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ABSTRACT

of the dissertation for the degree of philosophy doctor
on medicine

PROPHYLAXIS OF CHRONIC VENOUS INSUFFICIENCY IN THE LOWER EXTREMITIES, NEAR AND LONG-TERM RESULTS OF ENDOVENOUS LASER ABLATION IN PREGNANT WOMEN

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IMTRODUCTION

The relevance of the subject and the level of elaboration. Chronic venous insufficiency of the lower extremities (CVI) is one of the widespread diseases among the population, and it is more common among women. Among the symptoms of CVI (Chronic Venous Insufficiency), varicose veins of the lower extremities (VVLE) are considered one of the most prevalent clinical signs during preg-nancy.[1;2;3]

Many sources mention different approaches for prevention and treatment of CVI. Throughout the world two main treatment methods are widely used.

During conservative drug treatment, various tablets that increase the tone of the venous wall and support the function of the valve apparatus, ointments that alleviate the symptoms of CVI, and various physical exercises are applied in the early stages of the disease.[4;5] In patients with severe forms of CVI, surgical intervention is performed through high stripping of the great saphenous vein, removal of varicose veins, and ligation of perforator veins. Recently, due to the widespread adoption of minimally invasive procedures, endovenous laser ablation (EVLA) of the great saphenous vein is performed. Although the results of several studies have shown EVLA to be more effective, some contradictory opinions still remain regarding the comparison of open or minimally invasive intervention

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[1]Bayramov, N.Y. Cərrahi xəstəliklər /– Bakı: Elektron nəşr - ISBN: 978-9952-536-23-2 - 2019. - 20162s.

[2] Qasımov N.A., İsmayılova N.F., Fəttah-Pur V.Ə. Lazer ablasiya olunan qadınlarda doğuşdan sonra varikoz xəstəliyi // - Bakı: Cərrahiyyə jurnalı – 2023. №2, - s.11-15.

[3]Qasımov N.A., Əliyev M.S., Fəttah-Pur V.Ə., Əsgərov İ.M. Aşağı ətraf venalarının varikoz xəstəliyində cərrahi müalicənin inkişaf mərhələləri və müasir aspektləri // - Bakı: Cərrahiyyə jurnalı - 2018. №3, - s.86-90.

[4] Eberhardt, R. T. Chronic Venous Insufficiency / R.T. Eberhardt, J.D. Raffetto – Text : direct // Circulation. 2014. Vol. 130. № 4. – P. 333-346.

[5] Makedonov, I. Prevention and Management of the Post-Thrombotic Syndrome / I. Makedonov, S.R. Kahn, J.-P. Galanaud – Text : direct // Journal of Clinical Medicine. 2020. Vol. 9. № 4. – P. E923.

in terms of the occurrence of recurrences in the near and distant postoperative periods.[6,7,8].

The selection of the treatment method for CVI during and after pregnancy requires more careful approach.[9,10] In our republic, no research has been conducted that embodies the details of the use of compression hosiery for the purpose of preventing CVI in pregnant women. Another nuance was to determine how effective compression is in the progression of CVI in pregnant women with and without varicose veins during pregnancy. No clinical studies that reflect the recurrences of varicose disease (VD) during subsequent pregnancies and after childbirth in pregnant women after EVLA or phlebectomy have been found in the local and foreign literature we have researched, the dynamics of clinical manifestations, or a comparative characterization of the use of compression hosiery (intermittent, most days, permanent) in pregnant women for the purpose of preventing recurrent VD.

Thus, the prevention of complications of CVI in pregnant women and the prevention of recurrences of VD after previous interventions are one of the current problems of vascular surgery, necessitating new research and the application of innovative approaches in practice.

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[6]Abışov N.S, Zakirjayev E.J, Kərimov M.M, Abuşova G.N Result of endovenous radiofrequency thermal ablation with and without high ligation in comparisson with high liqation and stripping for treament of great saphenous varicose vein.Vascular without Borders. Cite des Congres – Lyon. France 2011.

[7]Kərimov M.M, Həsənov A.B Varikoz xəstəliyinin lazer cərrahiyyəsinin ilk təcrübəsi. Sağlamlıq jurnalı 2016, səh 46-49.

[8]Бокерия, Л. А. Оптимизация хирургического лечения больных с варикозной болезнью нижних конечностей / Л. А. Бокерия, М. В. Михайличенко, В. И. Коваленко // РМЖ. - 2015. - № 1. – с. 10-14.

[9] Saliba Júnior, O. A. Graduated compression stockings effects on chronic venous disease signs and symptoms during pregnancy // Phlebology. 2020. Vol. 35. № 1. – P. 46-55.

[10] Jain, B. K. Surgical intervention for varicose veins during pregnancy: Is it sensible? / B.K. Jain, D. Choudhary – Text : direct // Journal of Minimal Access Surgery. 2019. Vol. 15. Surgical intervention for varicose veins during pregnancy. № 3. – P. 277-278.

The object and subject of the study. Women who are in the risk group due to CVI in the lower extremities planning pregnancy and pregnant women who have undergone invasive intervention for VD were the object of the study. The subject of the study is the diagnosis and risk assessment of VD in the early stages in women planning pregnancy and pregnant women, the identification, prevention of recurrent VD in pregnant women who have previously undergone surgery for venous insufficiency, and the evaluation of the quality of life after pregnancy using the VCSS (Venous Clinical Severity Score) scale.

Then purpose of the study. Prevention of recurrences and improvement of the long-term outcomes of surgery during pregnancy in women who have undergone classical phlebectomy or EVLA for the prevention of CVI.

Objectives of the study:

1. Analysis of the approach of gynecologists working in various clinics in Baku to application of compression hosiery for the purpose of preventing and treating venous insufficiency in pregnant women;
2. To identify risk factors for complications of CVI during pregnancy in women with varicose veins of the lower extremities;
3. To study of the clinical effectiveness of using different classes of compression hosiery for the prevention of varicose veins Pregnant women with risk factors for developing CVI;
4. Comparative study of the frequency of recurrence and clinical symptoms, and complications during pregnancy in women who underwent EVLA or traditional phlebectomy, compa-rative analysis of the quality of life after childbirth according to the VCSS scale;
5. To determine the surgical tactics and the optimal period until the occurrence of pregnancy after surgery in women with varicose disease who plan to give birth in the future.

