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## Using the ERAS Concept as an Evolution of the Fast Track Surgery Program for Safe Elective Surgical Treatment of Primary Progressive Chronic Vein Disease During Pregnancy

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### ABSTRACT

**Objective:** To date, therapeutic tactics for primary symptomatic chronic disease of sphere and/or non-sphere veins during pregnancy remain the subject of discussion. There are no generally accepted approaches to the choice of therapy methods, especially indications for planned surgical treatment.

**Material and Methods:** Surgical treatment of 457 pregnant women in the second and third trimesters with primary symptomatic chronic disease of saphenous (large and / or small saphenous veins) of clinical class C2-4s, Er, As, p, Rg (according to the classification of the basis of CEAP, 2002) and / or non-saphene veins (varicose veins of the inguinal canal, and/or vulva, and perineum) was carried out in a planned manner according to the ERAS program. The most important thing in this program is a multidisciplinary approach to the observation of pregnant women, hospitalization of them in a specialized obstetric hospital on the day of surgery, the use of perinatal psychotherapy to prepare the pregnant woman and fetus for surgery, performed by a vascular surgeon - the so-called “obstetric vascular surgeon”.

**Results:** As a result of the study, all operated patients noted that the use of the ideology of the ERAS program for planned surgical treatment of pregnant women with primary symptomatic chronic disease of saphene and/or non-saphene veins required the implementation of general and adaptation of some of its components to this contingent of patients, scrupulous adherence to them at all stages (before, during and after) of surgery. These factors contributed to the achievement of clinical effectiveness planned surgical treatment 97% in the absolute absence of complications from the fetus and mother in all operated patients, protected against premature birth, caused a decrease in the number and severity of postoperative complications from postoperative wounds, which did not require additional treatment, did not affect the development of the fetus, the course of pregnancy.

**Conclusion:** This ensured the safety of childbirth and the postpartum period, formed comfortable conditions for the course of pregnancy in the postoperative period with a reduction in the period of stay in the hospital and the patient’s return to a normal lifestyle as soon as possible.

All operated patients did not need medical support in the postoperative and postpartum periods, except for the use of elastic knitwear of compression class 2 (stockings or knee-highs) during physical exertion.

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### Introduction and Literature Review

Gestational debut of chronic venous disease (according to the

classification of basic CEAP, 2002) of the lower extremities of the perineum, external genital organs is observed in 32-80% of pregnant women, most often in women who often become pregnant with short intervals between pregnancies. This pathology accounts for 5.6% of the total number of diagnosed extragenital

pathology during pregnancy [1-5]. According to V.I. Medved, this pathology is "... pregnancy-associated pathology" and is manifested by damage to extragenital organs and systems and, importantly, requires additional competence of a specialist not an obstetrician-gynecologist [6].

According to the authors, the primary symptomatic chronic disease of the saphene and/or non-saphene veins from pregnancy tends to progression and ultimately can lead to the development of severe forms of the disease: phlebitis, phlebothrombosis (10%), vascular embolism thrombus (0.6%), trophic ulcers of the lower extremities (2.3%). Thrombophlebitis with varicose veins of the lower extremities is detected in 20–30% of pregnant women, while in pregnant women without varicose veins of the lower extremities, thrombophlebitis is not recorded [7-9].

The development of society at the present stage with its pace of life, with the growth of the role of women in it, prompted the search for new concepts for the treatment of this contingent of patients. Today, therapeutic tactics for primary symptomatic chronic disease of saphene and/or non-saphene veins during pregnancy remain a subject of discussion. There are no generally accepted approaches to the choice of therapy methods, especially indications for planned surgical treatment. Further scientific research and study of the possibilities of implementing new directions in solving this problem is necessary.

The search for effective methods of therapy for surgical patients was aimed at improving the positive results of treatment, its safety with minimal risk of complications and significantly reducing the duration of hospital stay. This contributed to the formation of a comprehensive FAST TRACK SURGY (FTS) program, which was developed and launched for use in the 90s of the XX century by the Danish anesthesiologist N. Kechlet [10]. The author, having analyzed the pathophysiological mechanisms of complications after planned surgical interventions, proposed a multicomponent system of measures aimed at reducing the body's stress reactions to surgical aggression; formed 18 components of the FTS program, and it began to be perceived as a new direction, the evolution of surgical treatment [11]. Individual components of this concept were used in practice earlier by different authors, but it was he, most importantly, who proposed their scrupulous use in the complex and at all stages of the perioperative period: before the operation, during and after. The complex is aimed at potentiating all components of the treatment process for the rapid normalization of body functions through minimization of surgical trauma, the earliest possible rehabilitation and recovery of patients after planned surgical interventions in order to reduce the time of inpatient treatment and the fastest possible return of patients to their usual lifestyle.

