



# CLASSIC SAPHENEKTOMY OR ENDOVENOUS LASER COAGULATION OF VARICOSE VEINS: VALUATION OF POSTOPERATIVE PERIOD

V.B. Goshchynsky, R.S. Kokhan

Department of Surgery Educational-Scientific Institute of postgraduate education of Ternopil State Medical University, Ukraine.

**Abstract: Summary.** We carried out comparative characteristics of the flow of the postoperative period after performing classic saphenectomy (189 patients) and endovenous laser coagulation of varicose veins (201 patients) by the following indicators: suppurating wounds, pain syndrome, limforrea, bruises, oedemata, isolated distal thrombosis, temperature, duration of antibiotic treatment, duration of the operation, quantity of hemorrhage, duration of hospital stay. By all quantitative and qualitative indices, endovenous laser coagulation of varicose veins surpasses the classic saphenectomy.

**Key words:** endovenous laser coagulation, classic saphenectomy, postoperative period

## Introduction

Within total sick rate the share of lower extremity of varicose veins (LEV) is almost to 5 %, and the LEV percentage among lesions of peripheral blood-stream is 30-40 % (E Iliuhyn, 2004). 20-55 % of the population are ill with LEV in developed countries (V Hoschynskyy, 2012; Y Shevchenko, 2013; Fowkes F.G.R., 2007; Nelzen O., 2007), but the prevalence of the disease is among females - 25-73 %, and in the male population - 12-40 % in the US (B Disselhoff, 2007). About 90 thousand operations per year are carried out to treat VV in the UK, 25 % of them are associated with its relapse (Fowkes F.G.R., 2007). According to the latest data, LEV is detected in 20-55 % of the population in the developed countries (V Hoschynskyy, 2012; Y Shevchenko, 2013; Fowkes F.G.R., 2007), and according to international research programme «Vein Consult Programme» - 16 % are diagnosed with it. [E Shaydakov, 2013, Y Shevchenko, 2013].

According to the Ukrainian consensus on the LEV treatment (2005) 26-28 % of females and 10-20 % of men of working age have chronic venous insufficiency. Not less than 1-3% of the allocated budget funds for health care in developed countries is spent on the treatment of patients with venous pathology. The high level of economic costs is due to the constant increase in the number of cases of VV in young people, and reduction or loss of the ability to work in the event of complications (E Shaydov, 2011; M Vuylsteke, 2009; Evans C.J., 1999; Hayden A., 2011, Nelzen O., 2007; Wali M.A., 1998).

Proceeding from the above, timely and qualitative surgical treatment of LEV is an actual problem of modern surgery. At the same time, the debate about the choice of a method of operative intervention is continued. This is due to the fact that new, innovative technologies that have expanded the nominal range of operations were introduced in recent years in surgical practice. Unfortunately, this situation creates some problems for the practicing surgeons in the selection particular type of surgery. To solve this problem, an objective assessment of post-operative results is necessary.

**Purpose of the study.** To conduct a comparative assessment of the postoperative period after the classic saphenectomy and endovenous laser coagulation of veins in order to optimize the choice of surgical treatment of varicose veins of the lower limbs.

**Materials and methods.** Scientific work is based on materials of examination of 189 patients, for whom classic saphenectomy was done - group 1, and 201 patients), were operated by technology of endovenous laser coagulation of veins (ELCV) - group 2, during 2013-2015. Studies were carried out in accordance with the

principles of the Declaration of Helsinki (World Medical Association. WMA Declaration of Helsinki - Ethical Principles for Medical Research Involving Human Subjects. [Http://www.wma.net](http://www.wma.net). 2008). In addition, all patients were informed about the methods of surgical interventions. With consideration the received information patients gave written informed consent for the operation. All patients were operated in the Phlebology Municipal Centre on the basis of the surgical clinic of Educational and Research Institute of postoperative education. The average age of patients was  $45 \pm 6,7$  years old, among them: women - 254, men - 136. On the basis of our classification 157 patients were operated with the main LEVV form and 233 – with the mixed form [1]. According to the CEAP classification 129 patients were operated with C2, and 77 and 184 patients respectively with C3 and C4.

