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# STAGED TREATMENT OF VARICOSE DISEASE OF LOWER EXTREMITY VEINS IN INFECTED TROPHIC ULCERS

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**TABLE OF CONTENTS**

**INTRODUCTION 5**

**CHAPTER I. MODERN TECHNOLOGY IN TREATMENT VDLE FOR INFECTED TROFIC ULCERS OF THE LOWER EXTREMITY (Review)**

**1.1 The pathogenesis of venous ulcers of the lower extremity venous etiology 9**

**1.2 Methods of local treatment of venous leg ulcers of venous etiology 12**

**1.3 Methods of correction of the venous circulation in VBNK complicated trophic ulcer 18**

**CHAPTER II. GENERAL DESCRIPTION OF THE CLINICAL OBSERVATION AND METHODS OF TREATMENT**

**2.1 Characteristics of the clinical observations 22**

**2.2 Methods of investigation 25**

**2.2.1 Clinical evaluation 30**

**2.2.2 Bacteriological study 27**

**2.2.3 Histological evaluation 29**

**2.2.4 Diagnostics 30**

**2.3 Methods of treatment 33**

**2.3.1 Methods of rehabilitation of venous ulcers 34**

**2.3.2. Methods of operations on the veins 36**

**CHAPTER III effectiveness studies of different methods in treating infected trophic ulcers**

**3.1 Comparison of the bacteriological evaluation of local antiseptics 39**

**3.2 The efficiency of antiseptic therapy infected trophic venous ulcers 41**

**3.3 Research on the effectiveness of early elimination of high vertical venous reflux in the treatment of infected venous ulcers 43**

**CHAPTER IV. Results staged treatment of patients with infected venous trophic**

**ulcers of the legs** **49**

**4.1 Two-stage treatment of patients with infected venous trophic ulcers of the lower extremities** **60**

**4.2 One-step treatment of patients with infected venous trophic ulcers of the lower extremities** **54**

**Conclusion** **60**

**PRACTICE GUIDELINES** **65**

**REFERENCES** **66**

## LIST OF ABBREVIATIONS

VDLE Varicose disease of the lower limbs

UI Ultrasound investigation

USDG Doppler ultrasound

USACI duplex ultrasound scanning

ESDKV Endoscopic subfascial dissection perforantus veins communicating veins

AP Apparatus  Plason

CVI Chronic Venous Insufficiency

NO-T  NO-therapy

DSV Deep subcutaneous Vienna

## INTRODUCTION

## BACKGROUND:

Leg sores are one of the most serious consequences of chronic venous insufficiency and lead to a significant deterioration in the quality of life of a large number of patients. Despite progress in diagnosis and treatment of chronic venous insufficiency, sores remain a constant companion of varicose veins of the lower extremities and are found in 1-2% of the adult population of industrialized countries (AI Kiriyenko, 2002; AM Shulutko,, 2000, 2001; VY Bogachev, 2001; B.C. Saveliev et al., 2001, JM Stojko 2001, EP Cohan et al., 2003; Jimenez Cossio J.A., 1996, 1999; PDColeridge Smith, 2001; G. Fowkes, 2001).The pathogenesis of venous ulcers with VBNK lies a number of pathological factors. The approach to treatment can not be one-sided and standard. It is necessary to consider the mechanism of the disease in the individual patient and the therapeutic potential of the proposed methods of treatment. Treatment of patients with severe trophic disorders are extremely labor intensive and time consuming process. Much of the time is spent on preoperative preparation, which aims - improving trophic tissue and healing of ulcers. In this case, the majority of patients with the healing process is repeated relapses despite the use of a compression bandage and system flebotropnoy farmakogeranii (VK Gostishchev, 1999; AM Khokhlov, 2001, 2002, 2003, TD. Konstantinov et al., 2000; A . E. Bogdanov, et al, 2000; Shvalb PG, 2001, Chad A. et al., 2001, VJ Vasyutkov, 2003; JJ Bergan, 2001; EHOwens, 2001). Results were unsatisfactory treatment of venous leg ulcers associated with exaggeration of the value of local treatment and an underestimation of the pathogenetic mechanisms of the trophicdisorders. Crucial in the development of venous ulcers in varicosity owned static and dynamic venous hypervolemia (YT Tsukanov, 2000, PG Schwalbe, 2002), without addressing that it is hard to solve this problem. Therefore, the most radical method of removing abnormal venous vessel is surgery (V.S.Savelev et al., 2001; A. Kiriyenko, et al., 2000; VY Vasyutkov, 2003; AM. Khokhlov, 2003).However, the presence of infected trophic

ulcers in patients with chronic venous insufficiency significantly limits the radical one-stage surgical correction of regional circulation in the high risk of postoperative septic complications (AI Kirienko et al., 2001). However, there are some literature data and specific scientific research showing that, in some cases, possible pathogenetic-stage radical operation aimed at correcting abnormal veno-venous reflux in the presence of open sores, but with careful rehabilitation potential source of infection - ulcer surface (NF Druk et al., 2003, NG Askerov, AM Svetuhin et al., 2003).Offered a variety of tactical approaches to a radical solution of the problem of infected venous ulcers. While not fully explored is the fundamental question of the impact of early surgical removal of proximal venous-venous reflux on the dynamics of trophic changes in patients with VBNK. No sufficient information as well as medical diagnostic complex based on the phased approach and have individual therapeutic focus in patients with infected trophic ulcers. Thus, at the present time, given the capabilities of modern surgical techniques, there is a need to continue to search for the best treatment of varicose veins of the lower extremities with infected trophic ulcers.

Objective: to study the possibility of staged approach to the surgical treatment of patients with varicose veins of the lower extremities, complicated infected trophic ulcers.

To realize this goal, we have the following objectives:

1. Identify the most effective way of rehabilitation of infected venous ulcers before making pathogenetically substantiated flebogemodinamicheskih operation to correct disorders of leg;

2. To assess the clinical effectiveness of early surgical removal of high vertical veno-venous reflux in patients with infected trophic ulcers of leg;

3. Way to optimize rehabilitation ulcer before the pathogenetically directed operations for the correction of disorders flebogemodinamicheskih leg;

4. Evaluate the clinical efficacy of different treatment regimens in patients with trophic ulcers of the lower leg infected based on step approach.

**The novelty of the research:**

An effective method of remediation of infected venous ulcers in preparation of patients for radical surgery procedure flebogemodinamicheskih disorders; Shows the clinical importance of removing high-vertical veno-venous reflux in the complex treatment of venous leg ulcers; Clinically indicated and demonstrated the possibility of individual phased approach to the treatment strategy in patients with infected trophic ulcers.

**The practical significance.**

Remediation of contaminated trophic ulcers PLASON apparatus allows the shortest possible time to achieve microbial decontamination tissue trophic ulcer below the critical level, to carry out its isolation and in earlier time, to correct flebogemodinamicheskih disorders in patients with VBNK;

Early removal of high vertical veno-venous reflux contributes to the acceleration of reparative processes in the infected trophic ulcers and creates optimal conditions for early pathogenesis of combined operations based on the tibia;

Developed medical diagnostic system allows an individual approach to treatment selection of patients with trophic ulcers infected leg.

Implementation of research results into practice. The results of the research put into practice of surgical departments II Clinic TMA. Data provided are used in medical research and teaching in the department faculty and hospital surgery medical faculty TMA.

The success of the research would not be possible without the help and participation of faculty members of the department faculty and hospital surgery TMA Medical Faculty, staff offices of Vascular Surgery, Laboratory of Clinical Bacteriology and microbiology. To all of them I am deeply grateful and thankful.The main provisions to be defended.

1. Sanitation of infected venous ulcers with the high-PLASON unit is optimal and highly efficient way to stimulate epithelization trophic ulcers and prevent its secondary infection;

2. Eliminating high vertical veno-venous reflux creates optimal conditions for the course of reparative processes in the infected trophic ulcers and reduces the period of implementation corrective surgery on veins of the legs;

Volume and structure of the thesis. The thesis presented in 80 pages of computer text Times New Roman № 14, contains 9 tables, 17 figures. The thesis consists of an introduction, literature review, the three heads of their own research, findings, conclusions, guidelines and references. Bibliography includes 154 references, including 79 domestic and 75 foreign authors.

## CHAPTER I. Modern technologies of treatment varicose disease of lower extremitycomplicated infected trophic ulcers (Literature review).

Trophic ulcers of the lower extremities in patients CVI are common human diseases characterized by torpid course, prone to recurrence and resistance to conservative treatment (AG Evdokimov et al., 1999; BC Saveliev, 2000, VY Bogachev, 2002 , EP Cohan et al., 2003; J. Bergan, 2001; S.Takase, 2001). Sores are the most common complication of chronic venous insufficiency (CVI) of the lower extremities and occurs in 1-2% of the population of industrialized countries, about the prevalence of diabetes (G. Schmid - Schonbein, 2000; A. Nicolaides, 2001; A. A. Ramelet, 2001). Nevertheless, these data are very averages and have a fairly wide range of variation. B.C. Savelyev (2001) reported that chronic venous disease of the lower extremities affects 35-38 million people in Russia, with 15% of all cases decompensated form of the disease with severe trophic skin changes and recurrent ulcers. Although it is fair to note, increasing the number of patients with chronic venous insufficiency is caused not only by social factors (lack of exercise, prolonged static load during the day), but also to improved diagnosis of chronic venous insufficiency (AI Kiriyenko, et al., 2000, J. M. Stojko, 2001, F. Wing, 1998; JA Jimenez Cossio, 1996; PD Coleridge Smith, 2001; G. Fowkes, 2001).

1.1 Pathogenesis of venous leg ulcers of venous etiology still unknown etiological factors of leg ulcers (JJ Bergan, 1999). Foreign scientists believe that an indicator of the severity of clinical symptoms and, in particular, the cause of ulcers of education is to increase venous pressure in the lower extremities (M.Fukuoka, et at. 1999). This postulate is challenged by many authors as indicators of pressure in the veins of the lower extremities in patients with CVI can not be higher than the calculated hydrostatic (BC Saveliev et al., 2001; Shvalb PG, Kaczynski, A., et al, 2003 ). Researchers pathological veno-venous reflux in perforating veins no consensus on the hemodynamic significance of the individual groups of perforating. Some authors believe that the failure of the valve apparatus

results in permanent overload saphenous venous additional volumes of blood from the deep veins. Superficial veins are not adapted to the operation in such conditions, varicose expanded and, as a consequence, develop valvular insufficiency (NS Baron et al, 2001; KT Delis et ah, 2001) The most severe flebogemodinamicheskie processes are observed in the lower third of the inside of the leg. This is due to a valve failure surface (vertical reflux) and perforating veins (horizontal reflux). At the heart of the retrograde blood flow is horizontal dysfunction musculo-venous pump leg caused as valvular insufficiency subcutaneous and perforating veins, and a violation of the contractility of the calf muscles (TD Konstantinov et al. 2000; BC Saveliev et al., 2001). Due to volume overload is an increase in pressure in postkapillyarah, which becomes equal to the pressure in prekapillyarov. This is the reason for the disclosure of shunts between the pre-and postkapillyarami, desolation microcirculatory disorders oxygen supply. As the venous hypertension arteriolovenulyarnyh are opened, and then the arteriovenous shunts. Decreased blood flow in combination with venous congestion causes ischemia tissue and sclerotic pathobiochemical changes in the subcutaneous tissue and skin. The ultimate result of these changes is the development of degenerative and necrotic degeneration (AE Bogdanov et al., 2000, AM Khokhlov, 2001; JJBergan, 2001; EHOwens, 2001). On the wave of the study features in the pathology of venous microcirculation NLBrowse and RG Barnard (19S2) have suggested, according to which the death involves a violation of the diffusion of oxygen into the tissues, caused by the deposition of fibrin around small vessels mikrotsirkulyatornoga bed. After polymerization, the fibrin around microvascular forms a so-called "fibrin sleeve." According to the researchers, these deposits violate the diffusion of oxygen and small molecules, causing necrosis (PJ Pappas et ah, 1999).

However, the importance of this factor in the genesis of trophic disorders is not completely clear. A number of studies (DB Hackel, RH Peter, 1993) with direct measurement of tissue oxygen tension questioned the existence of local hypoxia.

At the same time, methodological difficulties in determining the true content of oxygen and clinical data clearly indicate tissue necrosis when a venous ulcers, not to rule out the impact factor of hypoxia in the genesis of trophic disorders in CVI. (Ivan Zolotukhin et al., 2001).

Tomas et al. (I988) by capillary microscopy showed that in the standing position in patients with CVI reduced the number of visible dermal capillaries. On this basis, it has been suggested that white blood cells, is retained in the microvasculature of venous plethora, hurt him.

In the future, this has been the development of the assumption of leukocyte aggression factor as a trigger mechanism for the formation of trophic skin changes

These new aspects of the pathogenesis of chronic venous insufficiency, obtained in research laboratories in the U.S. and Japan, indicate that the trigger in its development is a long-term venous hypertension, which causes a number of pathological mechanisms affecting the structure of the Department of the venous vasculature (G. Schmid- Schonbein, 2000). According to the authors, this leads to stretching and twisting superficial venous segments with their expansion and subsequent valvular insufficiency. Venous engorgement leads to a restructuring vein wall intima. Numerous experimental and clinical studies have shown that a major factor in the development of trophic disorders in CVI is the accumulation and fixation of leukocytes in the microcirculation. In the future, they are the conditions for m paravaskulyarnye extravasation in tissues and activation (EG Yablokov et al., 1999; BC Saveliev et al., 2001; A. Kiriyenko, 2001; Yu.M.Stoyko et al., 2001 ; G.Coleridge Smith, 2000; S.S. Shoab et all., 2000). According to the authors dysfunction endothelial layer with a progressive increase in the permeability of the vascular wall leads to accumulation paravasal tissue stem cells, macrophages, erythrocytes. The destruction of the last to form hemosiderin is a powerful trigger factor for the development of soft tissue inflammation. Thus, in recent years there is increasing evidence to indicate that an important role in the pathogenesis of chronic venous insufficiency of the lower limbs is an inflammation

(S. Takase, G. Schmid-Schonbein 1999, 2003). The emergence of the ulcer may occur spontaneously or as a result of even minimal trauma. In the future, in the absence of, a special treat is bacterial contamination formed trophic ulcers and subsequent colonization. The consequence of this is the expansion of bacterial aggression area and depth necrobiotic process, the development of irreversible degenerative processes in the soft tissues (AI Kirienko et al. 2001). However, the role of microorganisms in the event of venous ulcers is no consensus (AM Khokhlov, 1990 1998, GI Konstantinov, 2000). The details of this are various, often mutually exclusive. Some researchers consider the microorganisms as an etiological factor, others believe that the microflora is not critical, as it does not lead to the elimination of self-healing ulcers, others believe that the absence of microorganisms, on the contrary, a negative effect on healing.