According to the authors, "... Fast track is not a dogma, it is a set of measures, a dynamically developing concept, some of them have already been proven, and some are developed by ourselves, we give up something, and implement something. This concept is a dynamically changing concept and the emergence of methods with proven effectiveness of treatment, which contributes to continuous development" [12-14].

Decades later, the Fast track program has evolved thanks to the efforts of its author and an international working group, which took into account the reasons for the negative aspects of this program and more fundamentally approached the clinical components of the protocol and formed the concept of ERAS – enhanced recover after surgery, or earth rehabilitation after surgery. It is based on

pathophysiological principles designed to reduce the percentage of postoperative complications, to reduce the patient's stay in the hospital due to a decrease in the body's response to stress from surgical trauma, due to early activation and nutrition [15-17].

In the English-language literature, there are also the terms RRSP – rapid recovery after surgical programs, RAAC – enhanced recovery after surgical operations [18,19].

In Russia, the "Program for Accelerated Recovery of Patients in Surgery" is used, which was adopted at the XII Congress of Surgeons of Russia in October 2015 and is based on a multidisciplinary (team) approach to improving the quality of surgical treatment results at all stages of the perioperative period [15,16].

In some medical institutions in Russia, the program "Optimized Patient Management Protocol" is also used. In which the combination of elements of the ERAS philosophy and the options available in each specific clinic is considered. The authors consider an important element to be informing the patient about all stages of treatment, discussing each stage of the perioperative period and the features of the postoperative period [20].

O.Y. Ioffe et al. (2016) believe that the ERAS program in Ukraine should be implemented in surgical practice, adapting to our realities. According to the authors, it is advisable to use the general principle of the ERAS protocol and its components, both general and supplemented and adapted for each specific medical institution, taking into account the peculiarities of the organization of the medical service in it and nosology [13,14,21,22].

The ideal for all programs is not a quick discharge from the hospital, but maximum patient satisfaction [14,22].

The benefits of using the ERAS protocol have been repeatedly proven and confirmed by the clinical efficacy and cost-effectiveness of treatment, a large evidence base, randomized clinical trials, and meta-analyses [23-25]. The ERAS program was initially successfully used in cardiac surgery practice. Subsequently, it began to be successfully used in orthopedics, surgical practice for patients operated on the organs of the digestive tract in a planned manner. Today, the list of branches of medicine where this program is used has become wider. Obstetricians and gynecologists began to use it in practice, both in planned and urgent cases of surgical treatment of gynecological pathology [25,27-30].

Literature data from various researchers have shown that it is inappropriate to abandon the implementation of the program if it is impossible to use 100% of its options [31]. K.V. Puchkov et al. (2016) used 6 to 8 components out of 18 recommended [27].

Some authors emphasize that the ERAS program is multidisciplinary and comprehensive. Surgeons, obstetricians-gynecologists, therapists, ultrasound diagnostics doctors, nurses and other specialists are involved in its implementation, if necessary, and, importantly, the patient takes an active part in it [13,14,27].

Attention is drawn to the fact that the preparation of the patient's physical and mental health for surgery is carried out before hospitalization in the hospital at the outpatient stage due to the fact that a long-term stay of the patient in the hospital has more disadvantages than advantages, allows reducing the likelihood of infection of patients with hospital flora and the frequency of nosocomial infection. Therefore, it is advisable to perform

surgical interventions on the day of hospitalization with an emphasis on high-tech techniques with rapid discharge under the patronage of an obstetrician-gynecologist and a surgeon at the place of residence [32,33].

Today, it is relevant to conduct sessions of perinatal psychotherapy for pregnant women. Perinatal psychotherapy is understood as a system of influence on the psyche of a woman, and through the psyche - both on the woman's body and the fetus. The hormonal changes that accompany pregnancy can cause her irritability and vulnerability, the excess of manifestations of which is projected onto the child's psyche. A mother's experience of severe stress usually negatively affects the physical and psychological development of the child, so the psycho-emotional state of the woman herself, her resilience and emotional balance are very important. According to S. Grof's concept of "mother-child-stress", the fetus is exposed to the mother's complex emotional states. During negative experiences, anxiety hormones are released into the mother's bloodstream, reaching the fetus. Since the child has an undeveloped system for neutralizing these hormones, they accumulate in the body and amniotic fluid. Accordingly, the fetus also begins to experience anxiety and stress [34,35].