Methods of the study: 3 different cohorts were used for the study material in accordance with the goals and objectives of the research work. Initially, 113 gynecologists working in various clinics of Baku city were contacted with a questionnaire consisting of 32

questions. The second part of the material consisted of analyses of patients who applied for Doppler examination of the lower extremity veins during pregnancy, both with and without varicose veins. During each examination (at each visit), pregnant women were surveyed, a physical examination was performed, 3 dimensions of the lower extremities (diameters of the ankle, calf, and thigh) were measured, and a Doppler examination was performed. Laboratory indicators such as general and biochemical blood analysis, fasting blood glucose, and coagulation factors were studied. The clinical stages of CVI were determined using the CEAP (Clinical Etiology Anatomy Pathophysiology) classification. The severity of CVI was determined using the VCSS evaluation system. The third part of the material compared the number of recurrences, complaints, symptoms of CVI, and VCSS after childbirth in those who became pregnant after EVLA and open phlebectomies.

In order to determine the risk factors for CVI complications during pregnancy, the results of examinations of pregnant women with and without varicose veins were statistically processed based on Fisher's Chi-squared test for qualitative indicators.

Key provisions submitted for defense:

1. The methods of using compression knitwear in pregnant women by gynecologists in Baku were studied, and statistics on the approaches of doctors based on various criteria were compiled. Local tactics were compared with international guidelines and recommendations.
2. The effect of using compression stockings on the risk of developing complications of chronic venous insufficiency (CVI) and the progression of clinical symptoms was studied in pregnant women with varicose veins.
3. The clinical effectiveness of using different classes of compression stockings in the development of CVI was determined.
4. The incidence of recurrent varicose veins during pregnancy in women who underwent surgery with the traditional phlebectomy or EVLA method was determined, and the quality of life in the postpartum period was comparatively evaluated using the VCSS scale."

5. The surgical tactics and the optimal time period from surgery to the occurrence of pregnancy were determined in women with varicose veins who plan to have children in the future.

Scientific novelty of the study:

- The use of medical compression stockings for the purpose of preventing the progression of CVI during pregnancy was studied for the first time in our republic, and the clinical effectiveness of using different medical compression stockings in the prevention of CVI complications was evaluated.
- In women with varicose disease who plan to give birth in the future, the surgical tactics and the optimal period until the occurrence of pregnancy after surgery have been determined.

Theoretical and practical significance of the study:

1. As achieved results, significant points were revealed in the VCSS (Venous Clinical Severity Score) clinical evaluation based on the CEAP (Clinical-Etiology-Anatomy-Pathophysiology) classification of the development of CVI at various times during and after pregnancy.
2. Helped to differentiate the risk factors for the development of venous insufficiency in pregnant women who used and not used medical compression stockings and the indications for the use of various classes of compression stockings. The use of compression stockings allows for the prevention of further progression of the pathology at any stage of varicose disease;
3. Important recommendations have been identified for planning pregnancy and childbirth, in cases when surgery is required, in women with venous insufficiency in the lower extremities;
4. The results showing the minimization of recurrent VD during and after pregnancy will create conditions for the wider application of this minimally invasive method in women who have previously undergone surgical intervention with the EVLA method for varicose veins;
5. According achieved reslts the practical recommenfation will be prepared, scientific articles and theses will be written, and presentations will be given at conferences and seminars.

Approbation and application.

A number of results of the dissertation work were presented at the scientific-practical conference dedicated to the birthday of A. Aliyev (Baku: - 2024) and at the "72nd International Congress of the European Society for CardioVascular and Endovascular Surgery" (Istanbul: - 2024), and poster presentations were made at international conferences (Istanbul: - 2022, Tashkent - 2022, Antalya: - 2023, Istanbul: - 2024).

The initial discussion of the dissertation was presented and discussed at the meeting of the Department of Surgery of the Azerbaijan State Advanced Training Institute for Doctors named after A. Aliyev (February 26, 2025, protocol No.1) and at the Scientific Seminar under the Dissertation Council FD2.11 of the Azerbaijan State Advanced Training Institute for Doctors named after A. Aliyev (May 06, 2025, protocol No.4).

Publications. The main results of the research work have been published as 7 articles, including 2 in foreign journals, and 6 abstracts, including 5 in foreign publications; 1 local and 1 foreign conference presentation have been made. The published articles and abstracts correspond to the provisions of the dissertation. The journals in which the articles were published are in accordance with the list approved by the Higher Attestation Commission.

Name of the organization where the dissertation work was performed. The Dissertation work is conducted at the Surgical Clinics of the Azerbaijan State Advanced Training Institute for Doctors named after A. Aliyev and Istanbul NS Clinic.

The volume and structure of the dissertation work. The dissertation is printed on computer on 153 pages and consists of an introduction (12803 characters), 5 chapters (Chapter I: 55533 characters; Chapter II: 32052 characters; Chapter III: 16632 characters; Chapter IV: 42210 characters; Chapter V: 23594 characters), conclusion (30440 characters), results (2756 characters), practical recommendations (619 characters), bibliography, and abbreviations. The research work is illustrated with 6 tables, 8 diagrams, and 17 figures. The bibliography includes 132 sources, 13 of which are works by local scientists, and the rest are works by Russian and other foreign scientists. The total number of characters

in the dissertation is 216639 (excluding the table of contents, tables, figures and diagrams, bibliography, and abbreviations).

CONTENT OF THE WORK
MATERIAL AND METHODS OF THE STUDY

The study included retrospective and prospective materials. It was conducted on 262 pregnant women diagnosed with CVI between 2010 and 2021.

In correspondence with the tasks of the research work, the research materials were mainly divided into 3 parts. The first part of the materials consisted of doctors involved for research purposes among specialists in obstetric care services located in Baku. The second part of the materials consisted of 200 patients who applied for Doppler examination during pregnancy, both with and without varicose veins, at the Istanbul NS Clinic. The third part of the materials included the data of 31 patients who underwent endovenous laser ablation at the Istanbul NS Clinic and 31 patients who underwent open (traditional) surgical phlebectomy at the Scientific Surgical Center named after Academician M.A. Topchubashov. Totally, the main clinical part of the study is based on a comparative analysis of the results of examination and treatment of 262 patients.

The questionnaire contained 32 questions, and the doctors marked 1 answer accordingly. At the end, the doctors wrote information about themselves and confirmed the information with their signatures.

