimination of reasons of SPVC allows to significantly improve late fate for female patients with a combination of lower limb varicose vein disease and pelvic congestion syndrome in a long term.

### **Acknowledgments**

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### Highlights

- communicant vein dissection as a part of varicose vein disease treatment;
- the propose of the innovative technique of the surgery varicose vein disease treatment;
- the achievement is the lower percentage of post-surgery complications;
- the proposed method has better results for patients in a long term.

### Figure captures

**Figure 1.** The surge manipulations in the declared experimental operation

**(a)** 1.Arteries accompanying the communicant vein; 2. The incompetent communicant vein.

**(b)** 1. A preserved artery accompanying the communicant vein; 2. Dissection of the incompetent communicant vein.

Table 1 - Results of the analysis of the severity of varicose veins before and after surgery, depending on the group of examined

Terms of examination	Groups and subgroups							
	basic, n=32				comparison group, n=30			
	without small pelvis veins congestion, n=20		with small pelvis veins congestion, n=12		without small pelvis veins congestion, n=20		with small pelvis veins congestion, n=10	
	Me	Q	Me	Q	Me	Q	Me	Q
Before the operation	11,3	9,9/ 12,8	14,9	12,8/ 16,2	10,9	9,5/ 12,3	14,7	12,7/ 16,0
1 month	10,8	9,2/ 12,2	13,3	12,0/ 14,7	11,2	9,9/ 12,9	15,4	13,2/ 17,1
6 month	6,2	5,9/ 6,7	<b>9,5</b>	<b>8,7/ 10,4</b>	7,7	<b>7,0/ 9,1</b>	<b>13,0</b>	<b>10,9/ 14,1</b>
12 month	5,9	5,3/ 6,4	<b>9,3</b>	<b>8,6/ 10,1</b>	7,5	6,9/ 8,6	<b>14,1</b>	<b>12,8/ 15,5</b>

ote: significant differences between the corresponding subgroups of the main group and the comparison group are highlighted in bold