Attention is focused on the optimization of preoperative support, the basis of which is the refusal of drug premedication, its replacement with verbal, which reduces the level and duration of anxiety, leads to a decrease in pain syndrome [18].

Using non-aggressive surgical techniques, it minimizes the inflammatory component of the stress response, reduces the intensity of pain, and promotes accelerated mobilization. That is, the ability to move independently around the ward, at least staying out of bed for up to 6 hours, on the first day after surgery helps to reduce the period of stay in the hospital [36,37]. It is important to timely detect and prevent premature birth by monitoring the tone of the uterus and, if necessary, prophylactic tocolysis [38].

After studying and analyzing the available literature sources devoted to the surgical treatment of primary symptomatic chronic disease of saphene and/or non-saphene veins during pregnancy, it was noted that insufficient attention was paid to this problem. There is no information about the use of the ERAS program specifically in them during planned surgical treatment of this pathology [39-42].

### **The Purpose of the Study**

To evaluate the results of the use of components of the ERAS program during planned surgical treatment of pregnant women with primary symptomatic chronic disease of saphene and/or non-saphene veins.

### **Materials and Methods**

The study included 457 pregnant women operated on routinely for the primary symptomatic chronic disease of the saphenous veins of clinical class C2 S-4S, Er, As, p, Rg (according to the CEAP classification basis, 2002) and/or non-saphene veins from 2015 to 2024 on the basis of the Department of Extragenital Pathology of the Municipal Enterprise "Rivne Regional Perinatal Center" of the Rivne Regional Council. The age of pregnant women was 19–42 years, The average age is 24±7 years. The first pregnancy was in 130 (28.45%) women, repeated pregnancies - in 327 (71.53%). Gestational age is 28–38 weeks.

All 457 patients routinely operated on with primary symptomatic chronic disease of saphene and/or non-saphene veins were used most of the components of the ERAS protocol, which are distributed according to the stage of treatment, and taking into account the specifics of the patients:

#### **At the Preoperative Stage:**

- informed patients about surgery. Her live, active participation is at all stages of surgical treatment;
- received written consent for surgical intervention from a pregnant woman, after agreement with her husband and close relatives (parents);
- carried out prenatal psychological preparation of the pregnant woman and the fetus;
- refused to use mechanical cleansing of the large intestine;
- abandoned drug premedication with especially opium analgesics, replacing it with "verbal";
- abandoned preoperative fasting;
- prescribed carbohydrate drinking cocktails 1-2 hours before surgery;

#### **At the Intraoperative Stage:**

- local anesthesia was used;
- continued verbal and distracting therapy;
- minimally traumatic atypical open surgical interventions were used;
- prevented hypothermia of the pregnant woman's body during surgery;
- refused, if possible, to use drainage of postoperative wounds.

#### **At the Postoperative Stage:**

- abandoned the use of opioid analgesics to reduce postoperative pain;
- used early, usual enteral nutrition for the patient;
- used early activation of patients from the first hours after surgery.

Blood flow through the veins of the lower extremities (superficial and deep), iliac, accessible by duplex scanning with the Landwind Mirror II device (Italy) with a linear sensor with a frequency of 8–10 MHz before and after surgery, was also studied. In 82.5% of pregnant women, studies were carried out in the afternoon, when the clinical manifestations of the disease are most pronounced, with the obligatory Valsalva test in the supine and standing positions. The intensity and dynamics of pain in the early postoperative period (the first 24 hours after surgery) were assessed every 6 hours using the circadian visual-analog scale by V.S. Astakhov et al. with the interpretation of the results according to M.R. Jensen et al. [43,44].

Particular attention was paid to the possible effect of postoperative pain on the change in the position of the pregnant woman in bed, which before surgery provided safe comfort of the fetus, the so-called pain at rest (static pain). With the help of cardiotocography, the effect of elective surgery on the fetal heartbeat, uterine tone on the Teamcare V7.43 device in 30 minutes on the eve of surgery and 30 minutes after it were studied in dynamics.