It is believed that the treatment not a statement of fact finding or lack of microflora in the ulcer. It is equally important to know the type and its impact on the process of regeneration (A.M Khokhlov, 2003) Thus, most of the authors (VK Gostishchev 1999; V.S.Savelev et al. 2001; Shulutko AM, 2001, AI Kirienko et al., 2002) have suggested that treatment of patients should be directed not only to fight the infection, but also necessary for early correction of venous hemodynamics.

### 1.2 Methods of local treatment of venous ulcers of venous etiology

The main directions of the complex treatment of venous ulcers of venous etiology may be submitted at this stage as follows: correction of venous drainage by surgery in combination with sclerotherapy and compression therapy, medication effects on tone, microcirculation and lymphatic flow, local treatment of venous ulcers, depending on the stage wound healing (BC Saveliev et al., 2001; AI Kiriyenko, et al., 2000, 2001, NI Krotovsky et al., 2000, II Sukharev, 2001; VY Vasktsov, 2003).

The foundation of all medical events is elasticcompression. It is indicated in all patients regardless of the cause of CVI her occurrence (R.Stemmer, 1995). About the only contraindication to the use of compression are chronic obliterative

arterial disease of the lower extremities with a decrease in systolic blood pressure of regional tibial arteries below 80 mm. Hg. Art. Therapeutic effect of compression is determined by a number of mechanisms. This, above all, the acceleration of the venous outflow and reduce abnormal venous capacity, elimination or reduction of venous reflux, increased interstitial fluid resorption, increased fibrinolytic activity of blood. Arsenal of compression therapy presented crepe bandage, medical, jerseys, and various equipment for the variable (intermittent) Compression (AI Kirienko et al., 2003). The most common method to be a formation of compression bandages. This is due to their high efficiency at relatively low cost. For a comprehensive treatment of chronic venous insufficiency in the presence of trophic ulcer bandages preferred medium or small stretch.

The main goals of pharmacotherapy CVI is a relief of symptoms, prevention of complications, improve patient quality of life, prevention of CVD risk groups. Numerous multicentric study of domestic and foreign colleagues objectively proven positive effect on the course of reparative processes in the trophic ulcers using diosmin - gesperedinovoy fraction ("Detralex" firm "Servier", France). According to V.S.Saveleva et al. (2001), it is unreasonable to hope for success, applying in all cases, any one tool. Implementing medical approaches to venous trophic ulcers, follow basic principles: from simple to complex and from cheaper to more expensive method. Currently, there are many possible ways and methods of rehabilitation of venous ulcers. However, not many of them are capable in this regard to satisfy surgeons due to significant time required to obtain bacteriologically significant remedial effect before followed by radical surgery (VP Sokolov et al., 1999, HE Cohan et al., 2003 ; PD Coleridge Smith, 2001). In addition, the need for rapid and high-quality pre-operative rehabilitation of venous ulcers is directly related to the choice of an appropriate method of reorganization and is dictated by considerations of prevention of septic complications in the postoperative period, and the need to reduce the preoperative period (Vasyutkov VJ et al., 1999, and . A Zolotukhin et al., 2000; AI Kirienko et

al., 2000, AM Khokhlov, 2003). In this regard, there is a constant search for more and better ways of remedial effects on pathogenic microflora trophic ulcers for the early preoperative patients (MI Kuzin, BM Kostyuchenok, 1990, VG Nikitin, 2001; A . B. Ants 2003; DL Shungu, 1991). This is consistent with the need of local therapy, whose main goal is the purification of the plague of the necrotic mass and the reduction of microbial contamination of its tissues (S. Sizov, 1999; A.P.Chadaev, 1995). Local treatment of venous trophic ulcers is based on the concept of phase character of the wound healing process, which, being cyclical, it may be more or less clearly divided into separate phases, in accordance with the difference in the functional and morphological changes in the tissues of the trophic ulcers and surrounding tissues. Strictly speaking, the implementation of quality rehabilitation and further local treatment of venous ulcers of the food must be in accordance with the phases of wound healing process (AA Adamian, et al. 2000, GD, Konstantinov et al., 2000; AI Kirienko et al., 2000; BC Saveliev et al., 2001; HF Askerov, 2003).

Modern classification proposed M.I.Kuzinym, BM Kostyuchenko (1990) reflects the fact that the process of healing the source of infection, occurring periodically and always uniformly, can be represented as a phase of wound healing process:

1 - phase of inflammation and purification (vascular changes, cellular and metabolic changes, exclusion of non-viable tissue, which leads to purification of wounds);

2 - regeneration phase (formation and maturation of granulation tissue with proliferation of young connective tissue elements);

3 - phase of the reorganization of the scar and epithelialization (the transformation of immature connective tissue in the coarse-fibered tissue and epithelial wound closure).

According to the authors, this classification reflects the biological law of healing that lies genetically and formed during ontogeny and phylogeny.Any

method of local treatment of venous ulcers should be directed at minimizing the timing of phases of alteration and exudation, the early appearance of a full granulation tissue and stimulate regeneration phase (AV Ants, 1990, 2003, R. Muradian 1996; VG Nikitin, 2001; Vasyutkov VJ et al., 1999; N.A.Kuznetsov et al., 2000; V.S.Savelev et al. 1999,2000,2003). The methods used for these tasks can be divided into four groups (BC Saveliev et al., 2001): surgery (excision of ulcer, evacuation, curettage, etc.), physical (flushing, sorption coating, ultrasonic, laser sanitation); enzymatic and autolytic. Surgical techniques are widely used by Russian surgeons. The rationale for their use and modernization is necessary postulate of nonviable tissue dissection and resection of the source of chronic infection (AM Khokhlov, 2001, 2002, NG Askerov, AM Svetuhin et al., 2003).

Such methods are local effects on the ulcer, as curettage and evacuation, immediately after the procedure leading to the apparent release of trophic ulcers of the necrotic tissue and fibrin overlay. In fact, gross and undosed mechanical action causes a significant increase in the area and the depth of skin damage (BC Saveliev et al., 2000; V.Yu.Bogachev et al., 2001). Proved that as a result of germ layer of the skin is destroyed and disrupted the synthesis of collagen. For this reason, the healing of venous ulcers is delayed (M.Morison, C.Moffat, 1995). The main objective of the methods used is in biostimulation of reparative processes in the trophic ulcers, and in proper insulation sanitized surface ulcers in the implementation of pathogenetically directed operations on the venous system of the lower extremities. Recently, the highest recognition given two options of surgery - mioplasticheskaya fasciotomy (Alexander House group, 1992) and save-therapy (Ruckley et al., 1999).

When mioplasticheskoy fasciotomy supposed trophic ulcer excision within healthy tissue. Simultaneously resected en bloc sclerosal fascia leg. Then dissected longitudinally perimizy, blunt muscle mobilized two beams, which are sewn on the bottom of the trophic ulcers. Skin defect closed perforated autograft. According to the authors mioplasticheskaya fasciotomy really helps in cases of small in size, but

deep venous ulcers, localized on the lateral and posterior surfaces of the tibia. This treatment strategy is shared by many Russian surgeons (AM Khokhlov, 1998, 2002; H.G. Askerov AM Svetuhin, 2003)

Indication for save-therapy are single or multiple ulcers, take up more space and localized epifastsialno. In this case the layers removed indurirovannaya skin with subcutaneous fat. Of fundamental importance is the fact that it does not fascia resected tibia. Then the defect is also closed autodermotransplantantom. According to W. Schmeller et al. (1998), this procedure is useful to combine with the intervention of the subcutaneous and perforating veins. The authors note the method that save-therapy has a more gentle technique compared with various fasciotomy. However, the evidence for such an aggressive way of surgery there is not more than 1% of patients with trophic ulcers. Progress in science and technology during the past decade has stimulated the search for new, technically more complex ways of processing and treatment of wounds.
The method of ultrasonic cavitation is used as an adjunct to primary surgical treatment at povshennom risk of local infection and complications in the local microbial-inflammatory (MI Kuzin and BM Kostyuchenok, 1990). The positive effect of this method of treatment of venous ulcers is based on the biological activity of the ultrasonic waves with anti-microbial and anti-inflammatory effect (AP Krasilnikov, 1995). Found that ultrasound accelerates cleansing trophic ulcers due to cavitation damage cellular components of wound and release of lysosomal enzymes, hemotaksicheekih factors bactericidal protein that enhances the proteolytic activity of wound exudate (OV Lazutikov, 1997). The results of ultrasonic treatment of purulent wounds are not independent of the audio environment. Thus, reliable data on the positive effects of ultrasonic cavitation obtained only when used as an acoustic environment solutions of antibiotics and antiseptics (VI Gostishchev, LF Mulia, Alexander Khanin et al, 1986). In addition, the experiment revealed the damaging effect of ultrasound on malopovrezhdennye and healthy tissue (Y. Morozov, E.S Abramov, ST. Gajewski et al, 1981). Thus,

the widespread introduction of ultrasound in practice contaminated surgery constrained abundance quite contradictory observations (VI Gostishchev, et al, 1986).

Used in modern medicine, highly effective methods of local ozonoterapevticheskogo impact proved to be effective in the treatment of venous ulcers and local microbial-inflammatory processes (NP Krivolutskaya et al, 1999; Svetuhin AM et al., 2003 and others). However, the method itself and, above all, the treatment of venous venous ulcers ozone-oxygen gas mixture is technically complex, requires regular repeated use throughout thethe treatment period and the special provisions allocated based sanitation epidemiological norms ozonoterapevticheskogo use expensive equipment (VG Nikitin, 2001; A. Ants, 2003). One of the most effective methods of effective rehabilitation of venous ulcers is the use of high-NO-therapy. PLASON - apparatus for NO-therapy, plasma surgery at the basis of action of the universal, fundamentally new medical air-plasma device "PLASON" supposed influence on human tissue flow of hot air plasma for surgical effect and the flow of gas, formed by cooling the air plasma and containing molecule nitric oxide to produce a therapeutic effect (NO-therapy). In accordance with the specifications of the device is intended for coagulation and wound surface sterilization, evaporation and decomposition of non-viable tissue and pathological entities, dissection of biological tissue plasma flow temperatures up to 4000 ° C, and for stimulation of reparative processes in the treatment of various pathological conditions NO-containing gas flow temperatures up to 40 ° C.

Method has a long history of local drug treatment of venous ulcers. His arsenal of truly limitless - from herbal extracts to modern chemotherapy, and wound dressings.

The benefits of modern dressings used in all phases of wound healing process, no doubt. They allow you to carry out long and proregeneratornoe local antimicrobial effect, significantly reduce treatment time and improve the quality of life of patients (IS Baginskaya, 2003; A. Gericke, 1998). However, the use of

modern dressings, claiming the economic efficiency requires a rather extensive clinical experience working with a variety of dressings and materials, regular bacteriological control over the state of the local tissues in the treatment process and the essential starting capital for the purchase of expensive per unit of output dressing. The variety of proposed methods indicate a lack of them: the perfect tools (AI Kirienko et al. 2000, 2001). Thus, analyzing the literature data it can be concluded about the unconditional benefit of active surgical tactics toward reorganization of trophic ulcers of venous etiology. However, a greater variety of tactical proposed therapeutic approaches to this problem, it may indicate a lack of them advanced medical tactics. This, given the capabilities of modern surgical techniques, resulting in the need for further search for optimal treatment of varicose veins of the lower extremities with infected trophic ulcers.