All 113 doctors who answered all the questions met the inclusion criteria and constituted the material for the analysis. Questionnaires of doctors who did not fully answer all questions or gave contradictory answers to reciprocal questions were excluded from the study[11]. The design of the clinical study was a multicenter

[11] Касумов Н.А., Исмаилова Н.Ф., Фаттах Пур В.А. Влияние использования компрессионного трикотажа на клинику хронической венозной недостаточности у беременных // - Tashkent: 2022 Abstract book Association of phlebologists of Uzbekistan Oktober 13-14,2022

cohort prospective observation, and in terms of its purpose, it was diagnostic and screening in nature. The average age of the doctors was 46.2±1.09 years, and their average work experience was 19.7 ± 1.09 years.

8% of the doctors had 1-5 years of work experience; 15.9% - had 6-10 years; 33.6% had 11-20 years; 25.7% had 21-30 years; and 16.8% had more than 31 years of experience. 19 of the doctors had a scientific degree, while the others were mostly engaged in practical activities. The number of those working in state hospitals was 50, from private hospitals - 23, and from women's clinics - 40 (Table 1).

Table 1. Distribution of doctors by work experience, qualification, and workplaces

Work experience		Qualification		Workplaces	
1-5 years, n	9	D.m.s and PhD.	13	State hospital	50
%	8,0%		11,5%		44,2%
6-10 years, n	18	Specialist doctors	4	Private hospital	23
%	15,9%		3,5%		20,4%
11-20 years, n	38	Assistant doctor	4	Women consultation	40
%	33,6%		3,5%		35,4%
21-30 years, n	29	Doctoral student	2		
%	25,7%		1,8%		
31 and more years, n	19	Practical doctors	90		
%	16,8%		79,6%		
Total	n=113; 100%		n=113; 100%		n=113; 100%

Note: D.m.s. – doctor of medial sciences; PhD. – Doctor of Philosophy in Medicine.

The second stage of study covered 200 pregnant women. Pregnant women have been divided into two groups with 100 women

in each group. In 100 women included in the control group, there was no varicose veins of the lower extremities (VVLE) and chronic venous insufficiency (CVI) before pregnancy. After becoming pregnant, symptoms and complaints characteristic of CVI appeared: edema, heaviness, fatigue, and pain in the lower extremities. However, no visibly varicose veins were observed. These pregnant women used compression hosiery during and after pregnancy.

The main group, consisting of 100 pregnant women, similarly included those who had no varicose veins in their lower extremities before pregnancy and who applied for examination during pregnancy. The difference from the control group was that in these pregnant women, CVI was detected against the background of varicose veins (VI) of the lower extremities during the second and third trimesters of pregnancy. They were prescribed compression stockings during pregnancy and after childbirth. Within the main group, despite the prescription of compression hosiery, there were those who did not wear it or did not use it regularly.

All pregnant women included in the main and control groups were examined 4 times: the 1st visit in the second trimester of pregnancy; the 2nd visit in the third trimester; the 3rd visit 2 months after childbirth; and the 4th visit 1 year after childbirth. During each visit, all pregnant women underwent Doppler ultrasound examination, and 3 measurements of the leg (circumference of the ankle, calf, and thigh) were taken.

100 pregnant women without varicose veins, in other words, without visibly varicose veins in their lower extremities, but who experienced edema, heaviness, fatigue, and pain (control group) were aged averagely 29.7 ± 0.51 years, the youngest of which was 20 years old and the oldest pregnant woman give birth at 43 years old. The number of first pregnancies was 52, and more than one pregnancy occurred in 48 women, with an interval of 2.8 ± 0.14 years between pregnancies. Pregnancies ended with Cesarean section in 66 women and physiological childbirth in 34 women.

59 of the pregnant women applied from Baku, and 41 from other regions. Regarding anthropometric indicators, their average height was 162.1 ± 0.63 cm, average weight was 71.6 ± 0.63 kg, and their Body Mass Index (BMI) was calculated to be 27.2 ± 0.44. 36 of

the pregnant women had higher education, 48 had secondary education, 13 had secondary specialized education, and 3 were students.

In pregnant women with varicose veins, or more precisely, in the pregnant women included in the main group, along with the symptoms of CVI (edema, heaviness, fatigue, pain), varicose veins were obser-ved in their lower extremities. The average age of the 100 pregnant women participating in the main group was 31.1±0.61 years. The minimum age was 21, and the maximum age was 44. The analysis of their place of residence showed that 13 of the pregnant women were residents of Baku, while 87 were residents of other districts and cities of the republic.

The height and weight of the pregnant women did not significantly differ from the control group. In the main group, the average height was calculated as 163.2±0.56 cm, their weight as 66.3±1.17 kg, and their BMI as 24.8±0.38. Among the pregnant women, 36 had university education, 48 had secondary education, 13 had vocational secondary education, and 3 were students.

In the main group, the number of pregnant women with multiple pregnancies and deliveries was higher than in the control group. Thus, only in 22 women first pregnancy was recorded. It was determined that 78 women had 2 or more pregnancies. The interval between pregnancies was 3±0.18 years. Among the pregnant women, 64 delivered vaginally, while 36 had a cesarean section. Among the pregnant women, 32 had university education, 52 had secondary education, 16 had vocational secondary education.

As part 3 of the research work, the general characteristics of pregnant women who underwent invasive intervention on the lower limb veins before pregnancy were as follows:

The main material of the study consisted of the examination and treatment results of 62 pregnant women. All of these women had undergone surgical intervention for superficial venous insufficiency before pregnancy and childbirth. The respective women were divided into 2 groups. Pregnant women in the main group had a history of minimally invasive Endovenous Laser Ablation (EVLA) surgery (n=31). The results of these women's examinations were obtained from the archive of Istanbul NS Clinic. They became pregnant on

average 0–4 years after EVLA. Doppler examination was not performed during pregnancy. They were examined only 1–4 years after childbirth. Pregnant women in the control group had a history of open phlebectomy (n=31).

The average age of 31 pregnant women included to the main group was 31.9±0.61 years. Age range of the pregnant women changed between 21 and 39 years. The analysis of the place of residence showed that 13 of the pregnant women were residents of Baku, while 87 were residents of other regions and cities of the country. In the main group, the average height of the pregnant women was 166.7±0.74 cm, their weight was 66.2±1.81 kg, and their BMI was 23.8±0.54.

The average age of pregnant women included to the control group was 29.9±0.49 years. Height was determined as 165.4±1.06 cm; weight as 66.3±1.64 kg; and BMI as 224.2±0.47 at the calculation of anthropometric indicators.