### **Results of the Study and their Discussion**

Among 19,789 patients who were treated and gave birth in the regional perinatal center, 995 (5.02%) pregnant women were diagnosed with chronic venous disease. After the duplex scan, 895 (89.95%) patients with primary chronic venous disease (ER according to the CEAP classification of 2002) were detected. Of these, 500 (55.86%) were diagnosed with varicose veins in the basin of saphenous veins (large and/or small saphenous veins), varicose veins in the non-saphene basin (varicose veins of the

inguinal canal, vulva, perineum) in 90 (10.05%) pregnant women and in 305 (34.07%) patients - a combination of varicose veins in the basin of saphenous and non-saphene veins. In 785 (78.89%) patients, the progression of the disease was noted from the first weeks of pregnancy.

80% of patients with primary symptomatic chronic disease of saphene and/or non-saphene veins received conservative therapy from the first clinically significant manifestations of the disease to the extent that depended on the trimester of pregnancy. Treatment was carried out on an outpatient basis under the supervision of an obstetrician-gynecologist and a vascular surgeon.

Five hundred and twenty-nine (67.38%) pregnant women with primary symptomatic chronic disease of saphene and/or non-saphene veins did not receive a positive result from conservative therapy or it was short-lived. They were diagnosed with the progression of the clinic of chronic venous insufficiency and the increase in varicose veins and their spread. The obstetrician-gynecologist asked the vascular surgeon about the possibility of choosing an effective method of further treatment of this pathology.

The reason for the progression of clinical manifestations of chronic venous insufficiency in primary symptomatic chronic disease of the saphene and/or non-saphene veins, according to duplex scanning, is mainly due to an increase in the failure of the ostial and/or priostial valves and/or perforating vein valves, which contributed to the occurrence of pathological venous reflux. If at the beginning of the disease in 85% of patients, pathological venous reflux spread within the thigh with subcutaneous-femoral reflux or in the upper third of the lower leg with subcutaneous-popliteal reflux or in the case of a combination of them, then with the progression of clinical manifestations of the disease, reflux spread along the trunk of the large saphenous vein to the entire length of the thigh, lower leg and / or foot. In addition, pronounced reflux was noted due to the subcutaneous-femoral singing of the mouth into the proximal branches of the large saphenous vein, which form the Delbe bundle. In all pregnant women, according to duplex scanning, pathological refluxes detected before treatment were recorded, and in 25.3% there were additional ones, mainly on the lower leg, during conservative therapy.

Pregnant women underwent the most complete clinical and instrumental examination methods in dynamics. After receiving the final results of the examination and treatment at the council, the obstetrician-gynecologist and vascular surgeon, if necessary, other specialists, taking into account the obstetric status of the pregnant woman, manifestations of venous pathology, assessing the risks of exposure to pain relief and surgical intervention on the pregnant woman and the fetus, made decisions on possible options for further treatment, which were brought to the attention of the pregnant woman. All operated pregnant women took an active part in planning the choice of treatment method, especially surgical, and evaluating its effectiveness. The patient was informed about the existing methods of surgical intervention and the surgical method that was offered. It was explained in such a way that it was clear to the patient that this method is known, safe, cosmetic, has numerous advantages over other methods, as comfortable as possible, with a short rehabilitation period and a long-term therapeutic effect. For an easier and better understanding of the stages of surgical intervention by the patient, reducing anxiety, it is important to communicate with patients who have undergone the same type of surgical interventions, Such communication was used in the department by 87.3% of patients, in 12.5% - brochures and

posters were used. The final choice of treatment method remains with the pregnant woman.

A pregnant woman does not give written consent to surgery on her own, but only after agreement with her husband and family (parents). We have formed an appropriate strategy for planned surgical treatment of primary symptomatic chronic disease of saphene and/or non-saphene veins using the ERAS program and its components. The program is based on a multidisciplinary approach in a specialized obstetric hospital, in the center of which are mother and child.

457 (45.93%) pregnant women with primary symptomatic chronic disease of saphene and/or non-saphene veins agreed to surgery.

### **The Indication for Elective Surgery was**

- in 286 (62.58%) pregnant women – progression of clinical manifestations of the disease, despite conservative therapy;
- 61 (13.35%) patients have a pronounced deterioration in the quality of life and restriction of social activity, an increase in cosmetic problems;
- in 110 (24.07%) - active prevention of hemorrhagic, thrombophlebotic and thrombus embolic complications both during pregnancy and in the postpartum period and a decrease in the frequency of surgical delivery.