### 1.3 Methods of correction of the venous circulation in VDLE complicated trophic ulcer

Treatment of venous trophic ulcers not give a positive result, until the cause of reflux and all the points of the "leaks", causing venous engorgement of the lower limbs, are not identified and eliminated (P.Labas, M.Kembet, 2001.). The general trend in modern surgery VBNK if trophic disorders is rapid separation of superficial and deep venous systems based on the principles of minimally invasive and elective. If necessary, filling defect at the site of tissue trophic ulcers (A.P.Chadaev, 2000; BCSavelevi al 2001; AM Shulutko 2001, I. Sukharev, 2001; AM Khokhlov, 2002, 2003, VT Vasyutkov , 2003; G. Hauer, I985). Equipment operations in saphenous veins of constant develop and improve many surgeons. However, while the percentage of inefficient operations and the recurrence of trophic disorders was high (I. Zolotukhin, 1997). In the future, the effectiveness of these operations increased by introducing more thorough ligation of venous tributaries in sapheno-femoral junction and sapheno - poplitealnogo and delete extended superficial veins of the foot (A.N.Vedensky, 1983). According to a large-

scale international study RELIEF, failure sapheno-femoral junction with uncomplicated varicose veins of the lower extremities revealed an average of 40% of patients, at the same time in the presence of trophic disorders failure safeyao-femoral junction occurs in almost all patients (G. Jantet, 2002). In this regard, the majority of the supporters of surgical treatment there is no doubt that a large subcutaneous Vienna should be tied at the confluence of the femoral vein and removed (AM Khokhlov. 1990;. BC Saveliev et al., 2000). It is necessary to realize that the more radical operation, so it is traumatic, and the higher risk of severe necrotic complications (Ivan Zolotukhin, 1997, Kiriyenko AI et al., 2000). Interventions on saphenous system, including the removal of subcutaneous trunk lines and their tributaries, must meet the requirement of declivity. No need to remove all available inspection and palpation of the superficial veins, if not dictated to achieving clinical response. Intervention should primarily carry pathogenic in nature, ie Surgical removal, only those veins that are causing disturbances flebogemodinamiki (AI Kirienko et al., 2003). The best option for intervention subcutaneous system, na opinion V.S.Saveleva et al. (2001), in patients with venous ulcers are stem partial phlebectomy, which removes the trunk of the great saphenous vein to the upper third of the tibia. Great practical importance for the treatment of ulcers of venous etiology had work to topographic anatomy, diagnosis nadlodyzhechnyh perforating veins and developed on the basis of this classic epi-and subfascial access for their dressing. Subfascial ligation of perforating veins can not only progreeeirovanie prevent venous disorders, but also to their regression (BC Saveliev, 1999, 2000, 2001, GM Konstantinov, 2000, etc.). The classic treatment for postthrombotic disease, and then decompensated forms of varicose veins of the lower limbs Linton is surgery - Felder (Linton RR, 1938). But these interventions, for all their positive aspects are drawback. They are very traumatic, that along with the high frequency of postoperative septic complications resulting in prolonged postoperative medical and social rehabilitation of patients (IA Zolotukhin, 1997; Kushnarenko AV et al.,

2001). The situation has changed dramatically since the mid-80s, a period of rapid development of endoscopic techniques in surgery (AI Kiriyenko, 1997, IJ Zolotukhin, 1997; BC Saveliev, 1999, 2000, 2001). First endoscopic dissection of perforating veins leg used Hauer (1985). He used the introduction of thoracoscope in subfascial space on the medial surface of the tibia through a small incision in the upper part and then move down and cross perforating veins under direct vision. With insufficient perforating veins cross subfascial surgical approach of a small, formed outside the trophic disorders. Because of the low morbidity of this operation can be used in combination with stem Venectomy on his hip as the first phase of operations in a prolonged and unsuccessful conservative treatment (V.Yu.Bogachev and soavt.g 2000, Kiriyenko AI et al., 2000, 2002 ). Flebogipertenzii reduction, according to the authors, provides favorable conditions for healing ulcers and subsequent intervention in the surface veins. However, it should be recognized that this method, at present, can not be universally applied, as it requires specialized and technologically sophisticated medical equipment, and without the appropriate qualifications surgeon (BC Savelyev ETDF., 2001); This fact is sometimes finds its embodiment in the modification of the method using a "non-standard" equipment: set for laparoscopic surgery, cholecystectomy kits of minimal access, etc. Intervention in the deep veins of the lower extremities is now used very rarely, and usually only in cases where other treatments CVI not give proper effect (AI Kirienko et al., 2003). Of operations to improve the trophic tissue, special attention should be resected posterior tibial veins. Given their extensive contacts through the perforating veins with subcutaneous veins, as well as direct communication with arteriovenous shunts posterior tibial artery resection is the pathogenetic justified. First of similar interventions reported L. Heyhal and P. Firt (1961). They performed a segmental resection of the posterior tibial veins or in their dressing. the upper third of the leg, breaking thus pathological reflux of blood into the subcutaneous venous system. In our country, an active supporter of intervention on the posterior tibial veins was A.N.Vedensky (1986). He offered to

hold a distal occlusion of the posterior tibial veins of different materials. In the author's many years of experience with this technique allows almost 100% of the time to achieve a positive effect. However, this method has several disadvantages. Introduction into a vein of a foreign body inevitably induce thrombosis, control and predict the outcome of which in the veins of the legs is almost impossible (IA Zolotukhin, 1997, NA Kuznetsov et al., 1998). Thus, to date, there is a need to find the most effective tactical approaches to treatment and rehabilitation methods of the qualitative infected venous ulcers. These tasks, in our opinion, could allow to perform surgical operations in infected venous ulcers most radically with minimally invasive and thus reduce the risk of postoperative septic complications.

## CHAPTER II. GENERAL DESCRIPTION OF THE CLINICAL OBSERVATION AND METHODS OF TREATMENT

### 2.1 Characteristics of the clinical observations.

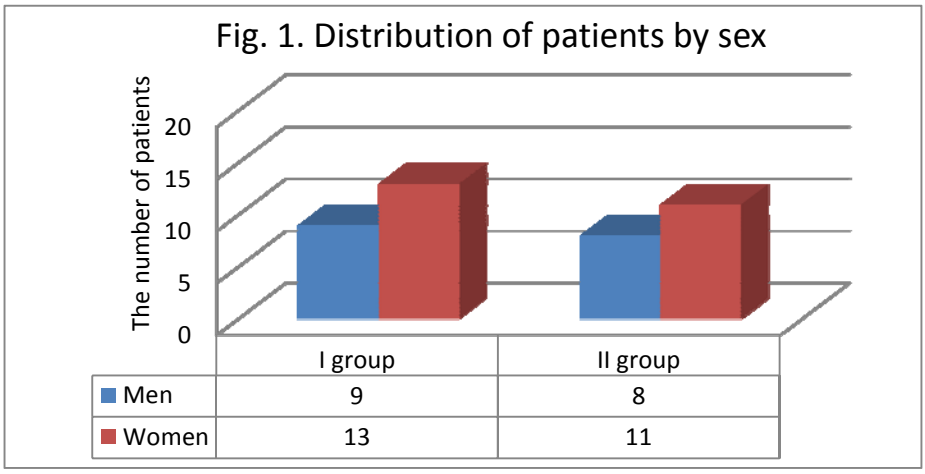
The basis of the clinical study laid a comparative analysis of the results of examination and treatment 41 patients with varicose veins of the lower extremities,

trophic ulcer complicated by an infected leg. All patients were under our supervision in the clinic TMA from 2000 to 2012. According to the clinical classification of chronic venous insufficiency of the lower limbs (CEAP) (PL Antignani, 2001; J. Bergan, 2001; G. Schmid - Schonbein, 2001; AA. Ramelet, 2001), all patients were consistent with the six stages of CVI. In order to ensure the reliability of the data and the necessary conditions for the comparison we have inclusion and exclusion criteria of patients in the study (see Table 1). Table 1. Criteria for inclusion and exclusion of patients included in the study

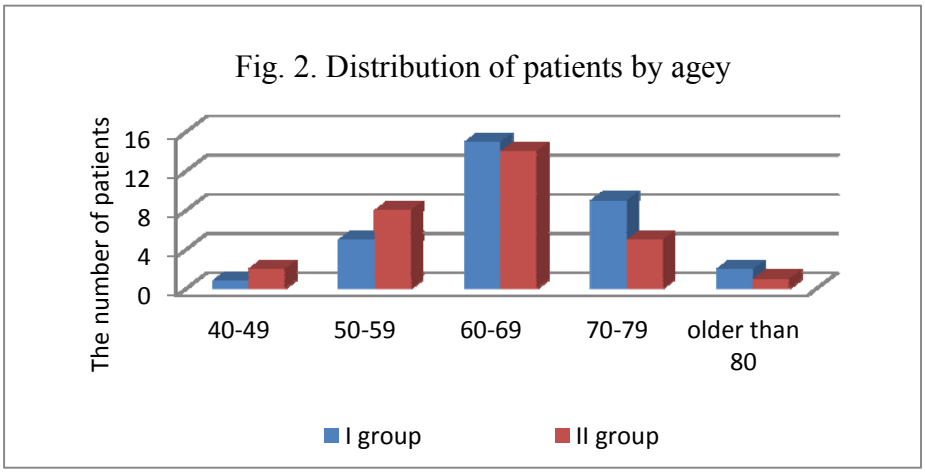
| INCLUSION CRITERIA | THE EXCLUSION CRITERIA |
|---|---|
| 1. Semination ulcer 105 - 107 microbes per 1 gram of tissue<br>2.Traversed by the deep veins lowerextremities<br>3. Ankle-brachial index ≥ 0,9<br>4. Area of the ulcer for at least 7 cm2<br>5. Valvular insufficiency sapheno - femoral junction | 1.Diabetes mellitus<br>2. Circulatory insufficiency 2-3 tbsp.<br>3. Dermatitis and eczema in the trophic ulcers<br>4. Lymphedema of the lower limbs<br>5. Nedostatochnost sapheno-poplitealnogo anastomosis<br>6. Drug poliallergiya<br>7. Signs of malignancy<br>8. Systemic connective tissue disease |

The study included only patients with a single infected trophic ulcer leg and an area of the ulcer, which initially will minimize the possibility of independent action by epithelialization complex conservative therapy. First of all, were excluded from the study patients with severe cardiovascular disease, obliterating

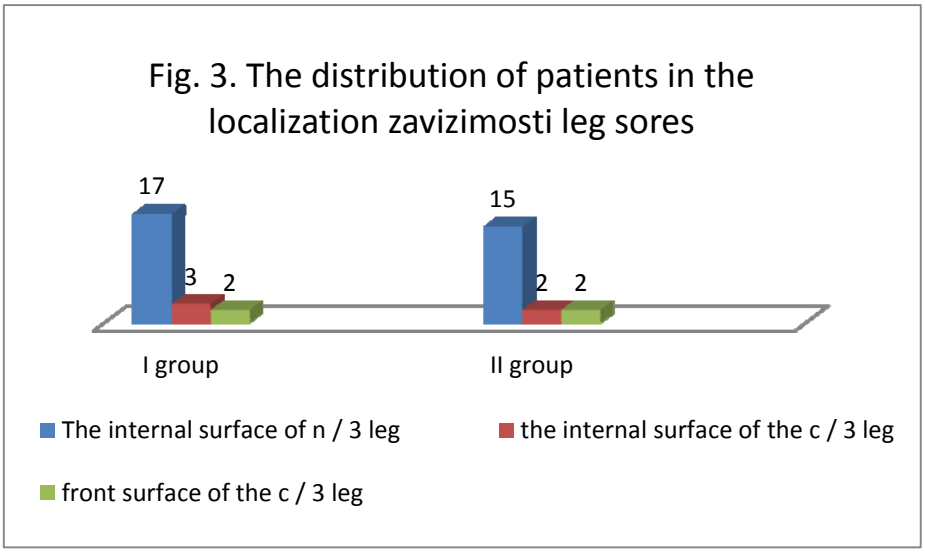
diseases of the peripheral arteries, the primary and secondary lymphostasis, has evolved as a result of diseases of lymphatic system, as each of these exclusion criteria, could complicate an objective evaluation of the impact of the proposed medical complex. All patients included in the study were comparable in clinical characteristics (see Figure 1-4) and randomized according to the proposed medical complex with the release of two groups. In the first group (22 patients) medical complex implemented in two stages, the second group (19 patients) in one step.



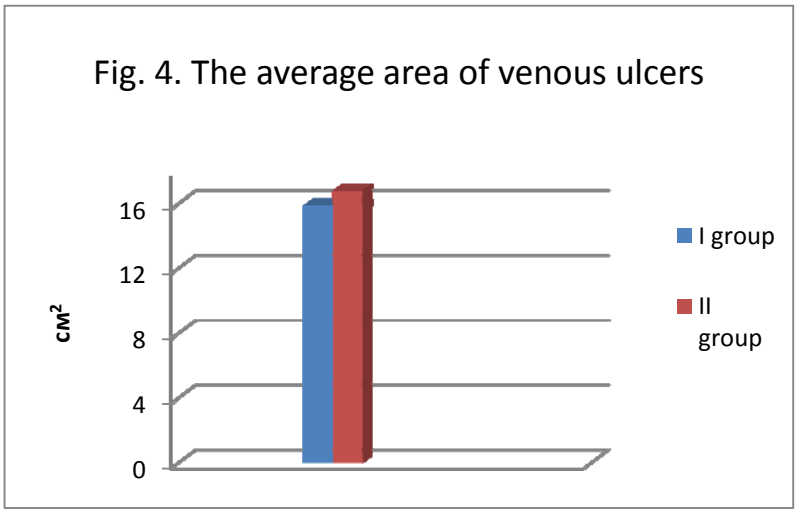

As can be seen from Figure 1 of 41 patients studied, there were 24 women (58.5%) and 17 men (41.5%).




The overwhelming majority of patients with venous trophic ulcers infected calf were persons over 50 (94%). Of these, the largest group was represented by patients in the age range 60-69 years (65%).




As shown in Figure 3 the most common site of venous ulcers is the interior surface of the lower third of the leg - the medial malleolus. Similar localization was present in 32 patients enrolled in the study (78%). Ulcers, localized on the inner surface of the middle third of the tibia occurred in 5 patients (12%). On the front of the leg in 4 patients (10%).

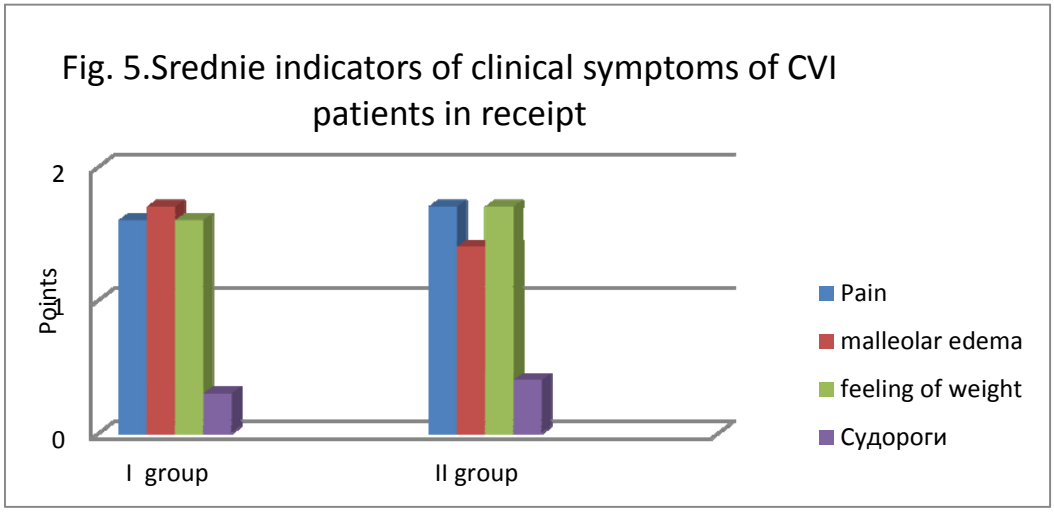



The average area of trophic ulcers at the initial examination of the first group of patients was 15.86 ± 3.2 cm 2, patients of the second group - 16.79 + 2.5.