All 62 pregnant women included in this material (including both the main and control groups) were prescribed compression stockings during pregnancy (in the second and third trimesters) and after childbirth (at 2 months and 1 year postpartum).

The average duration of standing during the day was 7.4±0.31 hours in the main group and 7.33±0.33 hours in the control group. The average duration spent sitting during the day was 6.1±0.27 hours and 5.5±0.23 hours in the groups, respectively. No statistically significant difference was found between the numerical indicators of these parameters ($p>0.05$).

Statistical processing of the material. Initially, the collected data were systematized in electronic spreadsheets using Microsoft Excel 2013. The indicators were analyzed according to parameters that could be calculated within these tables. Parametric and non-parametric methods were used to identify differences between the groups. Additionally, another statistical indicator used to evaluate the likelihood of positive and negative outcomes—odds ratio (OR)—was calculated using the probability table: $OR = A \times D / B \times C$. The statistical analysis of the obtained results was carried out on a personal computer using Microsoft Office Excel spreadsheet editor, MedCalc 12.7, and IBM SPSS 22 software packages.

The results of the research works conducted in Baku city for studying of the gynecologists' approach to using the compression stocking by pregnant women

The responses of 113 physicians who fully completed the questionnaire were systematically analyzed. The questions were divided into several groups. The first 6 questions were about diagnostic measures aimed to identify varicose veins in the lower extremities-one of the main symptoms of chronic venous insufficiency (CVI)-as well as detecting dilated veins in the external genitalia as a clinical manifestation of pelvic venous congestion during the initial examination and subsequent consultations of pregnant women.

In response to the question, "Do you conduct a survey to determine whether pregnant women have any complaints characteristic of venous insufficiency in the lower extremities?", the majority of physicians (79.6%) stated that it is important to obtain such information from every pregnant woman. In 18.6% of cases, physicians reported that they conduct this survey purposefully only when there are complaints suggestive of CVI. Only 2 gynecologists responded that there is no need to conduct this survey for all pregnant women.

In order to determine the presence of venous insufficiency (VI) in pregnant women, it was revealed that 53.1% of physicians performed a visual examination of the lower extremities. Meanwhile, 29.2% stated that they conducted such an examination only if there were relevant complaints. Additionally, 15% of physicians believed it was more appropriate to refer this assessment to a specialist (phlebologist). Three gynecologists expressed the opinion that there is no need to examine the lower extremities in every pregnant woman.

Regarding the referral of pregnant women for clinical-instrumental examinations for the diagnosis of chronic venous insufficiency (CVI), 84.1% of physicians stated that they preferred to do so only in the presence of visual signs or complaints. Nine physicians indicated that Doppler ultrasound is necessary for every

pregnant woman, while another nine physicians gave a completely negative response.

A small number of physicians (n=5; 4.4%) required Doppler ultrasound for the pelvic veins in pregnant women. 77% of the physicians indicated that the need for this examination arises only when there are complaints, while 18.6% stated that there is no need for this examination. 36.3% of physicians checked for varicose veins in the external genitalia in every pregnant woman who consulted them. In cases where the pregnant woman had any characteristic complaints, 57.5% of the physicians conducted a visual examination of the external genitalia, while 6.2% believed there was no need for this examination. Regarding the identification of symptoms specific to pelvic venous varicosity, 50.4% of physicians reported that they conducted the relevant survey, while 39.8% said they only performed it if any symptoms manifested. According to the opinions of 7 physicians, there was no need to conduct this survey for all pregnant women.

The main essence of the given questions and the received answers is to identify the activity of doctors - gynecologists, with whom pregnant women have their first contact, on the initial diagnosis and detection of venous thrombosis in the lower extremities and pelvic veins. It turned out that the majority of gynecologists are sufficiently informed in this area, preferring objective and clinical-instrumental examinations for the early detection of venous thrombosis. Based on this analysis, we tried to clarify the attitude towards the second part of the survey - the appointment and use of compression stockings in pregnant women.

Approximately half of the physicians participating in the survey (42.7%) recommended compression hosiery for pregnant women when visible varicose veins appeared in the lower extremities, 16.4% recommended it if chronic venous insufficiency (CVI) was confirmed on Doppler ultrasound, and 25.5% suggested compression hosiery for those with a history of CVI in their medical history or in their parents' history. 17.3% of physicians recommended the use of compression stockings for prophylactic purposes even when there were no complaints.Regarding the timing of compression hosiery prescription for CVI prevention during pregnancy, 18.8% of

physicians prescribed it in the first trimester, 38.4% in the second trimester, and 19.6% in the third trimester. However, in 23.2% of cases, physicians did not find it necessary to recommend compression stockings for prophylactic purposes. Chart 1 shows the percentage distribution of the types and classes of compression hosiery prescribed for CVI prevention in pregnant women.

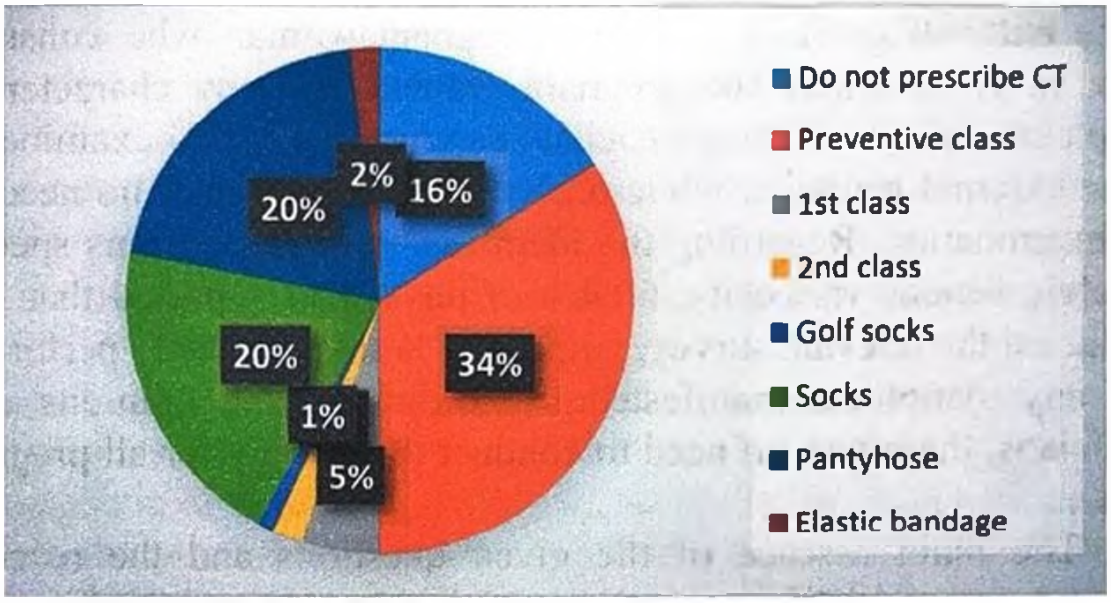

Chart 1. Types and class of compression stockings which doctors use to prevent varicose veins (%).
Note: CS – compression stockings