457 pregnant women were operated on. 495 surgical interventions were performed: 339 (74.18%) patients in the second trimester of pregnancy and 118 (25.82%) patients in the third trimester. Surgical interventions for 346 (75.49%) pregnant women were performed on one limb and in 111 (24.29%) cases – on two limbs (56 pregnant women – in one session, and in 55 cases – every other day).

In our opinion, the optimal period of pregnancy for the safe performance of elective surgery is the gestational age of the fetus of 28-38 weeks. During this period, the fetal organ systems and especially cardiac activity are already fully formed, which acquire properties inherent in similar organs and systems of the baby, due to which it is possible to assess the condition of the fetus as correctly as possible before and after surgery. For the mother, this is the period from mid-II to mid-III trimesters of gestation, when most pregnant women have stabilization of the psyche, there is a minimal threat of premature birth, this is the period of the highest frequency of manifestations of inferior vena cava syndrome [45-49]. During these periods, 98.5% of planned surgical interventions were performed.

The purpose of surgical intervention is to strive for the maximum possible normalization of venous hemodynamics by surgical elimination of pathological refluxes in the area of femoral-subcutaneous and/or popliteal-subcutaneous joints, perforating veins on the thigh and/or lower leg diagnosed by sonography, with the removal of varicose reservoirs (conglomerates) if necessary. In all cases, planned surgical interventions were performed in a specialized obstetric institution. It trains medical personnel (medical, paramedic) to monitor the condition of pregnant women and the fetus before, during and during the postoperative periods, which is equipped with appropriate diagnostic equipment for the timely detection of disorders and is capable of emergency treatment. In addition, the capabilities of the institution made it possible to perform surgical interventions on the venous system of the basin of saphenous and/or non-saphene veins on its basis, since surgical interventions do not require specific conditions and special surgical instruments, peculiarities in the training of nurses

in the operating room.

Hospitalization in the institution occurred in 96.3% of cases on the day of surgery in accordance with the orders of the Ministry of Health, which regulate the peculiarities of providing assistance to pregnant women with primary symptomatic chronic disease of saphene and/or non-saphene veins:

- Order of the Ministry of Health of Ukraine dated 15.07.2011 No. 417 "Methodological recommendations for the organization of outpatient obstetric and gynecological care", appendix to this Order No. 5 "Extragenital diseases in pregnant women that require joint supervision of an obstetrician-gynecologist and a specialized specialist", if pregnancy can complicate the course of the disease, cause complications, cause a threat to women's health;

- Order of the Ministry of Health of Ukraine dated December 29, 2003 No. 620 "On the organization of the provision of inpatient obstetric, gynecological and neonatal care in Ukraine", which states that after 22 weeks of pregnancy, assistance is provided for reasons of extragenital pathology on the basis of perinatal centers, if necessary;

- National Approaches to the Implementation of the System of Regionalization of Perinatal Care in Ukraine (Practical Guidelines) (Kyiv, 2012).

The list of medical indications includes heart and vascular diseases that can increase maternal perinatal risk both during pregnancy and childbirth or in the postpartum period.

All operated patients underwent prenatal psychological preparation of mother and child. Its main purpose is to reduce the patient's stress response both to the offer of surgical treatment of the pathology and to surgical trauma by psychoprophylaxis. Unfortunately, until recently, the psychological side of pregnancy, childbirth and interaction with the fetus was not decisive, and therefore it was not taken into account in traditional medicine. It is noted that the severity of stress during pregnancy is influenced not by the event itself that caused it, but by the reaction of the pregnant woman to what happened. In addition to affecting the body's nervous system, stress also suppresses the already weakened immune system of the expectant mother [47,50,51].

It is noted that the child reacts sensitively to changes in the mother's emotions with his behavior (shocks). Operated pregnant women noticed gender inequality in the response to stress: a male child reacts more violently to surgical stress than a female one. The expectant mother reports her self-observations, noting that when she is nervous, she feels excessive movements of the child, and interprets them with the words: "mischievous", "bullying", "pushing" or "moving strongly". This is due to the fact that at the moment the expectant mother experiences a nervous shock, vasospasm occurs, and the fetus experiences oxygen starvation, lack of nutrients [40].