**2.2 Methods of investigation**

All patients included in the study, carried out a comprehensive clinical, morphological, laboratory, including dynamic bacteriological and Diagnostics flebogemodinamicheskih disorders and trophic ulcer disorders.

2.2.1 Clinical Evaluation Clinical evaluation was carried out on the basis of both subjective symptoms and objective research data. In this case, to evaluate the nature of the local ulceration - the location, the size of the ulcer, depth, character, and its surface area, the type and amount of discharge. Almost all patients admitted, the deterioration of the general condition. At the initial examination, most of them had obvious signs of active microbial-inflammatory both in the lesion and surrounding tissues: the surface areas of necrotic masses were noted, the bottom of the ulcer was often represented a pale foam granulation, coated films and fibrinous purulent raids. Perifocal, against effects of hyperpigmentation and induration of the subcutaneous fat, were observed phenomenon of acute or subacute cellulitis. Clinically it is manifested in increasing pain that requires medical treatment. Edema, progressively increasing in the evening and after the passing of sleep was also significantly expressed. Deterioration in general well-being reduced quality of life. Thus, on the basis of the above local and global clinical status of the patients could be concluded prior lengthy and often unsuccessful conservative therapy, which may be carried inadequate, leading to decompensation flebogemodinamiki lower limbs, progressing local microbial-inflammatory and as a consequence, the need of hospital treatment. Clinical evaluation of the effectiveness of treatment was based on the measurement in points (maximum 2 points) most dynamic clinical symptoms of CVI according to the clinical part of the International Classification of CVI CEAR (PLAntignani 2001; J. Bergan 2001; G. Schmid-Schonbein 2001; AA.Ramelet, 2001) . This takes into account pain, malleolar edema, convulsions and a sense of gravity (see Figure 5).




Pain syndrome that requires taking non-narcotic analgesics - 2 points, moderate pain not requiring analgesics - 1 point, and a score of 0 to no pain in the trophic disorders.

Indicators of pain in almost all patients on admission to the hospital consistent with the degree of activity of microbial and inflammatory process in the trophic ulcers and severity flebogemodinamicheskih disorders. These important functional symptoms of CVI as cramps and a feeling of heaviness in the leg, was also evaluated in points. In marked signs - 2 points, moderate - 1 point and 0 points in the absence of seizures, and a feeling of heaviness in the lower limbs. Edema was evaluated on the basis of objective data obtained by measuring the circumference of the concerned leg above the ankle and the lower third of the leg. The measurements were made in the morning just before the imposition of the elastic band and before bedtime. Calculated based on the average of the two measurements. The results are expressed in centimeters. Averages malleolar perimeter leg in patients included in the study are consistent with 25.7 + 2.34 cm The experience of many researchers shows that one of the most objective way of evaluating the effectiveness of local treatment of venous ulcers is a measurement of the rate of epithelialization (NG Askerov, AM Svetuhin, 2003; Vasyutkov VJ, 2003, etc.). We determined the ulcer area by planimetry day after the admission to hospital and before discharge. For this purpose, the contours of ulcers, which was applied to a sterile plastic film superimposed on the ulcer surface. The

measurement data were transferred onto graph paper and calculate the area of the surface of the ulcer. These data are expressed in cm2. Epithelialization of the ulcer speed determined by the formula (S - Sn) / t, where S - the initial ulcer area before treatment, Sn - area at subsequent measurement, t - the number of days between measurements. The results are expressed as a rate of epithelialization cm 2 / day.

### 2.2.2 Bacteriological study

Most stable and informative indicator of assessing the nature of the local microbial - inflammation is the method of quantitative characterization of microflora of 1 gram of tissue purulent wounds or sores, taken by biopsy (AM Svetuhin et al. 1990, ST. Dobysh et al., 2001) . At the same time, the method of determining the number of bacteria on the surface of 1 cm or the number of microbial cells in 1 mL of discharge is not completely reliable, because the level of bacterial contamination on the surface of the trophic ulcers can fluctuate significantly depending on the nature of therapeutic action. Therefore, the purpose of bacteriological examination of tissue venous ulcers we used special rapid quantitative methods. Identification of the pathogen was carried out through an automated microbiological analyzer "ATB Expression» (OOO «Biomere", France) and standard bacteriological laboratory methods used in the laboratory of clinical bacteriology, microbiology. Collection of material on the day of admission and then at 3, 5, 7, 10, and day 15 in the presence of an open ulcer surface. To do this, by excision or curettage spoon Volkmann is extracted enough tissue for bacteriological research, and study the degree of bacterial contamination. Thus received tissue placed in a sterile tube with liquid transport medium and within a maximum period of two hours, brought to the bacteriological laboratory. In addition, in patients with carbon used a laser to study the degree of bacterial contamination and identification of the causative biopsirovanie trophic ulcer tissue taken before and after the reorganization. Primary seed tissue ulcers, taken from biopsies performed on a Petri dish with 5% blood agar supplemented with defibrinated sheep blood by the quantitative method. According to the results of this method in the first day of the date of the fence

biomaterial judged on the level of bacterial contamination of tissue trophic ulcers. In addition, the material is placed in a test tube with thioglycolic environment. Incubation is carried out in an oven at 37 ° C for 18-24 hours. When the primary identification of pathogens accounts for these native smear microscopy and smears of pure cultures of microorganisms, the morphological features of the growth of bacteria on nutrient media and their phenotypic characteristics (Williams & Wilkins, 1989).

Subsequent identification of microorganisms were performed using an automated microbiological analyzer "ATB Expression» (LLC «Biomere", France). To this suspension was prepared from the daily culture of the test organism in sterile deionized water (Biomere). As a result of bacteriological study also found that the isolated organisms were sensitive to almost all the most commonly used in the clinic cephalosporin antibiotics, aminoglycosides, macrolides, and fluoroquinolones. However, in six cases was isolated Gram-negative flora, multi-resistant to all test antibiotics.

### 2.2.3 Histological examination

The day of admission, during the first ligation, all patients, including those performed compulsory histology trophic ulcers. The main objective of this study was the exclusion of cellular atypia (squamous cell skin cancer, basal cell carcinoma), systemic zabolevaniysoedinitelnoy tissues (systemic lupus erythematosus, scleroderma) in tissue biopsies of trophic ulcer. Histological examination were mandatory biopsy of the ulcer edge and. Biopsy is done under local infiltration anesthesia, digged at least three pieces of cloth on the depth of the ulcer. Bleeding after the biopsy was stopped firmly pressed gauze swab moistened with 3% solution of hydrogen peroxide. After the biopsy, the ulcer bandage with a 1% solution of povidone-iodine. Were stained with hematoxylin-eosin and examined by a microscope, "Biola - R 11" with lenses 8 x 40 x 0.20 and 0.65.

The histological study of biopsies tissue fragments trophic ulcer patients were found morphological evidence of active inflammation. Tissue ulceration characterized by high cellular activity in the form of diffuse and focal infiltrates limfogistiotsitarnyh with a moderate amount of neutrophil polymorphonuclear leukocytes, plasma cells, macrophages, and mast cells isolated. Was a relatively small number of fibroblasts, indistinct collagenogenesis. In the biopsy specimens had reduced the number of capillaries and small blood vessels, the development of productive vasculitis in the deep parts of the maturing granulation tissue. In the walls of the arterioles and venules, larger vessels often observed endothelial cell proliferation and intimal thickening up to the obliteration of its lumen. In the same time period in other biopsies showed signs of active process. Become purulent infiltration, vasculitis acquired purulent. However, some observations in the presence of bacteria in the wound of polymorphonuclear leukocytes was small. In one case histological analysis of fragments of trophic ulcer revealed histological signs of malignancy trophic ulcers. These patients were excluded and sent to an institution.

Thus, the histologic study of venous ulcers allowed two patients with long ulcer history to identify early signs of malignant ulcer, to refrain from inappropriate in this case, surgical treatment and promptly send these patients to a specialized treatment facility.

### 2.2.4 Diagnostics

Physical examination was performed in orthostasis. Evaluate the appearance of course, the presence and location of varicose veins. On palpation defects aponeurosis was identified valvular insufficiency of perforating veins of different groups. Given the low specificity of the functional tests to verify the proposed flebogemodinamicheskih disorders of the lower extremities, with the initial examination was performed only sample Gakkenbruha. Instrumental diagnosis of lower extremity venous hemodynamics wore noninvasive nature, allowed visualization of anatomic and metabolic disorders flebogemodinamiki and included

ultrasonography of the venous system of the lower extremities. The objectives were instrumental diagnosis clarification cause CVI and educational prerequisites flebogemodinamicheskih trophic ulcers, assessment and cross-state valvular deep venous reflux through registration sapheno-femoral anastomosis, the definition states valvular trunks large and small saphenous veins, Identification and localization of failure - "problem "perforating veins. Instrumental diagnostic program implemented in both fixed and in the outpatient setting.

Instrumental evaluation of patients included a Doppler ultrasound (USDG), duplex ultrasound scanning of (USACI) veins of the lower extremities. Doppler ultrasound technique Doppler ultrasound was used as a screening method for the study. It was performed on the Doppler ultrasound equipment "Sanicaid Vasaflo 4" (England) with a set of sensors 4 MHz and 8 MHz. Study of venous this method was carried out in standard locations - ultrasonic "windows", auscultation of which provides the best location of the vessel of interest. These windows were: the area above and below the inguinal crease in its middle third, upper and middle third of the thigh, popliteal fossa, and the lower third of the medial surface of the tibia. The study was performed in the horizontal and vertical position of the patient, which provided the location of veno-venous shunt, resulting only in a standing position, and also facilitates the search of the superficial veins, which, because of the hydrostatic pressure in orthostasis well contoured, even in obese patients. The study was performed by standard methods. Originally surveyed laid on the couch with a raised at 30 ° head end, hands are placed along the body, feet shoulder width apart and slightly rotated outwards. In this position, the patient studied iliac, femoral, shin vessels and the great saphenous vein. Examination of the popliteal and the small saphenous vein was performed with the patient in the abdomen, below the ankle puts a cushion that provides relaxation of the back leg muscles and hips. The sensor is mounted at an angle of 45 ° to the vessel, which provides optimal auscultation. During Doppler determined antegrade and

retrograde flow of blood through the vein, which were detected on the screen. The used functional tests. Performed Valsalva breathing and compression (distal and proximal) of the sample. During Doppler ultrasound was evaluated patency and valvular segments state of deep venous system, the consistency of the venous valves. Study of lower limb arteries finished calculating the ankle-brachial index. Patients with trophic ulcers and varicose veins diagnosed with ankle-brachial index of less than 0.9 were excluded.

**Methods duplex angioscaning**

Duplex scanning of the venous system of the lower limbs produced by ultrasound imaging system "SONOASE X6" (firm Siemens, Germany) (see Fig. 6). It is equipped with convex or sector sensors with frequency ultrasonic vibrations 1,6-13 MHz, with the option of color Doppler flow.

Fig. 6. Appearance of ultrasound imaging "SONOASE X6" (firm Siemens, Germany)

For ultrasound study, we used modes of longitudinal and transverse scanning, color Doppler and Doppler blood flow. Duplex scanning technique of deep and superficial venous segments of the lower extremities is different from Doppler. Study of venous lower limb, as with USDG, carried out by the standard method of ultrasonic "windows." When UzACI in all cases detected valvular insufficiency of deep veins of varying degrees of severity. Changes in the deep veins were functional in nature - the walls are thin, easily compressed, leaf valve

float freely in the lumen of the vein and closes at the height of the Valsalva maneuver. All patients included in the study, with UzACI confirmed proximal venous-venous shunt in saphenofemoral fistula. The time spent on the study of the venous system of the lower extremities, ranged from 30 to 45 minutes. This method allows to noninvasively and accurately visualize anatomical flebogemodinamicheskie violations, largely determining the surgical approach. Possibilities of this method can estimate the functional condition of the walls and the valve apparatus of deep and superficial veins, venous patency segments and accurately map the functionally insufficient perforating veins in the area of trophic disorders in small ulcers. However, the presence of large ulcers, expressed Lipodermatosclerosis the lower third of the leg to fine verification of hemodynamic disturbances in the "problem" area was extremely difficult. Thus, the results of the survey were instrumental in determining the choice of surgery in the treatment of all patients. A complete list of the methods for evaluation of patients infected VBNK trophic ulcer is presented in Table 3.

Table 3. Quantitative data frequency of use survey methods

| The investigations | Number |
|---|---|
| Microscopic examination | 45 |
| Bacteriological examination | 86 |
| Doppler ultrasound | 56 |
| Ultrasound scanning of | 86 |
| | |
| TOTAL: | 273 |

## 2.3 Treatment

All patients included in the study, assign system flebotropnaya dosed pharmacotherapy and elastic bandages and medicines to correct comorbidity. Within flebotropnoy pharmacotherapy was used alone micronized flavonoid fraction - Detralex drug (pharmaceutical company "Servier", France). The drug

was used in all patients: 1 tablet 2 times a day for the duration of hospitalization. The mechanism of the positive action DETRALEX and elastic compression on the dynamics of trophic disorders is now well understood (BC Saveliev et al., 2000, 2002; GW Shmid-Schonbein, 2000; R: Weiss et all., 2001; AA Ramelet, 2003). As an elastic compression, we used moderate stretch bandages that imposed directly after ligation in accordance with the general principles applying elastic bandages in chronic venous insufficiency (Franks PJ, 1998).

Thus, the first group of patients was offered two-stage medical complex. In the first phase, it includes local antiseptic therapy. On the second and final step occurs pathogenetic operations aimed at correcting flebogemodinamicheskih disorders. Such radical surgery was performed in a volume of combined phlebectomy combined with subfascial dissection of the "problem" of perforating veins in the lower leg. Treatment of patients of the second group were combined and one-step. After the pre-renovation ulcer surface NO-therapy (with the unit PLASON) combined phlebectomy performed with dissection of "problem" of perforating veins in the lower leg. Medical complex in all of the two groups of patients is shown schematically in Table 4:

Table 4. Distribution of patients according to the method of treatment

| Stages of treatment | I two-stage treatment group | II group one-step treatment |
|---|---|---|
| | (N=22) | (N=19) |
| I stage | Integrated conservative therapy | Remediation ulcers PLASON apparatus, combined phlebectomy, Dissection perforators in the lower leg |
| II stage | Combined phlebectomy | |

| | | |
|---|---|---|
| | + Dissection perforators in the lower leg | |

Thus, in the first group consisted of 22 patients, in the second 19 patients with varicose veins of the lower extremities, complicated infected trophic ulcers.