The early identification of risk factors for the development of chronic venous insufficiency (CVI) and the appearance of varicose veins in the extremities during pregnancy, as well as the timely use of compression stockings, can be an important step in the prevention of these undesirable conditions. Based on these considerations, the second part of the study continued with the aim of identifying risk factors for the development of venous insufficiency (VI) in pregnant women. Additionally, the progression of CVI was monitored in pregnant women with and without varicose veins in the lower extremities.

Development of chronic venous insufficiency in women with and without varicose veins in the lower extremities and comparing of regretion after childbirth

The examination results of 200 pregnant women who applied to Istanbul NS Clinic were analyzed for conducting the second part of the study. The pregnant women were divided into two groups. In 100 of them, there were no varicose veins in the lower extremities. The other 100 were included in a group of pregnant women with varicose veins in the thigh and calf regions. The main reason for this grouping was to comparatively monitor the progression of venous insufficiency (VI) symptoms in pregnant women with and without varicose veins. Examinations were conducted during the second and third trimesters of pregnancy. During follow-up evaluations at 2 months and 1 year after childbirth, the rate of regression of CVI symptoms was assessed.

On the first day of examination, anamnesis was collected from the pregnant women. The following information was clarified: anthropometric indicators, level of education and occupation, workplace, work schedule, lifestyle at home, family history of varicose disease (in parents), dietary habits, presence of constipation, presence of hemorrhoids, number of pregnancies and deliveries, and other related factors. The clinical stages of CVI were determined using the CEAP classification, while the severity was assessed using the VCSS evaluation system.

24 of pregnant women without visible varicose veins in the lower extremities, refrained from using compression stockings, while 76 pregnant women used various types of compression stockings as recommended. Those who did not use compression hosiery during pregnancy reported more frequent complaints. These women continued to feel discomfort in the lower extremities (pain, edema, a feeling of heaviness) even after childbirth. However, in those who used compression hosiery, the complaints were milder and resolved shortly after pregnancy.

In the group that did not use compression hosiery, during the second trimester of pregnancy, the measurements were as follows: heel size 21.9±0.48 cm, calf size 32.4±0.69 cm, and thigh size 51.1±1.04 cm. In the third trimester, the measurements were

23.2±0.47 cm for the heel, 34.3±0.73 cm for the calf, and 54.8±1.02 cm for the thigh. Between the second and third trimesters, in those who did not use compression hosiery, all three measurements of the lower extremities increased significantly ($p<0.0001$). Two months after childbirth, the measurements of the lower extremities were as follows: heel size 22.9±0.45 cm, calf size 34.1±0.63 cm, and thigh size 54.8±1.13 cm. When comparing the measurements taken before and after childbirth, it became clear that, compared to the second trimester measurements, only the heel size had significantly decreased ($p<0.0001$) two months postpartum. The calf size had decreased insignificantly ($p>0.05$), and the thigh size had not changed at all.

The indicators of the VCSS evaluation system changed according to the follow-up visits, revealing interesting findings. During the second trimester, 95.8% of pregnant women complained of pain in the lower extremities, and these pain complaints became more intense during the third trimester. Two months after childbirth, 22 women continued to experience pain in the lower extremities, and varicose veins developed in these areas. During the fourth visit, women who had given birth complained of episodic pain in their lower extremities.

76 pregnant women without varicose veins used compression stockings for preventive purposes. During the second trimester (first visit), the measurements were as follows: heel size 24.4±0.38 cm, calf size 34.2±0.44 cm, and thigh size 55.2±0.8 cm. During the second visit, an increase was noted in all three measurements of the lower extremities. Specifically, the heel size was 25.1±0.4 cm, calf size was 35.1±0.48 cm, and thigh size was 58.1±0.87 cm. Upon comparing the results, it was found that only the heel size had a statistically significant increase during the second visit, while the changes in the thigh and calf measurements were not statistically significant. The examinations conducted 2 months and 1 year after childbirth yielded different results. During the third visit, the heel measurement significantly decreased ($p<0.001$), reaching 24.7±0.41 cm. The calf measurement remained unchanged at 35.4±0.87 cm. The thigh measurement decreased to 57.1±0.88 cm, which was statistically significant ($p<0.0001$) compared to the second visit.

One year after childbirth, measurements showed a reduction in all three dimensions. Although the heel and thigh measurements significantly decreased ($p<0.01$), with values of 24.2±0.44 cm and 55.6±0.87 cm, respectively, the calf measurement did not show any statistically significant change. Figure 1 depicts the evaluation during the third visit using duplex ultrasound.

Picture 1. Venous Doppler examination of the lower extremities in a postpartum woman at her 3rd visit

As a result of comparing pregnant women who used compression stockings with those who did not, it was found that signs of swelling and edema in the lower extremities were significantly more pronounced in those who did not use compression stockings. As the pregnancy progressed, the formation of varicose veins was observed. At the second visit, varicose veins were identified in the right leg of 27 women and in the left leg of 22 women.

Two months after childbirth, 67 out of 76 women continued to use compression stockings. The clinical presentation of varicose veins had regressed from CEAP classification stage C2 to C1, manifesting as telangiectasias. One year postpartum, a statistically significant reduction in varicose vein cases was observed ($p<0.0001$). It is noteworthy that, in the majority of pregnant women, only minor

pathological changes remained at the C1 level of the CEAP classification.

During the period between visits, in pregnant women who did not use compression stockings, CVI progressed to more severe stages. This was reflected both in the parameters of the VCSS evaluation system and in the women's subjective complaints. The statistical analysis of the VCSS system showed the following changes: At the first visit, 62 pregnant women reported pain in the lower extremities, while 24 experienced evening swelling around the ankle area only. By the third trimester, the number of women reporting lower extremity pain had decreased to 50.