Using the authors' experience, at the request of doctors, parents, most often mothers of all operated on, used a psychological (telepathic) path, based on the "mother-child" dyad and/or the "mother-child-father" triad and proceeding from the idea that "mother's and father's love is a single emotional field" [40]. It was noted in 98.8% of operated patients that the positive effect of perinatal psychotherapy was noted, which led to a decrease in the manifestations of stress in the child. Pregnant women did not feel excessive movements of the child, which would be interpreted with the words "mischievous", "hooligan", "pushes" or "moves strongly", the vital rhythm "activity-sleep" was not disturbed [52,53].

Also, in all cases, complete fasting before surgery and preparation of the large intestine were abandoned. Standard approaches recommended by the European Society of Anesthesiologists, USA, Great Britain were used, which are based on the fact that it is undesirable to refuse to consume solid food for 6 hours and the so-called clean liquid 2 hours before surgery, which does not carry an additional risk of aspiration and at the same time objectively increases comfort, reduces the degree of thirst in patients. All operated pregnant women consumed carbohydrate cocktails in a volume of up to 250-400 ml an hour before surgery. The use of carbohydrates in the form of liquids provides additional benefits – it reduces hunger and thirst, helps reduce stress by stimulating the production of serotonin, reduces patient anxiety [54-56].

At the intraoperative stage, they abandoned drug premedication, replacing it with "verbal", and continued it during surgery. An anesthetic for short-acting local anesthesia (concentration, volume) was used, taking into account the physiological characteristics of the pregnant woman, which made it possible to adequately perform in full the planned pathogenetic planned surgical treatment, safe for both the mother and the fetus. The patient's body temperature was observed by creating comfortable conditions in the operating room during surgery. They abandoned the routine use of drains.

Little traumatic surgical approaches and open atypical pathogenetic mini-surgical technologies were used, which were performed by a mono-technologist surgeon registered in the staff of the institution and having specific knowledge of anatomy, the development of primary symptomatic chronic disease of saphene and/or non-saphene veins, surgical intervention techniques, relevant experience of surgical interventions, can use this knowledge during surgical treatment of pregnant women.

All surgical interventions were performed in a planned manner without premedication, using tumescent anesthesia for anesthesia and a surgical technique such as CHIVA (Cute Hemodynamique de Insuffisance veinuse en ambulatoire) in the descending development of primary symptomatic chronic disease of saphenous and/or non-saphene veins in 357 (78.12%) patients, and in the ascending development of the disease - a combination of CHIVA and ASVAL (Ambulatory Selective Varices Ablation under local anesthesia) in 100 (21.88%) pregnant women. Distraction therapy (squeezing a tennis ball or rubber toy in the hand) was introduced and used during all surgical interventions, in combination with verbal therapy, which reduced psycho-emotional stress in a pregnant woman. They also took into account the fact that each operated pregnant woman in 98.5% has an individual position in bed - the same was used on the operating table in order to prevent aorto-caval syndrome or inferior vena cava syndrome. Surgical intervention in 100% of cases had a duration of up to 1 hour.

Analysis of the results of elective surgical treatment of 457 (1.5%) pregnant women with clinical-grade venous pathology in the basin of saphenous veins C2 S-C4S,EP, A,s,p,Pr (according to the CEAP basis classification, 2002), operated in an obstetric hospital according to the developed indications at the optimal gestation period of 28-38 weeks, showed that in the postoperative period all women have complications, were not directly related to the implementation of surgical interventions.

The effect of elective surgical treatment on fetal cardiac activity according to the ERAS protocol was studied 30 minutes before surgery and 30 minutes after its completion. Fetal cardiac activity was assessed according to the following parameters: basal heart rate, heart rate variability (amplitude and frequency of

oscillations); the presence and type of temporary changes in the form of acceleration (acceleration) or deceleration (deceleration) of the heart rhythm using cardiocography, which were recorded for 20 minutes (Table 1). 1.) The fetal heart rate was analyzed before and after surgery according to the parameters recommended by the Order of the Ministry of Health of Ukraine No. 900 of 27.12.2006 on the approval of the clinical protocol for obstetric care "Fetal distress during pregnancy and childbirth". It was noted that 100% of the operated patients did not have a negative effect on fetal cardiac activity and that there was no data to suspect fetal distress. At the postoperative stage, all operated pregnant women received their usual nutrition in full 1-1.5 hours after surgery. There were no restrictions on the early activation of operated patients in the first hours after surgery, depending on the desire and well-being of pregnant women.