Typical saphenectomy was conducted in a combined way, which included cross-ectomy, bandaging tributaries of the great subcutaneous vein and its stripping on the hip by Bebbcock method (main form LEVV). While using EVLT similar technology was used. EVLT was performed with Ukrainian portable, high-intensity semiconducting (diode) laser device «Ліка – хірург» ("Face - the surgeon"), which was produced by Cherkassy SPE "Photonics Plus" wavelength -1470 nm, power 10 - 12.5 watts. The position of the light conductor was controlled by a red pilot light or intraoperative ultrasound diagnostics. In cases of LEVV mixed forms operations on collateral veins were supplemented with microphlebectomy by Muller (103 patients) or sclera catheter therapy (130 patients) and a solution of Sclerovein. During EVLT conduction, Klein (J. Klein) solution was used to neutralize the impact of thermal laser subcutaneous tissue. In the case of incompetent perforating veins over-fascial bandage and their endoscopic subfacial dissection was used. EVLK without cross-ectomy (with consistency of ostial valve) was done for 35 (17.4 %) patients, and at this time the end-face was 1.0 - 1.5 cm from the sapheno-femoral junction and was controlled by ultrasound (US). Before surgery all patients were done estimation of functional status of deep and superficial venous system with ultrasound machine Vivid 3 ("General Electric", USA), transducer with frequency of 5-10 MHz, with a standard software package of the indicated company for venous system examination. Ultrasound diagnostics of the venous system was performed in the afternoon, in vertical and horizontal position of the patient. At the time of this examination presence of blood flow in the veins, the diameter and form of the vein lumen, wall thickness, homogeneity and elasticity of the valves, their functional state during hydrostatic samples taking, the presence of blood reflux, length of the retrograde flow of blood through the venous lines and its extension to anatomical segments, and the state of the saphenofemoral and saphenopopliteal anastomoses were evaluated. Ultrasound was used in the postoperative period to identify complications.

The evaluation of the postoperative period in the first and second group of patients was carried out according to the following criteria: wound abscess, pain syndrome, lymphorrhea, hematomas, swelling, isolated distal thrombosis, temperature reaction, duration of antibiotic therapy, duration of surgery, the amount of blood loss, length of in-hospital treatment.

For pain evaluation Verbal Descriptor Scale (Gaston-Johansson F., Albert M., E. Fagan et al., 1990) was used. The verbal rating scale allows evaluating the severity of the pain intensity by verbal qualitative assessment. One of the features of verbal rating scales is that verbal characteristics of descriptions of the pain can be presented to the patients in a random order. When using a verbal descriptive scale it is necessary to find out whether the patient feels any pain at the moment of examination. If there is no pain, his condition is estimated at 0 points. If he is experiencing pain, the pain intensity is to be determined. According to this scale, six possible variants of pain assessment: 0 - no pain, 2 - mild pain, 4 - moderate pain; 6 - severe pain; 8 - very severe pain, 10 - unbearable pain.

Proceeding from the fact that subcutaneous haemorrhage and hematomas usually looked like an ellipse, formula of an ellipse area calculation is used to calculate their area. The area of the ellipse is equal to the length of the major and minor axes of the ellipse on the number Pi (3,14) -  $S = \pi ab$  where S - area of the ellipse;  $\pi$  - pi (3.14); and - the length of the semi-major axis; b - the length of the semi-minor axis. Intraoperative blood loss was measured by weighing the tissue before and after taking into account that 1 ml of blood weighs 1 gram.

Data obtained during examination were treated by variation statistics with usage Student's t-test Fisher. The arithmetic mean of the total sample (M), an arithmetic error of the mean (m) were calculated. Significant difference (p) was determined between the indicators of 1 and 2 groups. This difference of mean was recognized as statistically significant at a significance level of 95 % ( $p < 0.05$ ).

**Results and its discussion.** After the analysis of indicators of the postoperative period (Table 1) draws the attention to the presence of *wounds abscess* in 8 (4.2 %) patients and *lymphorrhea* in 9 (4.8 %) patients

(group 1). We believe that this process is interconnected, and provoking factor of wounds abscess is *lymphorrhea* as a consequence of damage to the lymph collectors in the upper third of the femur and tibia.

**Table 1. Postoperative period indicators in patients undergoing classic saphenectomy and EVLT.**

Postoperative period indicators	1 group of patients n = 189	2 group of patients n = 201
Wounds abscess %	8 (4.2 %)	0
Pain syndrome in points	0,21±0,1*	2,4±0,3*
Lymphorrhea in %	9 (4,8 %)	0
Hematomas in sq. cm	43,4 ± 1,2 *	2,5±0,1*
Swelling in %	11 (5,8 %)	5 (2,5 %)
Deep venous thrombosis in %	5 (2,5 %)	1 (0,5 %)
Dissection length in cm.	23±0,4*	8,0±0,9*
Temperature (1-3 days)	37,5±0,3*	37,1±0,2*
Haemorrhage in ml	82,3±2,4*	9,2±1,3*
Nervous trauma, paresthesia	7 (3,7 %)	2 (1%)
Antibiotic therapy in %	57,2	10,7
Surgery duration in min.	50,4±2,1*	38,2±1,6*
Duration of staying in hospital	7,2±0,3 *	1,5±0,4*
*p< 0,05		

Intensity of pain in patients undergoing EVLK was (0,21 ± 0,1) points. It should be noted that 11 (5.4%) patients complained on the hip pain. Among patients who underwent classic saphenectomy, 106 (56.1%) paid attention to pain in the projection of vein removal. Severity of pain was (2,8 ± 0,3) points (p <0.05).