At the follow-up examinations conducted two months after childbirth, the number of women experiencing pain in the lower extremities had decreased by approximately half. Evening ankle edema was observed in 14 individuals, which was significantly lower compared to pre-delivery figures ($p<0.0001$). Varicose veins were recorded in 29 postpartum women. Among them, 28 had mildly superficial varicose nodules, while only one woman exhibited multiple significantly enlarged varicose veins. None of the postpartum women showed clinical signs such as ulcers, induration, or hyperpigmentation. Out of the 76 women, 65 continued using compression hosiery. The VCSS was calculated as 1.92 ± 0.12, which was statistically signifi-cantly lower than the values recorded at previous visits ($p<0.0001$).

At the follow-up examinations conducted one year after childbirth, only one woman reported experiencing occasional, mild, and insignificant pain in the lower extremities. Evening ankle edema that resolved by morning was observed in 4 women. In 16 women, small, isolated varicose nodules were detected in limited superficial areas. The frequency of all three clinical symptoms was statistically significantly lower compared to previous follow-up examinations.

25 of 100 pregnant women with observed varicose veins in the lower extremities, did not use compression stockings, while 75 wore compression stockings during pregnancy. Among those who did not wear compression stockings, more than half were already at the C2 stage of varicose vein development according to the CEAP classification during the first visit. By the second visit, clinical

progression of venous disease was observed—many women initially at the C2 stage began progressing to C3, while only a few clinical cases remained at the C1 stage.

At the follow-up examinations conducted two months after childbirth, only 6 women showed no signs of venous enlargement in either of their lower extremities. According to the CEAP classification varicose vein development in the right leg was observed as follows: C1 stage in 5 women; C2 stage in 10 women; C3 stage in 2 women. In the left leg: C1 stage in 5 women; C2 stage in 9 women; C3 stage in 3 women. One year after childbirth, CVI at the C2 stage was diagnosed in 11 women.

In pregnant women with varicose veins who did not use compression stockings, the progression of CVI was confirmed through Doppler ultrasound examinations. At the second visit, involvement of the pelvic veins in the reflux process was observed in 10 women. This venous reflux in the pelvic veins persisted during follow-up examinations conducted two months after childbirth. At the fourth visit, one year postpartum, venous reflux was no longer observed in 14 of these women. However, pathological reflux was detected in 11 women through Doppler ultrasound. Among these 11, 4 women showed reflux originating from the pelvic veins.

The VCSS (Venous Clinical Severity Score) evaluation system results have changed according to the visits, and interesting facts have emerged. At the first visit, the VCSS value was calculated as 2.48±0.3. During this period, most of the pregnant women reported complaints related to pain, varicose veins, and edema in the lower extremities.

In the second visit, the number of women with pain complaints statistically increased. During this period, the number of women with varicose veins and edema also increased. In the third trimester of pregnancy, the VCSS value rose to 4.12±0.12, indicating that the complaints and symptoms related to venous insufficiency were more pronounced. 2 months later after giving birth, it was observed that the situation had improved. 11 pregnant women reported no pain complaints, and no edema was observed in these women. Additionally, only 3 women had varicose veins. During this period,

the VCSS value decreased to 1.96±0.37, indicating a significant improvement compared to previous visits.

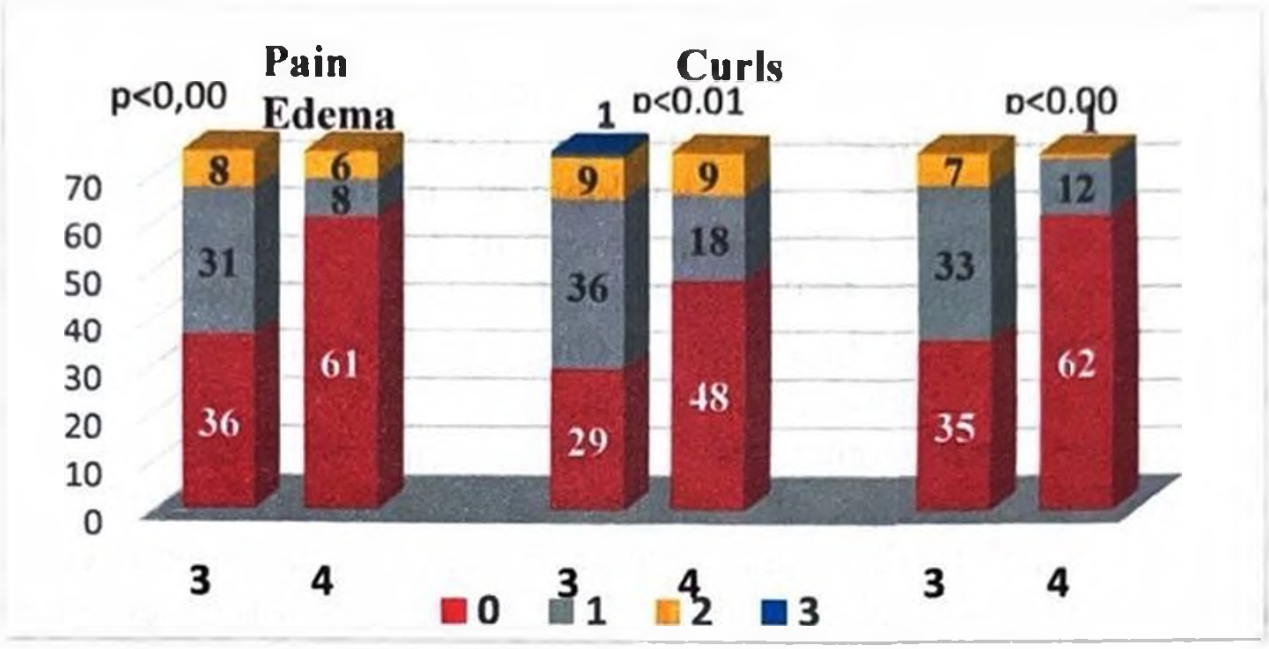

Chart 2. Results of postpartum VCSS assessment of pregnant women who had varicose veins and used compression stockings

During the examination at the 4th visit, despite one year passed since childbirth, 19 women still experienced pain in their legs. The number of women with pain did not differ compared to the 3rd visit ($\chi^2 = 2.23$; $p>0.05$). In 21 persons, venous coils were observed in the lower extremities, while 18 individuals complained of edema involving the heel area to some degree. During the observations one year after childbirth, VCSS increased to 2.52±0.53.