**Table 1: Evaluation of cardiocography results**

Indicator	30 minutes before surgery	30 minutes after surgery
basal heart rate, per 1 min	130±20.5 (normocardia)	140±10.3 (normocardia)
Heart rate variability, per 1 min	Wavy 15±10,5	Wavy 20±4,1
Oscillation frequency, cycle/min	2±0,8	5±1,3
Deceleration	Missing	Missing
Acceleration, in 1 minute	2±0,2	3±0,3

Planned surgery with local anesthesia in 100% of operated patients did not affect the obstetric status of the pregnant woman both during surgery and 30 minutes after its execution. The tone of the mother's uterus before and after surgery is the norm according to cardiocography (Table 2).

**Table 2: Indicators of Obstetric Status of Operated Patients**

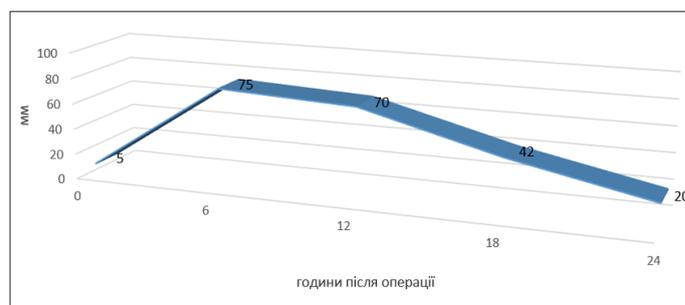
Indicator	Before surgery, n=457	After surgery, n=457
Uterine tone	Norm	Norm
Blood pressure, mmHg.	Systolic – 110±10.2 Diastolic – 85±5.3	Systolic – 125±5.3 Diastolic – 90±8.3
Pulse rate, per 1 min	90±6,3	95±4,5
Pulse	Rhythmic	Rhythmic

All operated pregnant women in the period before surgery took a position in bed that was safe and comfortable for the fetus and positive for their well-being. In 98.3% of cases, it was a position on the left side, only 1.7% of pregnant women did not note a negative effect on the fetus from the position in bed. The surgical intervention did not affect the change in the usual position of patients in bed, which they would use in order to minimize pain at rest (static pain), so as not to use analgesics.

According to the subjective assessment of all operated patients, pain in the early postoperative period (up to 24 hours) tended to increase in intensity in the first 6 hours after the intervention, stabilizing after 12 hours with a tendency to decrease during follow-up. At the end of 6 hours after surgery, pain was in the range of 66-74 mm (moderate pain) in 92% of operated patients, which did not require the administration of painkillers. Only in

8% of pregnant women the pain was 75-89 mm (severe pain), which required in 98% of cases a single administration of non-opiate painkillers, mainly tablets. After 12 hours, in 98.5% of cases, postoperative pain was kept within 50–72 mm (moderate pain), and in 1.5% of operated patients – within 75 mm (moderate pain with a transition to severe), but without the need for the administration of painkillers. 24 hours after surgery, all operated patients had pain in the range of up to 44 mm (mild pain), which had little effect on the volume of physical activity (Table 3).

**Table 3: Dynamics of Pain in The Early Postoperative Period Within 24 Hours After Surgery**



If necessary, a drug was used, which is both an analgesic and a tocolytic (such as indomethacin).

After 2 weeks, a control duplex scan of the operated limbs was performed. It was noted that the refluxes that were detected before surgery through the subcutaneous-femoral, subcutaneous-popliteal vane of the mouth, and perforating veins are absent, since the ligated veins were not found, the trunks of the large and/or small saphenous veins and their remaining branches are moderately filled. In the subcutaneous tissue of the legs and feet, there are no or minor signs of soft tissue edema.

According to the subjective assessment of their condition, operated pregnant women improved both general and local status in 96%, improved quality of life in 89.3%, and improved psycho-emotional state and social activity in 90%.

During the analysis of the course of pregnancy, depending on the nature of treatment of the primary symptomatic chronic disease of the saphene and/or non-saphene veins, it was noted that among 529 women who received conservative therapy and who had pronounced varicose veins of the external genital organs and perineum, in 22% of cases the birth ended by caesarean section and in 75% of cases, patients with severe varicose veins of the lower extremities received prophylactic doses of direct anticoagulants in order to prevention of thrombophlebotic, thromboembolic complications. In 10% of cases, acute thrombophlebitis of the saphenous veins was diagnosed before delivery, which required urgent surgical intervention.

