

Treatment of the leg ulcers by skin grafting

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Key words: skin grafting, leg ulcer, hydrocolloid dressing.

Summary. The ulcers, located below the knees and remaining for 6 weeks and more, are called trophic leg ulcers. The leg ulcers of different etiology disable 0.8–1% of total Earth population. It was found that blood vessel problems in legs account for more than 80% of ulcers; even 65% from these are caused by venous diseases. In Lithuania about 8000 patients suffer from venous trophic ulcers. Regardless of modern methods the treatment of leg ulcers remains an extremely expensive process. The treatment cost of trophic ulcers is the highest of all surgical wounds and also requires a lot of personal investments. In order to assess the efficiency of autodermoplastics in the treatment of large venous ulcers in legs a prospective study was carried out of 111 patients who were treated in the Department of Plastic Surgery and Burns of Kaunas University of Medicine Hospital from January 2001 to January 2004. The data was analyzed exceptionally of the operated 54 patients with venous origin ulcers open for more 6 months or exceeding 50 cm². The above-mentioned patients were prepared for surgery by dressing the wounds with hydrocolloid Granuflex bandages and were operated by transplanting a 0.2–0.3 mm thick skin graft. The results were estimated by the surgeon during the dressings after the operation. The graft was taken in 35 (64.81%) cases; in 19 (35.19%) cases the graft was partially not taken and there were no cases when it was not taken at all. We came to the conclusions that skin graft transplantation is efficient in treatment of trophic venous leg ulcers larger than 50 cm² and cures the trophic leg ulcers of vein origin completely in 2–3 weeks for 64.81% patients.

Introduction

Chronic leg ulcers are the ulcers located below the knees and not healing for 6 weeks or longer (1). It is a very old and widely described pathology that is not easy to treat. It troubles not only the patients but their caregivers as well. Already in 400 B. C. Hippocrates wrote: “If a person has ulcers it is inadvisable for him to keep standing especially if one has ulcers in his calves” (2).

Ulcers of different origin cause disability for 0.8–1% of the world population and according to different researchers, even 2/3 of the ulcers after having healed due to various treatment tend to open again during the examination period (3–7). Up to 5% of the population aged over 65 suffers from ulcers in calves. Leaky venous valves are the main reason causing ulcers (8). Women suffer from this disease twice more frequently (6).

It was found that blood vessel problems in legs account for more than 80% of ulcers, even 65% from these are caused by venous diseases (9). Out of all ulcers, 5–20% open due to artery pathologies (6). According to the data provided by V. Triponis et al, about 8000 people in Lithuania suffer from trophic ulcers of

venous origin, and in the age group of 60–80 the frequency of ulcers is even 5% (10).

Despite the availability and common usage of modern bandages, compression therapy, modern medications improving artery blood inflow and return flow of venous blood, trophic leg ulcers treatment remains a very expensive and long process, especially when the cause of the ulcers cannot be eliminated (7, 11).

The treatment of the trophic ulcers is the most expensive one from all surgical wounds. According to the method approved by International Wound Treatment Committee, the following expenses should be included into the price list of ulcer treatment: all the bandages, total nursing time, drugs and other means for treating skin complications, travel to the doctor, working time missed, expenses of additional care and time. Some authors (V. Triponis, I. Gudgalytė) carried out a research and came to the conclusion that the patients in our country spent from 500 to 2000 litas per year from their personal budget for ulcer treatment (10). In Great Britain the sum of money provided for ulcer treatment comes to 300–400 million pounds (1400–1900 million litas) per year (6). Therefore a discus-

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sion can often arise whether it is more effective to use a long conservative treatment or to use surgery with autodermoplastics spending a part of the designated funds for the operation but reducing the treatment time. It still remains unclear whether ulcers covered by autodermatransplant open again as frequently as the ones treated by conservative methods. The single answer to the question which method is more effective does not exist. Some authors argue that ulcers exceeding the diameter of 50 cm² and open for more than 6 months cannot be treated only by conservative means during the following 24 weeks. They recommend surgery with skin transplantation and operations on veins (12). W. Schmeller and Y. Gaber came to the conclusion that in 29 months after skin transplantation the healing of venous origin ulcers was accelerated or the ulcers healed completely for 58–76% ($p=0.08$) of the patients (13). Other authors argue that the priority in ulcer treatment should be given to the conservative medicine and only afterwards the reconstruction operations on deep veins should be carried out or surface veins should be removed (14). However, it happens that even the most modern conservative medical means cannot heal trophic ulcers successfully, especially if they are large or the factors causing them cannot be eliminated.