In 75 pregnant women with varicose veins, during the second trimester of pregnancy, the measurements were as follows: heel size 22.4±0.34 cm, calf size 35.4±0.44 cm, and thigh size 53.7±0.73 cm. During the next visit in the third trimester, growth was observed in all three measurements of the lower extremities. Specifically, the heel size increased to 23.4±0.46 cm, the calf size to 36.8±0.61 cm, and the thigh size to 55.3±0.87 cm. Two months after childbirth, a reduction in the measurements was observed. One year later, further reduction occurred, with the heel size being 21.9±0.4 cm, the calf size 34.9±0.66 cm, and the thigh size 53.3±0.94 cm.

Although the measurements of the extremities decrease after childbirth in pregnant women with varicose veins, the regression of existing CVI allows reduction in extremity size that could be observed as early as the second month of pregnancy. The progressive venous insufficiency during pregnancy continues to exert its negative effects even one year after childbirth.

In the third trimester of pregnancy, the number of patients with more advanced stages (C3, C4, and C5) according to the CEAP classification increased. Besides it, complications were observed in one patient at stage C4 (eczema with hyperpigmentation, lipodermatosclerosis) and in one patient at stage C5 (healed venous ulcer). During examinations conducted after childbirth, signs of CVI were not observed in 53.3% of the patients. In examinations of other women, mainly mild varicose dilated veins were noted, and cases of induration and hyperpigmentation were not encountered. In the long-term postpartum period, the effectiveness of compression hosiery became more clearly evident.

It should be noted that during pregnancy, the progression of CVD was confirmed to be associated with the following risk factors: excess weight ($p=0.0023$; $\chi^2=3.09$), high BMI ($p=0.0023$; $\chi^2=4.13$), presence of varicose veins in the mother ($p=0.0001$; $\chi^2=38.49$), constipation ($p=0.0011$; $\chi^2=10.61$), sitting with one leg crossed over the other ($p=0.0380$; $\chi^2=0.77$), having more than one pregnancy ($p=0.0001$; $\chi^2=19.31$), and having more than one delivery ($p=0.0069$; $\chi^2=7.31$).

The results clinical observation after pregnancy and childbirth in women who underwent venectomy by the traditional open method and endovenous laser ablation.

The main objective of the third part of our study was a comparative analysis of the recurrence of varicose veins after pregnancy in women who had previously undergone interventions on the lower limb veins by open surgical operation or endovenous laser ablation. At the same time, the quality of life after pregnancy and childbirth was also studied and comparatively analyzed.

The material for this part of the study consisted of 62 female patients with a history of invasive intervention. The women were divided into two groups. In the control group (n=31), patients had undergone open venectomy surgery for varicose veins of the lower limbs at the Scientific Surgery Center named after M.A. Topchubashov. In the main group (n=31), patients had undergone EVLA intervention at the Istanbul NS private clinic. The age, height, and weight of the women included in the groups did not differ.

Based on the data obtained from archived medical records, the preoperative indicators of the patients were recorded. Diagram 3 presents the preoperative measurements of the venous vessels.

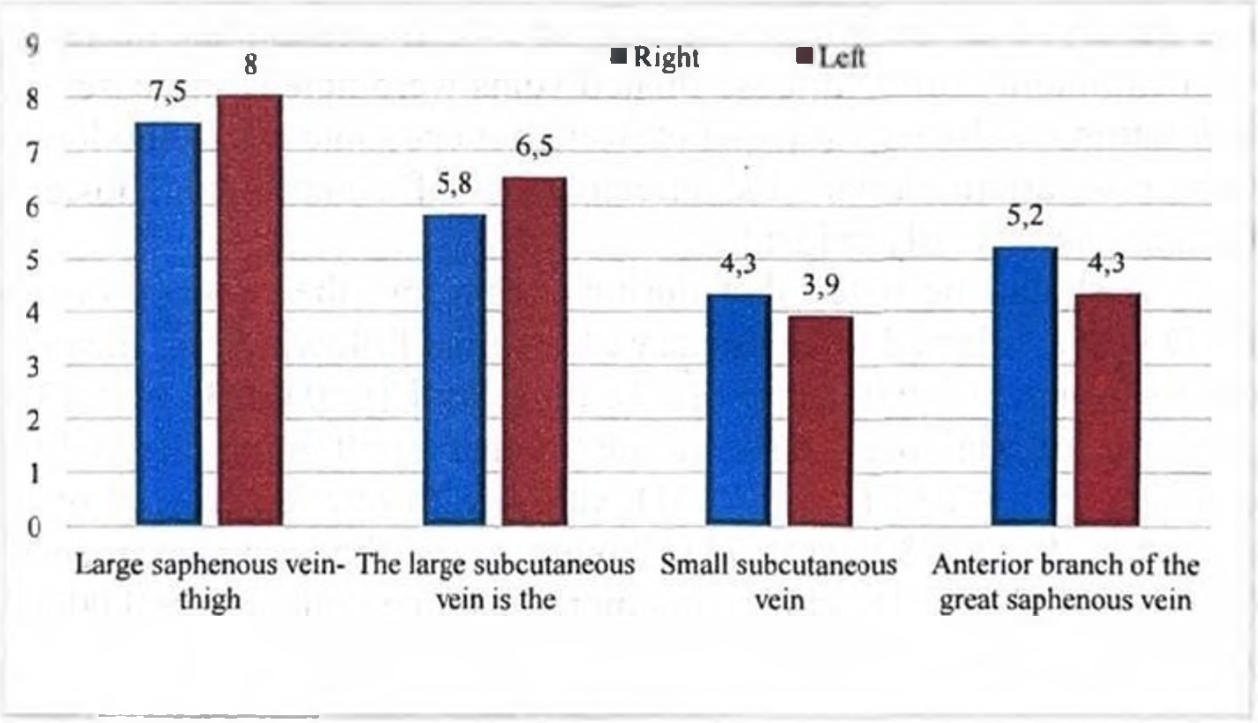

Chart 3. Preoperative Doppler measurements of the venous vessels.

All women were invited to the clinic at various times after childbirth for examination purposes. Medical history was collected, physical examination was performed, and assessments using CEAP and VCSS classifications were carried out. Post-pregnancy occurrences such as reflux, recurrence, neovascularization, recanalization, and the emergence of perforating veins were compared between the open surgical operation and EVLA groups. Neovascularization refers to

the formation of veins with a diameter greater than 4 mm in the presence of reflux.