In the group of pregnant women with surgical treatment of the primary symptomatic chronic disease of the saphene and/or non-saphene veins, there were no indications for caesarean section due to varicose veins of the external genital organs, perineum. Pregnant women of this group of anticoagulants for prophylactic purposes before, during childbirth and in the postpartum period did not receive anticoagulants. Them. It is recommended to use elastic knitwear in the form of stockings or knee-highs of compression class 2 in case of physical exertion. The need for medical support was not recorded (Table 4).

**Table 4: The Course of Pregnancy Depending on the Methods of Treatment**

Indicator	Operated, n=457	Conservative treatment, n=529
Caesarean section due to primary symptomatic chronic disease of the saphenous and/or non-saphene veins (varicose veins of the inguinal canal, perineum and external genitalia)	There was no	22%
Acute thrombophlebitis	There was no	1,5%
Use of low molecular weight heparins	There was no need	75% used low molecular weight heparin (according to the recommendations on the Caprini scale)
Disease dynamics		
Disease progression	2	68
Stable form of the disease	8	10
Disease regression	84	22

After assessing the obtained state data of 457 operated pregnant women, 294 (82.6%) pregnant women were discharged from the hospital after 24 hours, whose indicators were within the normal range and at their request; 17.4% of women 48 hours after surgery.

All operated patients with recommendations are transferred under the patronage of an obstetrician-gynecologist and a surgeon at the place of residence, provided that:

- adequate mental assessment of the pregnant woman's condition;
- full consent of the pregnant woman to discharge;
- opportunities for self-care in the postoperative period;
- readiness to adhere to the usual rhythm of life and regimen with the maximum approximation of the state of physical (motor) activity before the operation;
- no need for constant medical supervision;
- readiness to take measures in case of complications during your stay at home;
- mandatory two-way telephone communication with the doctor throughout the postoperative period;
- the presence of stable psychological comfort in the patient's family.

62 (13.57%) pregnant women operated on at the end of the third trimester remained in the hospital until delivery.

In 11 (2.4%) patients in the postoperative period, complications were detected: in 6 (1.31%) – from postoperative wounds in the form of seroma and in 5 (1.1%) – thrombophlebitis of individual isolated branches of the large saphenous vein on the lower leg, which did not require additional treatment and did not limit the physical activity of patients. Complications were eliminated before delivery.

### Conclusions

The use of the ERAS program, based on a multidisciplinary approach to the planned surgical treatment of patients with primary symptomatic chronic disease of sphere and/or non-sphere veins in the second and third trimesters of pregnancy, has shown its high efficiency and safety.

Close cooperation between an obstetrician and a vascular surgeon in a specialized obstetric institution is decisive in the choice of tactics for the planned treatment of primary symptomatic chronic disease of saphenous and/or non-sphere veins.

### Indications for Elective Surgery are:

- progression of clinical manifestations of this pathology in the absence of a positive result from conservative therapy in the pool and/or non-sphere veins;

- an increase in cosmetic defects on the external genital organs and open parts of the lower extremities;
- preparation of the birth canal for safe childbirth in a natural way. The use of perinatal psychological support for the mother, and through it for the fetus, had a positive effect on the preparation of the pregnant woman for safe surgery.

Surgical intervention carried out in a planned manner according to the ERAS program in a specialized obstetric institution by a vascular surgeon-“mono technologist” or “obstetric” vascular surgeon in pregnant women with venous primary progressive pathology in sphere and/or non-sphere pools according to individual indications, taking into account the condition of the pregnant woman, fetus, venous hemodynamics, is one hundred percent safe for the mother and fetus according to objective examination and positive in 97% of operated patients as clinical results of the examination, and according to the subjective assessment of the patients themselves.

Operated pregnant women in the postoperative period, during childbirth, in the postpartum period did not need medical support. If necessary, only (especially during physical exertion) elastic knitwear in the form of knee-highs, stockings of compression class 2 were used. This approach leads not only to a quick recovery with a significant reduction in the overall duration of treatment and rehabilitation, but also has a social effect due to the rapid restoration of the quality of life of patients.

The mission of the vascular surgeon today is to prove to both obstetricians and gynecologists and most surgeons that the surgical treatment of primary symptomatic progressive disease in the basins of sphere and/or non-saphenous veins is safe for both the mother and the fetus, with a positive clinical outcome for the mother only if the appropriate conditions are strictly observed.

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