We also observed a significant difference in the areas of haemorrhage and hematoma. After the EVLT conduction, hematomas in the great saphenous vein were absent. In this group of patients there were minor hematomas (2,5 ± 0,1) cm<sup>2</sup> in the projection of additional cuts, where microphlebectomy was performed. At the same time, after the classical classic saphenectomy hematomas in the projection of the great saphenous vein in the thigh and calf area which reached (34,1 ± 1,3) cm<sup>2</sup> (p <0.05) were detected. Blood loss after EVLT was minimal – (9,2 ± 1,3) ml, and in the first group of patients, it was more significant – (82,3 ± 2,4) ml (p <0.05), mainly due to canal of the great saphenous vein.

By the time spent on the operation, the difference between the first and second group of patients was also noted, respectively (70,2 ± 8,4) m and (58.3±4,7) m, (p <0.05). We believe that shorten of EVLK was failed due to its technical features and to minimize the length of skin incisions.

An important indicator in terms of beauty is the length of skin incisions. The introduction of the puncture method of EVLT (laser fiber through the introduction of the great saphenous vein puncture in the medial malleolus) and the rejection of cross-ectomy of solvency ostial valve when the valve of the great saphenous vein. 17,4 % of patients gave possibility to reduce the length of skin incisions (including microphlebectomy)

to  $(8,0 \pm 0,9)$  cm, whereas after the classical saphenectomy length of skin incisions was  $(23 \pm 0,4)$  cm ( $p < 0.05$ ).

When comparing the length of hospital stay a significant difference in bed days between the first and second group of patients was detected. So, after EVLT hospital stay was  $(1,5 \pm 0,4)$ , and after performing classical saphenectomy it was  $(7,2 \pm 0,3)$  ( $p < 0.05$ ). This difference is due to injury rate of the last, the presence of hematomas, edema, infiltrates, which required additional physical therapy. According to other indicators (reaction temperature, duration of the use of antibiotic therapy, deep vein thrombosis) differences between the two groups of patients (tabl. 1) are also marked.

**Conclusions.** Thus, after performing the EVLT significant reduction of postoperative complications and a more favourable postoperative course was noted. On this basis, it can be argued that the EVLT excels classic saphenectomy both functionally and while concerning cosmetic terms.

#### REFERENCES:

1. A Belyaev. Property damage of the the wall of venous vein of endovasal electro coagulation of the great saphenous vein. *Flebology*. 2013;7 (1):36-41.
2. V Hoschynskyy. The structure of postoperative complications after the endovenous laser coagulation of varicose veins of the lower limbs. *Bulletin of scientific research*. 2012;2:121-122.
3. E Iliuhyn. Substantiation of modes of application of endovascular techniques in the surgical treatment of varicose veins. Extended abstract of PhD dissertation. 2004. 20 p.
4. E Shaydov. Comparison of laser wavelength of 970 nm and 1470 in the simulation laser obliteration of the veins in vitro. *Flebology*. 2011;4:23-29.
5. E Shaydakov. Optimum modes of endovenous laser obliteration with a wavelength of 970, 1470 and 1560 nm: a retrospective longitudinal cohort multicenter study. *Flebology*. 2013;7 (1):22-29.
6. Y Shevchenko. Selecting the optimal radiation parameters for the 1470 nm endovenous laser obliteration. *Flebology*. 2013;4:18-24.
7. B Disselhoff. Endovenous laser ablation: an experimental study on the mechanism of action. *Phlebology*. 2008;23(2):69-76. doi:10.1258/phleb.2007.007038
8. M Vuylsteke. Endovenous laser treatment: a morphological study in an animal model. *Phlebology*. 2009;24(4):166-175. doi:10.1258/phleb.2009.008070
9. Department of Health and Social Security. Hospital episode statistics 2002/2003. – London- 2003.
10. Evans C.J. Prevalence of varicose veins and chronic venous insufficiency in men and women in the general population: Edinburg vein study / C.J. Evans et al. // *J. Epidemiol. Community Health*. – 1999. – No 53. – P. 149-153;
11. Hayden A. Complications following re-exploration of the groin for recurrent varicose veins / A. Hayden, J. Holdsworth // *Ann. R. Coll. Surg. Engl*. – 2001. – No 83. – P. 272-273.
12. Fowkes F.G.R. Epidemiology of venous disorders. Venous and lymphatic diseases / F.G.R. Fowkes, J.J. Bergan, C.K. Shortell // *Venous ulcers* / Eds. J. Bergan et al. – San Diego: Acad. Press, 2007. – P. 15-25.
13. Nelzen O. Epidemiology of venous ulcers / O. Nelzen, J.J. Dergan, C.K. Shortell. – San Diego: Acad. Press, 2007. – P. 27-41.
14. Wali M.A. Recurrent varicose veins / M.A. Wali et al. // *East Afr. Med. J*. – 1998. – Vol. 75. – P. 188-191.

Address for correspondence:

Kokhan Roman – clinical resident, an applicant for degree of Candidate of Medical Sciences, Department of Surgery Educational - Scientific Institute of postgraduate education of I.Ya. Gorbachevsky Ternopil State Medical University

Vilhova St. 6/45

46008 Ternopil

Ukraine

E-mail: [roman.kohan@meta.ua](mailto:roman.kohan@meta.ua)