For the conservative approach a number of medical and other means are used including compressive socks, zinc-jelly bandages, compressive bandages of high pressure and low elasticity, hydrocolloid and other bandages, different ointments, cream and honey, medicines improving microcirculation (pentoxifylline), venous tonics improving local blood circulation (venoruton forte or others), physiotherapy, electrostimulation, diet, etc. (6, 15, 16). The wide range of the possible means just proves once again the lack of clear and approved tactics for ulcer treatment in conservative approach.

Though ulcers as a rule are colonized as *P. aeruginosa* or *S. aureus*, antibiotic therapy is not recommended as long as there are no signs of active infection. Dressing with silver sulphadiazine ointment or other antiseptic is sufficient enough (17).

With the intention of assessing the efficiency of surgical treatment of venous trophic ulcers we analyzed the data from the medical histories and special questionnaires filled in by the patients suffering from large venous trophic leg ulcers (larger than 50 cm² or covering more than 0.5% of the body surface) who were treated in the Department of Plastic Surgery and Burns of Kaunas University of Medicine Hospital (KUMH) from January 2001 to January 2004.

Materials and methods

The prospective course of disease analysis of random sample of 111 patients was carried out to assess the efficiency of autodermoplastics in the treatment of large ulcers in legs. These patients were treated in the Department of Plastic Surgery and Burns of KUMH, due to large trophic ulcers in legs from January 2001 to January 2004. Forty-three patients were treated conservatively and 68 were operated. The data was analyzed exceptionally of the operated patients with venous origin ulcers open for more 6 months or exceeding 50 cm² ($n=54$). Before being hospitalized all the mentioned patients were consulted in the Out-patient Department of KUMH by the vascular surgeon where the artery pathology was eliminated and venous origin of trophic ulcers was approved by anamnesis (past thrombophlebitis, varicectomy and ligation, and anti-reflux operations), clinical course (varicose subcutaneous veins, hyperpigmentation of skin, atrophy and induration), ultrasonography – duplex imaging, sustaining the insufficiency of veins or/and perforant valves. Microbiological test was made for assessment of the impurity of ulcer when there were every signs of infection (the redness of inflamed skin or/and induration around the ulcer, suppuration of ulcer, fever, and leucocytosis in the blood). To get the patients ready for the operation the ulcers were dressed in hydrocolloid (Granuflex) bandages, artery blood circulation was improved by pentoxifylline (400 mg twice a day), and venous blood flow and lymph drain was improved by medicines of flavanoid group (venoruton forte or others). The ulcers were operated on only when neither necrosis nor infection was detected, when the general condition of the patient was satisfactory and parallel illnesses were compensated. Regardless of the results of the ulcer microbiological testing during the operation penicillin was prescribed as prophylactics against infection caused by *Streptococcus pyogenes*. *Staphylococcus epidermidis* and *Staphylococcus aureus* were considered the potential not absolute pathogens of wounds and therefore prophylactic antibiotics therapy was not used against them. The patients were operated on by transplanting 0.2–0.3 mm skin graft, which was taken off the anterior surface of thigh or the posterior surface of calf. After the operation the legs were bandaged with strong pressure and small elasticity *Roselastic* bandages as an antireflux therapy. Three days after the operation the patients were bandaged, and then they were re-bandaged every second day using paraffin nets for the security of the transplanted skin and the absorbent gauze bandage. The donor area was cured bandaging it with gauze bandages. Medicines

were further taken to improve artery blood circulation, venous blood flow and lymph drain. The results of the operation were assessed by the surgeon while changing the bandages for the first time after the operation and once again while discharging the patient from the hospital. If at the time of leaving the wound was not epithelized up 5 to 15 cm² it was considered that a part of the transplant has not naturalized, and if the wound was not epithelized over 30% – the skin graft was not taken. The analysis of the data was carried out using *Statistica 5.0* program.

Results

From January 2001 to January 2003, 54 patients were operated on due to large trophic ulcers in legs by transplanting a part skin thickness skin graft in the Department of Plastic Surgery and Burns of KUMH. The mean square of the ulcers was 247.7±238.41 cm².

The age of the patients varied from 42 to 86 years (median – 67 yrs., mean – 66.73±9.81 yrs.) (Fig. 1). The number of men suffering from ulcers was 23

(42.59%), women – 31 (57.41%). According to the localization the distribution of ulcers was as follows: in both calves – 14 (25.93%), in the right calf – 12 (22.22%), in the left calf – 24 (44.44%) and in feet – 4 (7.41%). The duration of illness was from 0.5 to 30 years (median – 8 yrs., mean – 10.74±9.88 yrs).