### 2.3.1 Methods of rehabilitation of venous ulcers

To cleanse ulcers and prevention of secondary infection in this study, 22 patients used a procedure traditional local antiseptic therapy. In 19 patients bacterial decontamination was achieved by treating the surface with a high-ulcer PLASON apparatus. The main task of the local antiseptic therapy as a necessary component of a comprehensive medical therapy was to achieve the most efficient and optimal in terms of decontamination tissue trophic ulcers. The second important task was to create a reliable prevention of secondary infections sanitized ulcers, as this factor has a significant impact on both the terms of elimination of the ulcer, and in terms of performance pathogenetically directed operations on the veins in the lower limbs. Remediation of venous ulcers with the device PLASON. As best in our opinion, the method of microbial decontamination ulcer surface within preoperative patients of the second group performed a preliminary reorganization of trophic ulcers with a high-NO-therapy.

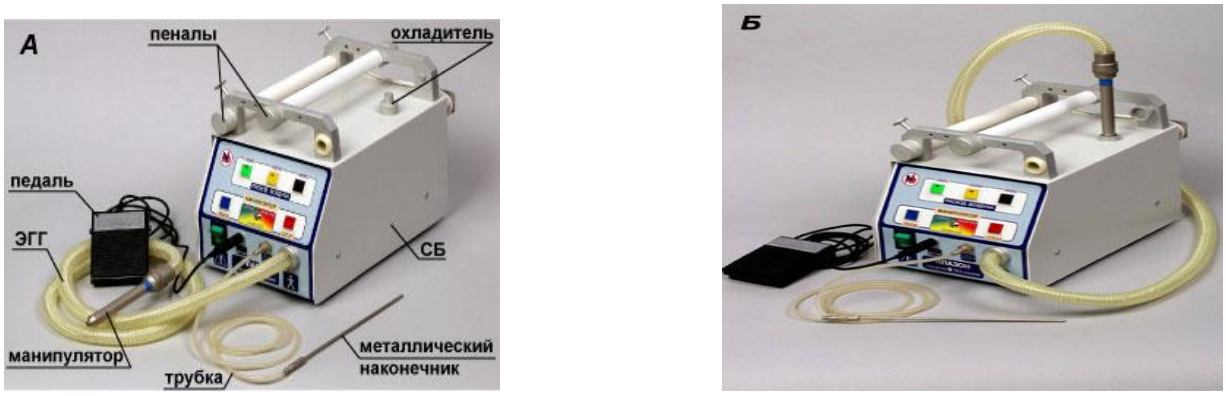



Fig. 7. External appearance PLASON NO-therapy A local anesthetic before the ulcer surface readjustment used 5% cream "Emla" (Sodertalje, Sweden). In this case, at least 2 hours before necrosectomy in dressing ulcers after treatment with 3% solution of hydrogen peroxide into ulcerous surface uniformly applied the

cream, and the top was applied aseptic plastic film and fixed its circular bandage. Specified amount of time was sufficient for a smooth vaporization of tissue to be removed.

After removing the bandage and remove excess cream machine focused PLASON remotely produced layer by layer evaporation necrotic foci and dense fibrinous raids until well bleeding tissue. After that, in the cutting mode excised ulcer perimeter edges, and the bottom, which are subsequently sent for histological examination.

The resulting burn eschar was completely removed 3% hydrogen peroxide solution, then re-evaporated tissue to be removed. For the purpose of hemostasis and wound surface sterilization operation ends defocused effect of air-plasma device.

The time taken to process the surface of the ulcer, ranged from 15 to 20 minutes and the average time was 15 ± 2,5 minute. This wide range of time can be explained by differences in the size and depth of ulcers. Ulcer surface after air plasma treatment was covered with dry, very thin crust golden brown. NO-therapy, causing immediate coagulation of tissue and blood vessels and allow for the processing of ulcers completely bloodless. After that, the re-sampling of biopsy tissue in ulcer surface to control bacteriological study. The resulting crust removed swab dipped in a 3% solution of hydrogen peroxide. Wound surface with a uniform light pink color. Wound surface osushivali gauze and re-produced reorganization wound surface for stable hemostasis. Then was applied to the wound surface indifferent atraumatic coarse textile bandage (tenderWet), does not contain antimicrobial components, and crepe bandage was applied. Thus, as a result of air-plasma treatment of ulcers in addition to removing infected tissue could also optimize the shape of ulcer surface for subsequent adequate adaptation of the plastic material.

### 2.3.2 Method of operation of the veins

As the most radical treatment receiving surgical correction of pathological venous-venous shunt, revealed in a survey carried out carefully all the patients included in the study. The main types of surgical interventions at various stages of treatment were combined phlebectomy, various subfascial dissection of perforating veins in the legs, sclerotherapy catheter on the tibia. Combined phlebectomy performed the traditional method under epidural anesthesia. Surgical approach was performed in parallel and above the inguinal crease. Volume phlebectomy directly dependent on the location and severity of the ulcer area of trophic disorders in the lower third of the leg. In severe venous disorders in the lower third of the leg and the presence of large ulcers, located on the medial surface of the tibia, the extent of surgical benefit for superficial venous system was to remove the trunk of the great saphenous vein to the area of trophic disorders. The intervention complement sclerotherapy catheter on the shin, which was carried out after treatment subfascial perforators on the tibia. Technically, it looked like. Removed the trunk of the great saphenous vein combined way to zone Lipodermatosclerosis. After processing, "crow's feet" over the medial malleolus was removed blood from the site of the GSV by washing it 0.9% sodium chloride solution. Next on the catheter distally into the trunk of GSV injected sclerosant - 3% solution ethoxysclerol (Germany) and applied elastic bandage. The operation ends stratified suturing wounds. Low multiperforantny venous shunt dissection eliminated or "problem" perforating veins leg of minimal access or videoassistiruemoy subfascial endoscopic dissection of perforating veins or traditional surgery Linton. With the localization of trophic ulcers on the front of the leg or on the inner surface of the middle third of the tibia performed dissection of perforating veins of minimal access. To do this, outside of trophic disorders performed a longitudinal skin incision 4 cm further layers, sharp by cutting the skin and subcutaneous tissue. Isolated calf deep fascia, which dissects longitudinally along the fibers. Then blunt and sharp separated by fascia of muscles within the wound. Later in the surgical wound in the direction of an ulcer was injected with fiber glass from a set of minimal access to cholecystectomy,

during which the control eyes was exposed subfascial space and perforating veins, which intersect with the bipolar coagulator or ligated. With the localization of trophic ulcers of the medial malleolus was used videoassistiruemuyu subfascial endoscopic dissection of perforating veins. For this purpose, a medial approach to the upper and middle third of the leg. After separation blunt subfascial space distally under ulcer injected laparoscope. Subsequently isolated perforating vein and using a set of manipulators for laparoscopic ligated or coagulated its klipatorom diatermokoagulyatorom it. The operation ends stratified suturing wounds.

List and the number of surgical procedures performed in this study are presented in Table 5.

Table 5. A list of surgical procedures

| Kind of transactions | Number operations |
|---|---|
| Combined phlebectomy + subfascial dissection of perforating veins in the lower leg | 19 |
| Catheter sclerotherapy for leg | 11 |
| Dissection of perforating veins in the lower leg of the mini - access | 2 |
| Subfascial dissection of perforating veins in the lower leg | 12 |
| TOTAL: | 44 |

## CHAPTER III. Effectiveness studies of different methods in the treatment of infected venous ulcers

### 3.1 Comparison of the bacteriological evaluation of topical antiseptic

In order to identify the most effective antiseptic topical treatment and prevention of secondary infections sanitized surface ulcer patients included in the study, we conducted a preliminary pilot study. The experiment was conducted in three series of experiments on two types of agar in a bacteriological laboratory. In order to objectify the experimental conditions and improve the reliability of the data as culture media were used 5% blood agar Mueller-Hinton (A) and Mueller-Hintoyaa (B) by adding equal doses of therapeutic concentrations of the most frequently used in the clinic include chemical preservatives different groups . We used 1% solution of povidone-iodine, 0.5% aqueous chlorhexidine, 1% solution dioksidina, solution furatsillina 1:5000. As a control, agar was added to the physiological saline solution in equal volume ratio, V agar (with the above antiseptics) placed in numbered wells seeded cultures of various species of pathogenic aerobic microorganisms.

For the experiment, three cultures were selected museum strains of microorganisms: Staphylococcus aureus 22352, Enterococeus faesalis 22350,

Escherichia coli 22340. In addition, in the experiment were used hospital strains of microorganisms isolated from biopsy samples of venous ulcers in patients enrolled in the study and have a high resistance to antibiotics, namely, Staphylococcus aureus, Pseudomonas aeruginosa, Escherichia coli, Proteus mirabilis.

For all used experimental microorganism cultures prepared a series of standard dilutions with concentration of microorganisms from 102 to 107 md. bodies in 1 ml. Considered a positive result at which all dilutions was obtained antiseptic effect. Thus, in the experiment indicated that the 1% solution of povidone-iodine in a test organism most sensitive. Museum strains of microorganisms were in all cases sensitive to 1% solution of povidone-iodine and 0.5% aqueous chlorhexidine. Hospital strains of microorganisms, including Pseudomonas aeruginosa, were resistant to 0.5% aqueous chlorhexidine. In doing so, and Dioxidine, Furatsillin shows greatest resistance. Full details of the experiment are shown in the following Table 6.

Table 6. Comparative efficacy of antiseptic agents in vitro

| Experimental strains | Chlorhexidine 0,5% | | Povidone-iodine 1% | | Dioxidine 1% | | Furatsillin 1:5000 | | NaCl 0,9% | |
|---|---|---|---|---|---|---|---|---|---|---|
| | А | Б | А | Б | А | Б | А | Б | А | Б |
| Staphylococcus aureus 25923 | S | S | S | S | S | S | S | S | R | R |
| Enterococcus faecalis 29212 | S | S | S | S | R | R | R | R | R | R |
| Escherichia coli25922 | S | S | S | S | S | S | R | R | R | R |
| Staphylococcus aureus | S | S | S | S | S | S | S | S | R | R |
| Escherichia coli | S | S | S | S | S | S | S | S | R | R |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Proteus mirabilis | S | S | S | S | S | S | R | R | R | R |
| Pseudomonas aeruginosa | R | S | S | S | R | R | R | R | R | R |

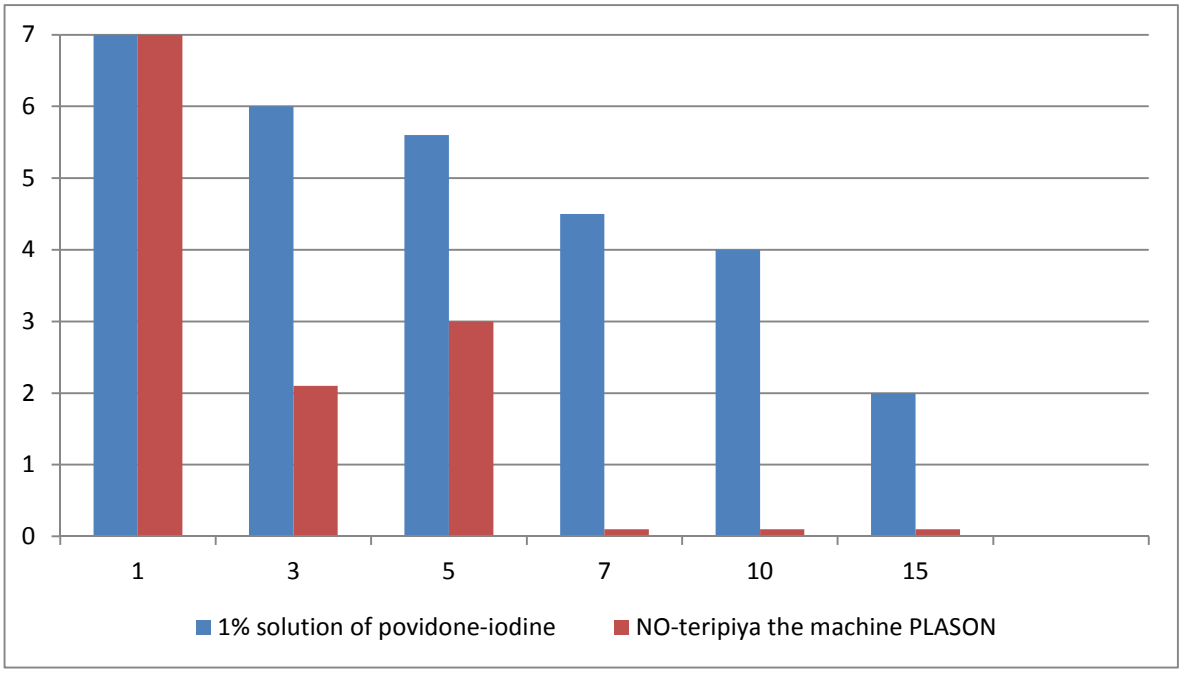
Note: S - sensitive R – resistant

Thus, based on the results of this experiment, it was concluded that a 1% solution of povidone-iodine is the most effective local chemical preservative against microorganisms most commonly planted of trophic venous ulcers, including the most resistant to antibiotics. The 1% solution of povidone-iodine was elected as a universal means for conservative local antimicrobial therapy in the first and second groups of patients, and prevention of secondary infection ulcer surface in all patients studied.