Preoperative CEAP classification in the group of women who underwent open venectomy showed that 3 women had varicose veins larger than 3 mm (C2), 15 women had varicose veins accompanied by noticeable lower limb edema (C3), 11 women showed signs of hyperpigmentation and trophic changes in subcutaneous tissues (C4s), and 2 women had active venous ulcers (C6). These women became pregnant, gave birth, and returned for follow-up examinations in the subsequent years. During examination, based on the CEAP classification, 8 women were found to have C1 stage chronic venous insufficiency (CVI) in the lower limbs, 21 women had C2, of whom 11 were classified as C2,4a, 2 as C5, and 2 women were at stage C3. Stages C4s and C6, which were present before surgery, were not observed.

In the postoperative period following open surgery, Doppler examination revealed venous reflux in all women. After childbirth, recurrence was observed in 12 women on the right side and in 16 women on the left side. Of the 12 recurrences on the right side, 9 were associated with pelvic vein congestion, reflux, and branches originating from the pelvis. Of the 16 recurrences on the left side, 11 were similarly related to pelvic venous congestion and reflux. According to the VCSS assessment, the mean score indicating the severity of chronic venous insufficiency (CVI) was 6.4±0.57. The comparison between preoperative and postoperative indicators showed a statistically significant difference ($p<0.0001$).

In women who had undergone EVLA, the clinical signs of CVI in the lower limbs were notably milder at the time of our examination. After EVLA, recurrent varicose veins were observed in the right lower limb in 12 clinical cases and in the left lower limb in 9 cases. Doppler examination revealed pelvic vein reflux in 16 patients (Table 2).

The severity of CVI according to the VCSS system was assessed for both groups. At the time of our examination, the VCSS score was 6.4±0.57 in the group of women who had undergone open surgery, and 3.6±0.3 in the EVLA group.

As seen, the VCSS score is higher in the open surgery group, indicating a more severe course of CVI in these patients. The comparison of both indicators revealed a statistically significant difference ($p<0.05$).

Table 2. Distribution of recurrence and recanalization cases after EVLA according to the type of procedure.

EVLA	Recurrence		Varicose veins on the opposite leg		Recanalization		Reflux in the pelvic veins	
	right	left	right	left	right	left	right	left
Right GSV, n=7	5			5			4	5
Left GSV, n=8		5	1				5	5
Right and Left GSV, n=10	3	2			1		3	3
Right and Left GSV, n=1								
Right GSV and Right SSV, n=1	1			1			1	1
Left GSV and Left SSV, n=1		1					1	1
Righ, Left GSV, left SSV, n=2	1	1					1	1
Both GSV and SSV, n=1	1						1	
Total: n=31	11	9	1	6	1		16	16

CONCLUSION

1. The study revealed that 40% of gynecologists recommended using of compression stockings for prophylactic purposes starting from the second trimester of pregnancy until delivery. However, only 29.2% of physicians considered the use of compression hosiery important for preventing recurrences after childbirth. [2,8]
2. Risk factors identified for the aggravation of varicose disease during pregnancy included: living in rural areas ($p=0.0001$; $\chi^2=45.92$), excess weight ($p=0.0023$; $\chi^2=3.09$), high Body Mass Index (BMI) ($p=0.0023$; $\chi^2=4.13$), prolonged standing at the workplace ($p=0.0002$; $\chi^2=3.74$), presence of varicose veins in the mother ($p=0.0001$; $\chi^2=38.49$), constipation ($p=0.0011$; $\chi^2=10.61$), sitting with one leg crossed over the other ($p=0.0038$; $\chi^2=0.007$), having more than one pregnancy ($p=0.0001$; $\chi^2=19.31$), and having more than one delivery ($p=0.0069$; $\chi^2=7.31$) [1,4,5,7].
3. In pregnant women belonging to risk groups, the use of compression stockings did not affect the incidence rate of varicose veins during pregnancy, but it supported a milder presentation of symptoms such as pain and edema. Among those who used compression hosiery during pregnancy, the clinical course of chronic venous insufficiency after childbirth (VCSS = 1.83 ± 0.22) was statistically significantly milder ($p<0.05$) compared to those who did not use compression hosiery (VCSS = 2.52 ± 0.23) [1,3,4,7].
4. In women who had undergone open venectomy, recurrence at stages C2–C3 was observed in 20 patients (64.5%), reflux in perforating veins in 17 patients (54.8%), and neovascularization in 5 patients (16.1%) after childbirth. In contrast, among women who underwent endovenous laser ablation (EVLA), recurrence of varicose veins at stage C2 was observed in only 2 patients (6.4%). Telangiectasias developed in 16 patients (51.6%) due to veins originating from the pelvis, no cases of neovascularization were detected, and recanalization occurred in only 1 patient (3.2%). The difference in recurrence rates

between the two groups was statistically significant ($p<0.05$). The comparative study of recurrences and complications demonstra-ted that EVLA is a more effective treatment method [6].

5. Comparison according the VCSS scale after childbirth showed that women who underwent EVLA experienced a milder clinical course of chronic venous insufficiency, lower symptom severity, and better quality of life. In the open surgery group, the VCSS score was 6.4 ± 0.57, while in the EVLA group it was 3.6 ± 0.3, and the difference between the results was statistically significant ($p<0.05$). Comparative analysis of both groups according to VCSS and CEAP also demonstrated that when pregnancy occurred 1.5 years after the surgery, the outcomes were more favorable [6].

PRACTICAL RECOMMENDATIONS

1. The promotion of the use of compression stockings for both prophylactic and therapeutic purposes among gynecologists working in Baku city may be effective in preventing complications of chronic venous insufficiency after childbirth.
2. For women with varicose veins in the lower limbs who wish to become pregnant and give birth, it is more advisable to plan pregnancy at least 1.5 years after undergoing surgical intervention.
3. The endovenous laser ablation is more effective in terms of producing fewer recurrences after pregnancy and childbirth compared to the open venectomy method, and therefore, it should be used more widely in clinical practice.

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ABBREVIATIONS

VVLE – Varicose veins of the lower extremities;
BMI – Body Mass Index;
CEAP – Clinic Etiology Anatomy Pathology;
EVLA – Endovenous laser ablation;
CVI – Chronic venous insufficiency;
VCSS – Venous Clinical Severity Score;
VV– Varicose veins

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