**3.2 The efficiency of the antiseptic treatment of infected trophic venous ulcers**

In the study, were used two different methods of local antiseptic treatment of infected venous trophic ulcers in 41 patients from the first and second groups based on our own experimental research to treat and prevent secondary infection ulcer surface was used 1% solution of povidone-iodine. 19 patients in the group where treatment was one-step, to bacterial decontamination ulcer surface, we used a high-energy rehabilitation of infected ulcers PLASON apparatus. Since entering and after the session management of venous ulcers reorganization was carried out under coarse textile atraumatic dressing that does not contain antimicrobial components. The effectiveness of local antiseptic treatment was monitored by the above scheme by regular bacteriological study, the technique is described in detail in the second chapter (see Chap. 2.2.2). Against the background of the local treatment of a 1% solution of povidone-iodine in the bacteriological examination of the dynamics observed reduction in microbial contamination of venous ulcers (see Figure 8).

Fig. 8. Dynamics of microbial contamination of venous ulcers with different methods of rehabilitation




As can be seen from the figure, the initial level of microbial contamination of venous ulcers in patients enrolled in the study, there was a significant and consistent with the average level of about 106 ± 5h104 mic. phone at 1 g. tissue ulcers. This, according to our observations, in line with the local nature of the flow of microbial and inflammatory process in the ulcer. We also noted that the surface of venous ulcers 5-7 days were partially or completely covered with festering films, and along with the presence of granulation tissue spongy dull in some

patients revealed focal necrosis. Only to 10.8 ± 2.5 days in the degree of microbial contamination reaches the lower limit of its critical level, with an average of 105 ± 0,5 h102. It was also noted increased growth of granulation tissue with a reduction of exudation ulcer surface. Sustained reduction in the level of microbial contamination of tissue trophic ulcers to a level that allows to perform skin grafting, was achieved only to 12,5 ± 1,3 days, averaging 103 ± 0,5 h102. This average level of microbial contamination can count on a favorable outcome of plastic surgery and healing of skin grafts. Dynamics of objective indicators of wound process in patients in treatment which, as a topical therapy was used a high-energy AP, in our opinion is objective evidence that high local antiseptic and clinical efficacy of this treatment. These bacteriological examination of tissue ulcers, taken immediately after the NO-therapy, in most cases showed a complete lack of growth of microorganisms. So in 16 patients (84.2%) bacteriological examination showed no growth of microorganisms, and in 3 patients (15.8%), the level of microbial contamination of tissue trophic ulcers was significantly lower than the critical and remained at 103 ± 0,5 x102 microbes 1 gram of tissue ulcers.

Thus, a comparative evaluation of the two methods of local antiseptic therapy in patients with infected trophic ulcers leg suggests that the laser readjustment in the earlier periods lead to sterilization or decontamination of microbial tissue trophic ulcers to well below the critical value. At the same time, it allows to actively influence the perceiver bed topography, creating optimal conditions for the adaptation of plastic fabrics. In addition, laser readjustment allows an average of 3 days without the use of local antiseptics to keep the degree of microbial contamination of tissue trophic ulcer on a level that allows to perform the plastic surface of the ulcer. However, keep in mind that the 3 days after laser readjustment infected trophic ulcers degree of microbial contamination of tissue begins to exceed its level, allowing her to resort to plastic closure.

### 3.3. The study of the effectiveness of early elimination of high vertical veno-venous reflux in the treatment of infected venous ulcers

The effects of early elimination of the upper vertical veno-venous reflux through sapheno-femoral anastomosis on the course of reparative processes in the trophic ulcer was assessed by the degree of bacterial contamination of the dynamics of tissue ulcers, its rate of epithelialization. It also took into account the severity of the most dynamic changes in functional clinical symptoms of chronic venous insufficiency (pain, malleolar swelling, heaviness). Comparative dynamic characteristic degree of bacterial contamination of venous ulcers in 12 patients with reflux through sapheno-femoral anastomosis and 10 patients without reflux is shown in Table 7.

Table 7. Influence SAFE - femoral reflux dynamics level of microbial contamination of venous ulcers

| Day | The level of microbial contamination (mikr. phone / 1 gram of tissue) * | |
|---|---|---|
| | Group 1 (with reflux, n = 22) | Group 2 (no reflux, n = 19) |
| 1 | $10^6 \pm 5x10^4$ | $10^6 \pm 5x10^2$ |
| 3 | $10^4 \pm 5x10^6$ | $10^6 \pm 5x10^4$ |
| 5 | $10^6 \pm 5x10^3$ | $10^4 \pm 5x10^5$ |
| 7 | $10^6 \pm 5x10^4$ | $10^5 \pm 5x10^2$ |
| 10 | $10^5 \pm 5x10^3$ | $10^5 \pm 0,5x10^3$ |
| 15 | $10^3 \pm 0,5x10^2$ | $10^4 \pm 5x10^2$ |

*$p<0,05$

As the table shows, the initial level of microbial contamination of venous ulcers in the group of subjects with high vertical veno-venous reflux was significant and corresponded to an average level of 106 ± 5x104 mic. phone at 1 g. tissue ulcers. On a background of elastic compression system flebotropnoy and local antiseptic treatment of gastric surface to 5-7 days bore signs of active local microbial and inflammatory process with the slowdown of local tissue repair.

Only the 10-th day in patients with reflux level bacterial contamination of tissue trophic ulcers reached the lower limit of the critical level of microbial contamination, making up with 105 ± 5x103. This corresponded chronologically increased growth of granulation tissue and decreased exudation ulcer surface.

Of septic wound complications were reported in either case. In our opinion, this could be due, first, to the remoteness of the area of operations of the exogenous source of infection, and secondly, the ongoing course of antibiotic prophylaxis.

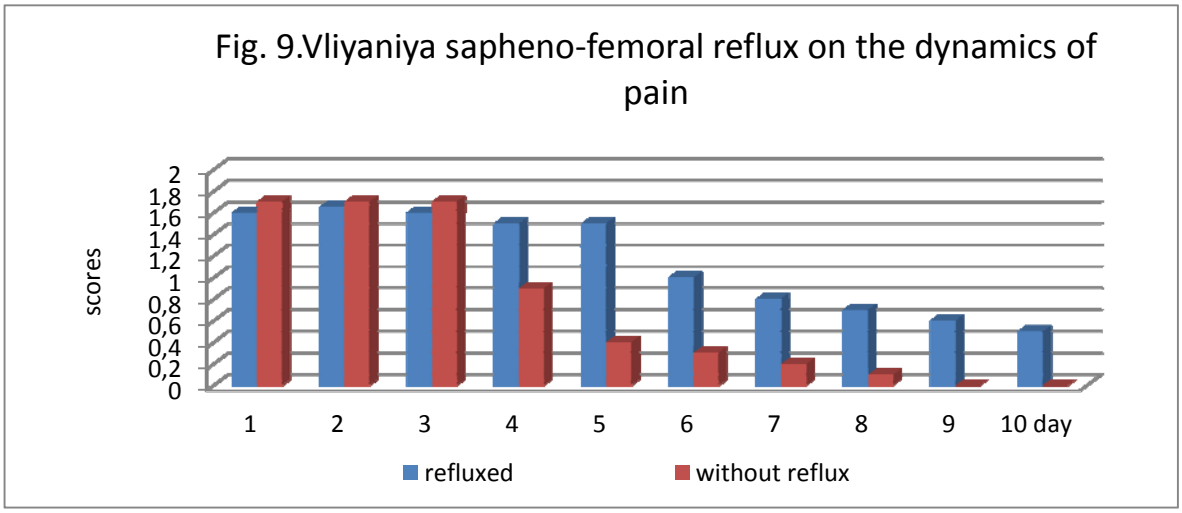
According to the results of bacteriological research to an average of 7,3 ± 1,2 days in the level of bacterial contamination reached the lower limit of the critical level of microbial contamination. Thus, closing the upper vertical reflux against elastic compression of the lower extremities, from our point of view, a positive effect on the course of wound healing in the food ulcer. This fact had a positive impact on the dynamics of both subjective and objective measures of wound process. In our opinion, early run dissection of "problem" of perforating veins in the lower leg with satisfactory results at an earlier date than in patients without the elimination of reflux. The data in Table 8 demonstrate that, given the complex therapy was noted not only the level of bacterial contamination of the regression of trophic ulcers, and reducing the area of the ulcer.

Table 8 Influence sapheno - femoral reflux dynamic area of venous ulcers

| Group | | | Day hospital stay | | | |
|---|---|---|---|---|---|---|
| | 1 | 3 | 7 | 10 | 15 | Speed epithelialization $sm^2$ |
| With reflux | 15,96 ±3,2 | 14,60 ±1,4 | 12,36 ±0,9 | 10,46 ±1,8 | 9,76 ±0,6 | 0,45 ±0,07 |
| Without reflux | 17,53 ±2,5 | 16,30 ±1,3 | 9,13 ±0,52 | 4,28 ±1,95 | 2,16 ±0,98 | 0,75 ±0,11 |

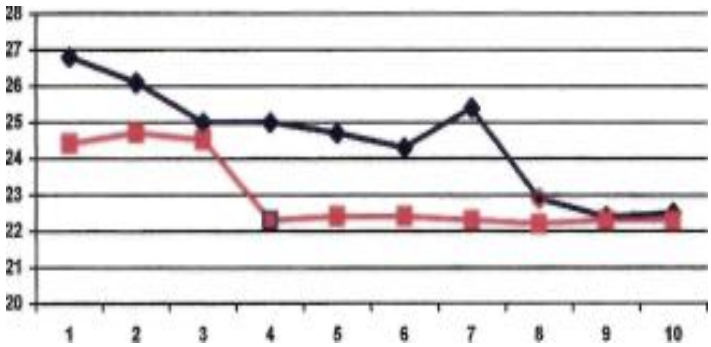
* $p< 0,05$

Thus, on admission in patients with high vertical reflux average ulcer area were 15,96 ± 3,2 cm2. To the 10-th day there was a decrease in ulcer area by 30%, corresponding to 10,46 ± 1,8 cm2. In the group of patients where the upper vertical eliminated veno-venous reflux, the dynamics of bacterial indicators and repair processes in the trophic ulcer was more distinct. Since the area of ulcer in patients at admission ranged from 7.8 to 61.6 cm2 and averaged 17,53 ± 2,45 cm2. Against the background of the therapy until the upper discharge rates average rate of epithelialization of the trophic ulcers were comparable to data in patients with early correction of vertical top Reflux was not performed and averaged 0.44 sm2/sutki. According to the results planometrii to 3rd day average ulcer area was on average 16,30 ± 1,45 cm2. The rate of epithelialization almost doubled and averaged 0,75 ± 0,1 sm2/sutki. This, in our opinion, the positive impact on the dynamics of the average area of recourse ulcers. So, given this trend, it can be concluded that the early removal of the upper vertical reflux with traditional complex therapy to create more favorable conditions in the course of reparative processes in the trophic ulcers compared to patients whose upper vertical reflux was eliminated.




As shown in Figure 9, the nature of the dynamics of objective indicators of clinical symptoms of chronic venous insufficiency was associated with the degree

of effectiveness of the treatment in 12 patients with the presence of the upper vertical veno-venous reflux and in 10 patients with reflux eliminated. At the time of admission in patients with upper vertical veno-venous reflux pain in trophic disorders were expressed significantly and amounted to an average of 1,8 ± 0,51 points. The degree of pain remained fairly stable level of the first three days. By the fifth day on the intake of analgesics and pain intensity decreased in line with the average 1.32 + 0.3 points. Only an average of 9.1 + 1.2 days of treatment noted relief of pain (0 points). Starting from the fifth day, the proportional reduction observed values of all clinical parameters of CVI. For the pain it was 0,33 ± 0,18 points, for a sense of gravity - 0,92 ± 0,43 points. Pain syndrome patients to eliminate the upper vertical veno-venous reflux was also significant, at admission corresponded on average 1,75 ± 0,42 points. However, after the operation to the 5-th day the average score of pain was almost half that corresponded 0,92 ± 0,57 points, and the 7 th day - 0,32 ± 0,06 points and was absent in 10 day of treatment. With patients subjectively reported feeling better, normalization of sleep without the use of painkillers and sedativngh drugs. On admission to the hospital, all patients reported a problem of the lower extremity edema predominantly in the day. Swelling with significantly regressed after a night's rest, with its lofty position. From the study data showed that the basic therapy, including the use of elastic compression and modern flebotropnyh drug, has a positive effect on the dynamics of malleolar edema (see Fig. 18). Fig. 10. Influence sapheno – femoral reflux dynamics malleolar edema.




As shown at the time of hospital admission in patients with upper reflux did not remove malleolar perimeter averaged 26.8 + 1.52 cm on the third day of their

positive dynamics malleolar perimeter, which averaged 25.0 + 1.44 cm to the 11-th day rates stabilized at an average of 22.4 0.7 cm In the second group of patients, consistent with malleolar perimeter 24,7 ± 1,28 cm in this case to the 3rd day, before elimination of reflux, there was a small (24,1 ± 0,34 cm) positive trend edema syndrome, which is most likely to could be due to the limitation of motoring in the hospital during the treatment, which includes the systematic wearing a compression bandage. After the operation Endolintona almost the next day after was awarded a clear positive trend regression malleolar edema. Later in this patient severity indices malleolar edema remained at about the same level of about 22,3 ± 0,57 cm in the group of subjects with reflux malleolar edema rates were unsustainable and were in the range of 2 cm and stabilized only by the $8^{th}$ days of hospitalization. Limitation of motoring in the hospital for treatment with systemic flebotropnoy and adequate compression of the lower extremities in all patients positive effect on the dynamics of clinical symptoms of chronic venous insufficiency as a sense of gravity and severity of seizures in the problem of the lower extremity. Given these data, it can be concluded that the early removal of the upper vertical veno-venous reflux in the mandatory application of the treatment of the traditional positive effect on the degree of functional clinical symptoms of chronic venous insufficiency. Early implementation of short-stripping patients VDLE created more favorable conditions for the flow of microbial-inflammatory and reparative processes in the trophic ulcers.

## CHAPTER IV. Results staged treatment of patients with infected venous trophic ulcers leg.

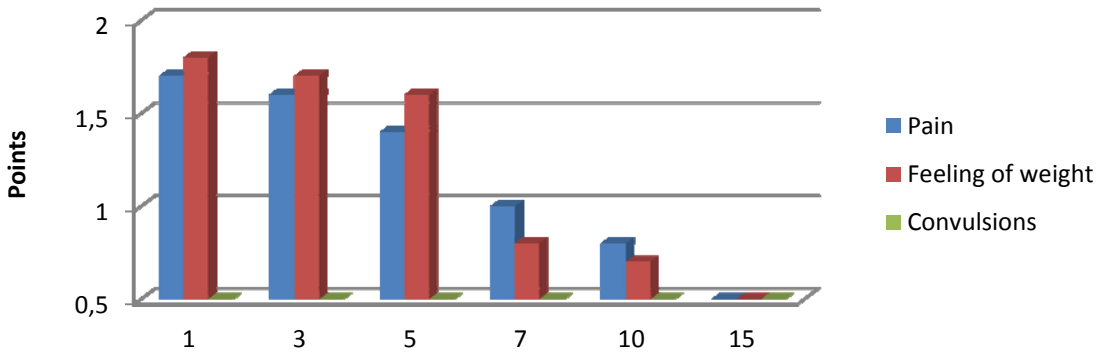
As was pointed out earlier (see Chapter 2), all patients included in the study were comparable in clinical characteristics (see Fig. 1-5) and were randomized according to the proposed medical complex with the release of the three groups. In the first group (22 patients) medical complex implemented in two phases and in the second group (19 patients) in one step.

### 4.1 Two-stage treatment of patients with infected venous trophic ulcers of the lower leg

In group 1 patients with infected VBNK trophic ulcers, medical complex was implemented in two stages: Improved sanitation and surgery, that is, Correction flebogemodinamic disorder - combined phlebectomy and dissection of "problem" of perforating veins in the lower leg. One of the objectives of the first (remedial) step was to prepare the surface of the infected gastric ulcer and surrounding tissues to correction flebogemodinamic disorder - combined phlebectomy and dissection of "problem" of perforating veins in the leg. Another important objective of this phase was to reach the most dynamic regression of symptoms of CVI in the shortest possible time. The main route of the first objective, taking into account the experimental data was the use of local antiseptic monotherapy 1% solution of povidone-iodine. In addition, a comprehensive medical therapy CVI (flebotrop pharmacotherapy and compression therapy), can count on the timely implementation of the objectives of the first and second treatment stage. Therefore, treatment for remedial stage, group 1 patients was

conservative, and in a comprehensive manner. In such a complex treatment at this stage is noted significant regression of the main clinical symptoms of chronic venous insufficiency (see Fig. 11).

Fig. 11. Dynamics of regression of major clinical symptoms of CVI in patients with venous ulcers during treatment vduhetapnogo




The figure below shows that in the context of complex conservative treatment occurred regression main clinical symptoms of chronic venous insufficiency. However, the time taken to achieve the optimal degree of CVI syndrome (pain, malleolar swelling, heaviness, cramps) remained significant, amounting to an average of 12,5 ± 1,5 days. Along with the regression of clinical symptoms of CVI was an improvement of objective indicators of microbial and inflammatory process in the trophic ulcers. This was accompanied by decrease in the degree of microbial contamination of tissue trophic ulcer below the critical level and a decrease in ulcer area at an average rate of epithelialization of 0.45 ± 0.07 cm 2 per day. However, only 11.2 + 1.6 days in the degree of microbial contamination reached the lower limit of the critical level, with an average of 105 ± 103. To gain the potential readiness for the final stage in a two-stage patients were required to achieve the complete elimination of the ulcer to reliably eliminate the risk of infection by endogenous contact pathogenesis of radical intervention aimed at the shin. It can be divided into the clinical situation of the potential patient

readiness and VDLE CVI with 6 stage for the radical surgery. From our point of view, this is a clinical situation in which ulcerative defect completely eliminated or properly insulated from the wound and thus eliminated or significantly regressed the most dynamic clinical symptoms of CVI. Thus, surgery for radical surgical correction flebogemodinamic disorders in the first group of patients could not be implemented before 24,07 ± 2,56 days of treatment. With subsequent pathogenesis Directed Prolongs hospital treatment of patients in an average of 29,17 ± 3,86 days. Reduce the time of hospitalization, in our view, would be for the remedial phase of treatment on an outpatient basis. Given the above, it can be argued that the implementation of a two-stage treatment of patients with venous ulcers infected leg of the proposed scheme (even with satisfactory immediate and late results) does not allow to meet the deadline specified in the medical and economic standards for this nosology. However, from our point of view, this treatment can be recommended for elderly patients with severe or unstable comorbidities ulcers total area 100 sm2. This fact, in the framework of the research led to the need to develop alternative treatment schemes to reduce the timing of remedial phase of the treatment of patients with varicose trophic ulcers. Long-term results of treatment two staged were followed in 22 patients during the period from two months to three years after discharge from the hospital. I want to mention that two patients relapse occurred trophic ulcer on the contralateral leg after microtrauma in one case, after undergoing bulezno - necrotic forms of erysipelas,-in the other.

In order to demonstrate the clinical efficacy of two-stage medical complex can cause the following clinical example. Patient G., 51y.o., and / diseases № 2698, enrolled in a planned manner with the diagnosis 09/10/10 trophic ulcer of the left leg. On admission complained of ulcer on the front of the right leg and severe pain. Anamnesis revealed that after the second birth in 26 years began to mark swelling of the lower extremities to the end of the day, a sense of gravity, the presence of varicose veins. About 1.5 years ago was contused wound of soft tissues of the upper third of the left tibia. The wound was not closed for a long time. Of

local drug use ointment "levomikol." Over time, the wound was progressing in size, took chronic. At the same time an increase in pain trophic disorders. In the future, the pain was unbearable nature, requiring continuous use of painkillers. Significantly, that because of the pain and the inability to be a long time in a fixed tilt test the patient had to quit work (see Figure 12.13).

Fig. 12.13. Patient B. Nature of trophic ulcers on admission to hospital and the type of trophic ulcers after two-stage treatment at 6 months

After the consultation, the patient was offered admission to the surgical department for examination and treatment. On examination, found that the lower limbs are formed correctly, pasty to the upper third of the leg. Malleolar perimeter of the left lower limb was 22 cm, right - 18.4 cm in overall examination varicose transformation of the right lower limb was identified. Gakkenbruha positive sample on the left. Ripple on major arteries satisfactory sensitivity retained in full. The front surface of the middle third of the leg against the effects of hyperpigmentation has inflammatory shaft, which is located in the center of the trophic ulcer oval, measuring 3.3 x 3.9 cm, an area of 6.38 cm2, partly covers dense fibrin coating with scant purulent discharge. Marked hyperemia edges ulcers with white patches of skin atrophy.

When USDG deep veins of the lower extremities are passable. Registered valvular insufficiency sapheno-femoral junction on the left. Deep vein valves wealthy. Main type of blood supply to the left lower extremity. Ankle-brachial index in the front and rear tibial arteries corresponded to 1.2, and 1.4.

When USACI deep veins of left leg passable blood on them synchronized with the breath. Thin walls of the veins, the compression sensor can easily

collapse. Additional structures in the lumen of the vein was identified. Deep vein valves consistent. More subcutaneous Vienna expanded to 14 mm. Registered valvular insufficiency sapheno-femoral junction. Small subcutaneous Vienna to 4.6 mm in diameter. Its walls are thin, easily compressed with compression sensor. Circulation on it synchronized with the breath. When the distal sample valve it is consistent. In the projection of two ulcers visualized perforating veins to 2.8 and 3.4 mm.

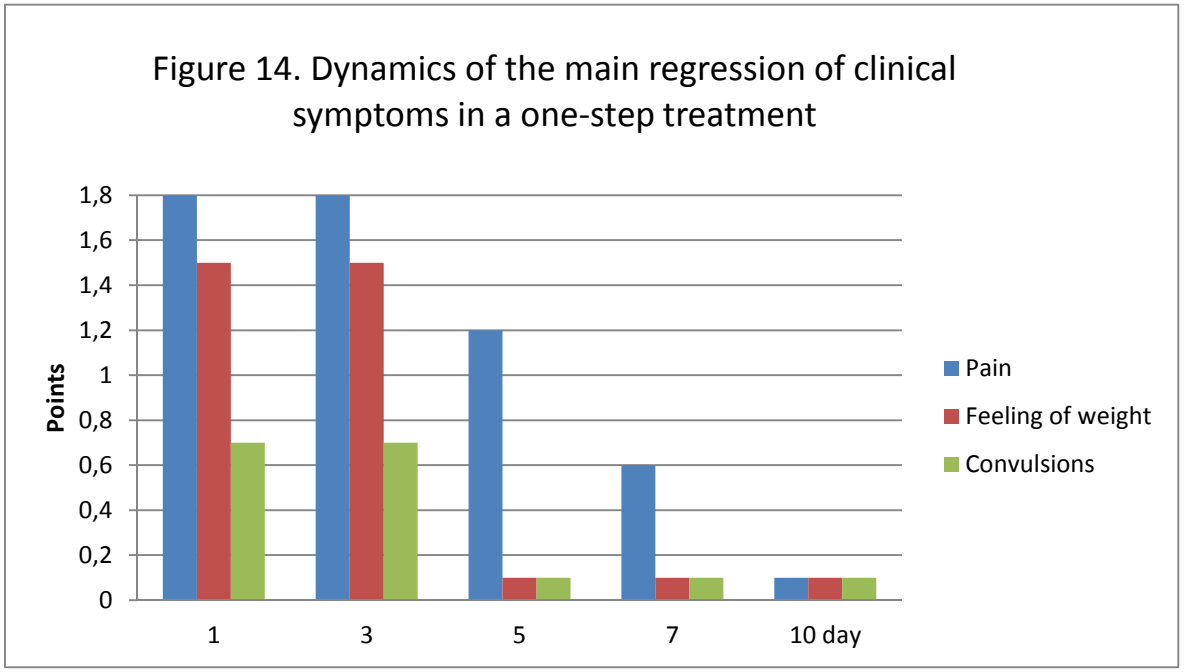
Ultrasound of the abdomen and pelvis revealed no pathology. Histological examination of the surface is covered with necrotic detritus with the colonies of microorganisms. This layer shall be well vascularized granulation tissue with focal inflammatory changes in the contact area with the detritus of ulcer. A large number of white blood cells with signs of incomplete phagocytosis. According to the bacteriological examination of tissue ulcers, sown Proteus mirabilis and Staph, aureus with the level of microbial contamination of 107 and May 10 microbes per 1 gram of tissue.

When R-graphy bones left shin bone and destructive changes were observed. At the initial examination in aseptic conditions under local anesthesia the samples of tissue ulcers for bacteriological and histological analysis. After that, superimposed on the ulcer sterile drape with a 1% solution of povidone-iodine and implemented elastic compression bandage high stretchability. In the combined treatment in addition to pain medication from the group of NSAIDs was appointed Detralex no 1000 mg per day.So "based on patient complaints, medical history and data tools and laboratory studies was diagnosed varicose veins of the lower extremities century. CVI with 6 stages (for CEAP). Trophic ulcer infected left leg. At the first stage, the Conservative local antiseptic therapy 1% povidone-iodine solution using closed dressing method, and the evaluation of bacteriological landscape and degree of bacterial contamination of tissue with the dynamics of trophic ulcer clinical signs of CVI. By the 6th day of treatment the positive dynamics of clinical signs of CVI. This was expressed in the relief of pain,

regression malleolar perimeter left shin. However, the degree of bacterial contamination of tissue trophic ulcer below the critical level was not achieved until the 13 th day. This was chronologically linked to the dynamics of the local status of the ulcer surface. Active succulent granulation marked boundary with discharge was poor and had a serous character. Thus, on the 13th day as treatment phase was the final stage - combined phlebectomy with dissection of perforating veins of the leg on the front of the minimal access. For operations under the ulcer surface ligated two perforating veins of 0.4 and 0.3 cm of complications from surgical wounds were observed. Wounds healed by first intention, and, at 24 days, the patient was discharged from the hospital after 7 days after the removal of sutures. Subsequently, the patient was assigned to compression hosiery: stockings as the second degree of compression and recommended pharmacotherapy - 2X two-month course of the drug Detralex a daily dose of 1000mg. Assessing the long-term results of treatment of this patient, it should be noted that during the two years after discharge ulcer recurrence has not occurred (Figure 13). Moreover, we noted that a year completely regressed hyperpigmentation lipodermatosclerosis of trophic disorders. No symptoms of chronic venous insufficiency and trophic ulcers positive impact on the quality of life of the patient.

**4.2 One-step treatment of patients with infected venous trophic ulcers of the lower leg.**

In the second group of patients with complex treatment included a reorganization of trophic ulcers, and surgical correction of high vertical veno-venous reflux, a cleansing of ulcers and reduce microbial contamination to a level below the critical place at the earliest possible time.The task of cleaning and sanitation of the ulcer was solved immediately after the session, a high-energy plasma exposure apparatus PLASON by the above method. In the course of treatment is also marked regression of all the main clinical signs of CVI (Fig. 14).




The data presented demonstrate the clinical efficiency of complex treatment. In addition, a positive in terms of the degree of microbial contamination of bacteriological situation sanitized unit PLASON ulcer allowed to 2,3 ± 1,1 days pathogenetically directed perform surgery on the superficial venous system. This allowed for all patients, in relation to which one stage was used medical complex, at the earliest possible eliminate high vertical and horizontal low veno-venous reflux and cleaning apparatus PLASON ulcer with positive clinical results in the future. After correction of venous hemodynamics and against conservative the treatment, there was regression of ulcer surface area at a rate of epithelialization on average 0.79 ± 0.08 cm 2 per day. Thus, taking into account this trend, it can be concluded that sanitation AP trophic ulcers in 86.6% of cases led to its sterilization. Our data show, it is also influenced by the timing of preoperative and average duration of hospital stay, which was an average of 13,46 ± 1,21 days. Long-term results were assessed in terms of up to 1.5 years. In this ulcer recurrence in all patients, which was used one-step treatment of recurrent ulcers were noted. In order to demonstrate the clinical efficacy of a single-stage treatment can cause the following clinical example. Patient Z., 59 years old, and b / w number 9648, was hospitalized in TMA. with 23.06.12g. by 06.07.12g. During the clinical

examination instrumentalnogo was diagnosed as varicose veins of right leg. Chronic venous insufficiency with six stages (for CEAP). Trophic ulcer infected right leg. Among the peculiarities of history for 29 years suffered varicose veins of the lower extremities. Repeatedly proposed operations on the veins, from which the patient adamantly refused. About 3 years ago, there was blunt trauma soft tissue internal surface of the right tibia. She was treated independently by different ointments and lotions. About 6 months ago in hematoma formed trophic ulcer, which, despite treatment, progressed in size. When viewed on the inner surface of n / 3 right shin against the effects of hyperpigmentation and induration of the skin has a trophic ulcer oval 10.7 x8sm, total area 37.6 cm 2. Bacteriological examination revealed a mixed flora: Staphylococcus aureus with the level of microbial contamination of 107 mic. bodies in one gram of tissue ulceration and Pseudomonas aeruginosa to the level of microbial contamination of 107 mic. bodies in one gram of tissue ulcers. Histological studies showed that the surface structure of the finished leather to the development of young granulation tissue in the subepidermal departments, the deposition of brown pigment limfogistiotsitarnymi inflammatory infiltrate in the dermis, cellular atypia in the obtained samples were found. Following up a survey carried out sanitation trophic ulcers PLASON apparatus (Fig. 16). Figure 15, 16. Patient V. 15 - the kind of trophic ulcers on admission, 16 - view ulcers during rehabilitation with the device PLASON.

A monitoring bacteriological examination of tissue after laser varicose ulcers rehabilitation sown epidermalnyi aureus with the level of microbial contamination of 102 mic. tel na1 gram of tissue. 26.06.2012g. perform an operation - combined

phlebectomy in the right lower extremity with subfascial dissection of perforating veins of minimal access. It should be noted that the operation revealed two perforating veins dilated to 0.5 mm and 0.8 mm, which were located under the surface of the ulcer. Postoperatively, the continued course of conservative therapy with complex Detralex of 1000 mg per day and hour mandatory compression bandages moderate stretch.

Fig.17. Kind of trophic ulcer patients T. 3 days after correction of veno-venous reflux in the right lower extremity

At the first dressing, which was carried out on the following day, it was noted, the discharge was very scarce, and in a serous character. In order to prevent secondary infection in this case the surface of ulcers imposed sterile atraumatic textile cloth moistened with a solution of 1% povidone-iodine. Finished dressing elastic bandage overlay. On the next ligation on day 5 bared portions epitelizirovannoy ulcer surface. Early postoperative septic complications in the surgical wounds were observed. On the 14th day of hospital treatment of postoperative wounds with sutures were removed and the patient was discharged to outpatient follow-up care with recommendations for conservative medical maintenance therapy. To be discharged from the hospital the patient was picked up by compression hosiery - socks, 2 nd degree of compression (25-35 mm Hg) of natural fibers (company «Sigvaris», Switzerland). The patient is recommended to change the I atraumatic tissue every 4-5 days. All fully wound healed ulcer surface after 42 days (see Fig. 18).

Fig. 18. Patient T. View trophic ulcers after 42 days of operation.

The patient is under the supervision of our 1 year. Ulcer recurrence for the entire period of observation was noted. Taking into account the above, it should be noted that the time spent on the ulcer surface quality training for the operation and achieve the potential of clinical readiness to implement radical intervention on the veins, in different groups of patients was different. Time costs, in our view, is closely related to the chosen scheme for each group staged treatment, advantages and disadvantages of each component of a medical complex (Table 9).

Table 9. The results of treatment of patients included in the study

| Groups of patients | Number of patients | Average predoper. patient day (one day) | Average duration of treatment (days) | Frequency repeated operations | Frequency recurrence trophic ulcers |
|---|---|---|---|---|---|
| 1 group | 22 | 12,5 + 1,5 | 29,17 + 1,5 | 8,3% | 2 (6%) |
| 2 group | 19 | 2,3 + 1,1 | 13,32 ±1,33 | 0 | 0 |

With one-step treatment strategy varicose ulcers and create optimal conditions for the implementation of radical surgery for the correction of flebohypertension on the affected leg. At the present time, given the above advantages and disadvantages of different landmark regimens, we believe it is necessary to identify possible ways of differentiated approach to the selection of the optimal treatment strategy for patients with varicose ulcers infected leg. This step approach, first of all, based on

a comprehensive clinical, bacteriological and instrumental evaluation of the disease.

Optimal implementation of it - individual medical-diagnostic complex feature of which is that the clinical need and the possibility of rehabilitation unit PLASON varicose trophic ulcers, the conditions for a one-time operation for radical correction of venous blood flow throughout.

## CONCLUSION

It has been established that the decisive role in the development of venous ulcers in varicose veins of the lower limbs belong to the static and dynamic venous hypervolemia without elimination of which it is hard to solve this problem. Results were unsatisfactory treatment of venous leg ulcers are often associated with an exaggerated importance to the local treatment and underestimation of the pathogenetic mechanisms of trophic disorders. The most recognized radical treatment VDLE if trophic disorders is an operation aimed at eliminating veno-venous reflux in order to improve local status and prevention of trophic disorders. Currently, however, the implementation of such a radical operation during the existence of the potential source of surgical infected sores, many authors questioned. However, there are special research showing that in some cases can be performed one-stage operation pathogenetically directed to correct abnormal veno-venous reflux in the presence of an infected ulcer, but only if its thorough renovation. In addition, there is the view that the presence of venous ulcers radicalism always take phasing. However, to date no generally accepted strategy of staged treatment and sequence of each stage. Has not been fully explored is the question of the impact of early surgical removal of proximal venous-venous reflux flow dynamics of local microbial-inflammatory and reparative processes in the trophic ulcer, as the problem of selecting the optimal method of remediation of infected venous ulcers before correction veno-venous reflux.

All this, with the capabilities of modern surgical techniques, requires further scientific inquiry clinically effective combination therapies and the development of their optimal, surgical technique for the treatment of patients with infected trophic ulcers of the lower leg. The basis of this clinical study was based on the comparative analysis of the results of examination and treatment, specially selected 41 patients with varicose veins of the lower extremities, trophic ulcer complicated by an infected leg. In this case, from the study excluded patients with cardiovascular disease, obliterate peripheral arterial disease, primary or secondary

lymphostasis, which developed as a result of diseases of lymphatic system, as each of these factors can make it difficult to use an objective assessment of the results of the proposed medical complex, in the study included patients infected with only a single trophic ulcer leg and an area of the ulcer, which initially will minimize the possibility of self-epithelialization under the influence of the conservative complex therapy. All of the patients, depending on the medical complex were randomizing by sex, age, area of venous ulcers, the nature and severity of comorbidity and divided into dvegruppy. Treatment in groups of patients were pathogenic and included one to two interrelated stages with a common medical problem, but had in each group at different stages in an individual combination of treatments. Conservative combined therapy were applied to all patients included in the study. As a part of the system was administered and dosed pharmacotherapy flebotrop elastic bandage.

The first group of patients has been proposed and implemented two-stage medical complex. In the first phase, it includes local antiseptic treatment, the second - pathogenetic operations aimed at correcting flebogemodinamicheskih disorders. Such radical surgery was performed in a volume of combined phlebectomy combined with subfascial diseektsiey "problem" perforating veins in the lower leg. Treatment of patients of the second group was one-step. After the pre-renovation ulcer surface NO-therapy apparatus "PLASON" combined phlebectomy performed with dissection of "problem" of perforating veins in the lower leg.

All patients included in the study, carried out a comprehensive clinical, morphological, laboratory, including dynamic bacteriological and Diagnostics flebogemodinamicheskih disorders and trophic ulcer disorders. Clinical evaluation was carried out on the basis of the disease both subjective symptoms and objective research data. Take into account the nature of the local trophic ulcer change - the location, the size of the ulcer, depth, character and ulcer surface area, the type and amount of discharge. Clinical evaluation of the effectiveness of a medical complex

was carried out on the basis of GMAT most dynamic measurement of clinical symptoms of CVI, using the evaluation criteria of the International Classification of CVI CEAP. Account of pain, malleolar edema, convulsions and a sense of gravity. Indicators of pain in almost all patients on admission to the hospital consistent with the degree of activity of microbial and inflammatory process in the trophic ulcers and severity flebogemodinamicheskih disorders.

For the purpose of bacteriological examination of tissue-venous ulcers have been applied in specific quantitative and semi-quantitative rapid methods of bacteriological study of biological material. Identification of the pathogen was carried out using standard laboratory bacteriological methods. Instrumental examination of patients included, Doppler ultrasound (USDG), duplex ultrasound scanning of (UZDAS) veins of the lower extremities. When UzACI in all cases detected valvular insufficiency of deep veins of the functional nature of varying severity. The results of the survey were instrumental in determining the choice of surgery in the treatment of all patients. To cleanse ulcers and prevention of secondary infection in this study, 22 patients used a procedure traditional local antiseptic therapy. In 19 patients bacterial decontamination was achieved by treating the ulcer surface NO-therapy apparatus PLASON.

Conducting a local antiseptic therapy before making radical surgery for surgical correction flebogemodinamicheekih disorders in patients with infected venous trophic ulcers put us in front necessitate effective topical antiseptic. This problem was solved by the present study experimentally by performing bacteriological laboratory studies using strains of microorganisms, most commonly planted from tissues of venous ulcers. The results of the pilot study showed that a 1% solution of povidone-iodine is the most effective local chemical preservative against microorganisms most commonly planted of trophic venous ulcers and the most resistant to antibiotics. The 1% solution of povidone-iodine has been chosen as a universal means for conservative local antimicrobial therapy and prevention of secondary infection of the surface of the ulcer in the first and second groups of

patients. When rehabilitation ulcers 1% solution of povidone-iodine in the dynamics observed decrease microbial contamination of venous ulcers.

Results rehabilitation unit PLASON ulcers were significantly better than the results of the use of a 1% solution of povidone-iodine. With dynamic bacteriological control after laser readjustment noted that for 3 days remained sterile tissue ulceration or level of bacterial contamination corresponded on average 102 ± 0,5 x102. However, it was noted that then there is an increase of microbial contamination of tissue trophic ulcers to a critical level. By the 5th day level bacterial contamination increased and corresponded on average 103 ± 102 microbes per 1 gram of tissue ulcers. This we can explain secondary infections sanitized ulcer surface. This fact, according to our data, leads to the need to re-run or NO-therapy rehabilitation ulcer surface is just before a pathogenetic operations on the veins of the lower limbs or the additional use of an effective means of local surface antiseptics or timely plastic replacement sanitized ulcer. Analyzing the quantitative results of the use of high-AP, it should be noted that the time taken to reorganize ulcer surface PLASON the machine is directly proportional to the area of the surface of the ulcer. In this case, we noted the fact enhance pain in the attack after the termination of the terminal anesthesia. Also seeing a significant exudation ulcer surface. This, in our opinion, could be the result of the impact of the thermal factor during rehabilitation. It should be noted that the treatment of NO-therapy of deep venous ulcers, the bottom of which can include anatomical and functional significance of education (such as fascia tibia, medial malleolus, perforating veins, superficial peripheral nerves), is associated with the likelihood of serious complications.

Thus, the dynamics of indicators of wound healing process in patients who are in treatment as local therapy was used by a high-energy NO-therapy, objective evidence of high local antiseptic and clinical efficacy of this treatment. Comparative evaluation of two methods of local antiseptic therapy in patients with venous ulcers infected tibia suggests that laser readjustment in the earlier periods

lead to sterilization or reduce microbial decontamination tissue trophic ulcers to well below the critical value. In the course of reorganization creates the possibility of modeling the surface due to peptic vyparizatsii tissue surface and the edges of the ulcer, the alignment of the relief and the formation of ulcers. However, given the experience with the AP, we believe that in some cases the indications for rehabilitation ulcers before performing simultaneous operations should be limited. Here be sure to take into account the size and the qualitative characteristics of the surface of the ulcer. From our point of view it is, first of all, the large size ulcer surface (100 cm2 or more), much of its depth, and the presence on the bottom or in the immediate vicinity of the ulcers of functionally important structures. In addition, it is difficult terrain ulcer surface clinically pronounced perifocal inflammation. These settings clinical characteristics of trophic ulcers and periultseroznyh tissues should be considered when choosing a surgical treatment of patients with venous ulcers infected leg, ie the use of minimally invasive surgical techniques (videoassistiruemaya subfatsialnaya dissection of perforating veins in the lower leg, etc.). Thus, as the results of the study, a differentiated approach to the treatment of patients with venous trophic ulcers. And it is necessary to take into account the size and stage of wound healing, the possibility of the effective use of elastic compression, the patient's age and the nature of comorbidity, technical and material capabilities hospital, competence and individual wishes of the patient, as well as its social and labor statue. In this case, his choice may be offered different performance, the degree of invasion and the terms of a scheme of staged treatment. They may include one to two interrelated phases of treatment and be targeted at both the infected venous ulcers, as well as the main pathogenic factor of the disease - pathological venous reflux.

## PRACTICE GUIDELINES

1. In the treatment of patients with infected VBNK venous trophic ulcers, use individual step approach. The priority objectives of this approach are high-quality sanitation tissue ulcers, early correction of pathological venous-venous reflux.

2. The best way is sanitation Plason its high-energy machines for NO-therapy. For the purpose of adequate analgesia during plasma remediation can be effectively used Emla cream 5% to be applied to the surface of the ulcer in 2 hours before the procedure followed by the imposition of mandatory aseptic sealed waterproof bandages;

3. The presence in the tissues of the trophic ulcers functionally and anatomically significant structures (surface vessels, nerves, tendons, etc.) and other existing constraints for plasma remediation of trophic ulcers in the preoperative stage can be effectively used 1% solution of povidone-iodine ;

4. In patients with venous trophic ulcers of not more than 80 cm2 in area, with the possibility of the plasma and the radical reorganization of one-stage surgery for the correction of flebogipertenzii on the affected limb must be made no later than 3 days from the date of the reorganization of the plasma;

5. In severe comorbidities the patient may be offered a medical scheme in which the correction of pathological reflux is carried out only after the complete removal of the ulcer. Thus reducing the time statsionarnoga treatment can be achieved by reorganization of outpatient ulcers, and patients with contraindications to radical surgery can restrict the use of life-long elastic compression and adequate course intake flebotropnoy pharmacotherapy.

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