The following microorganisms were found in the ulcers: *S. aureus* in 19 (35.19%) cases, *P. aeruginosa* in 7 (12.96%) cases, in 3 (5.56%) cases other microorganisms, in 7 cases (12.96%) no pathogens were detected and 18 (33.33%) patients were not examined (Fig. 2).

Analyzing the results we established that autodermotransplant naturalized completely for 35 (64.81%) patients, a part of the transplant did not naturalize for 19 (35.19%) patients, and there were no cases of the complete rejection of the transplant (Fig. 3).

Before the operation patients were treated in hospital for approximately 7.6±7.87 days (from 0 to 31 days), median – 4.5 days. The total duration of treatment was 18.93±8.58 days (from 4 to 42 days), median – 18 days.

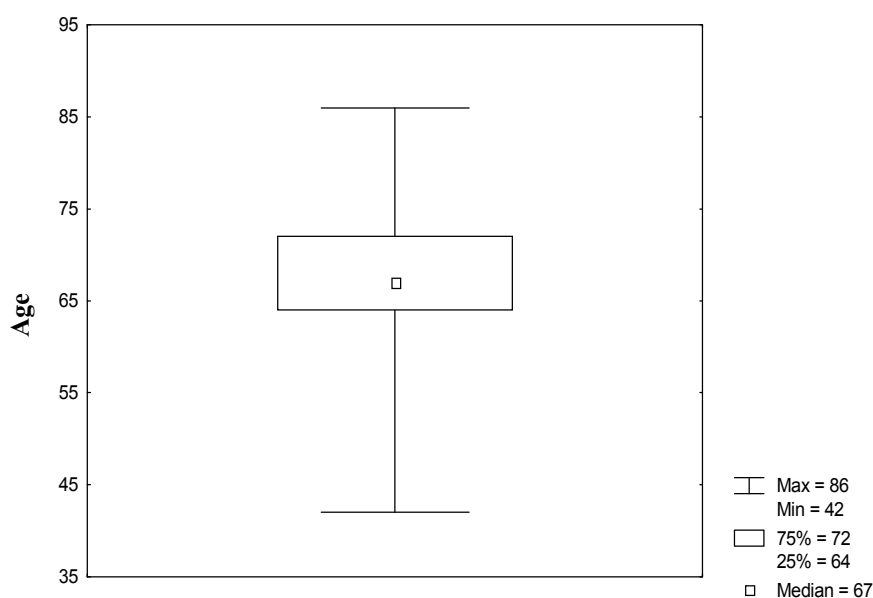


Fig. 1. Distribution of patients (n=54) according to age

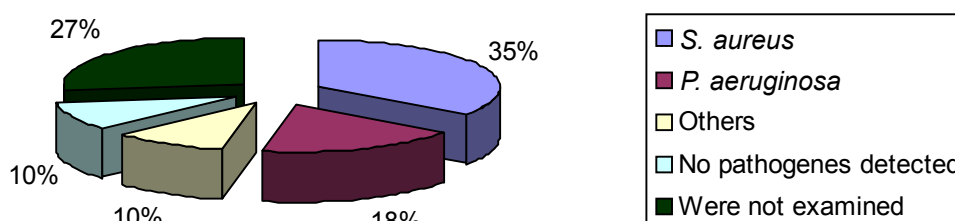


Fig. 2. Distribution of patients (n=54) according to contamination of ulcers with microorganisms

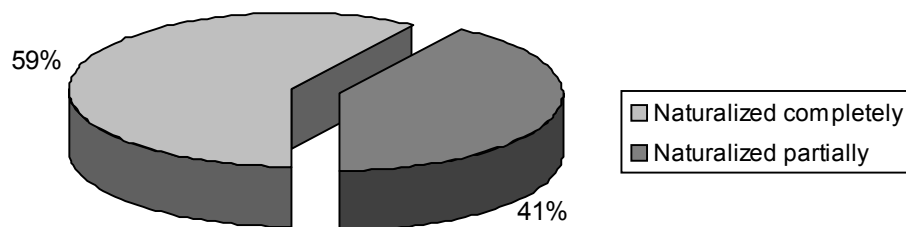


Fig. 3. Distribution of patients (n=54) according to the naturalization of autodermotransplant

Discussion

Etiology of the patients treated in the Department of Plastic Surgery and Burns of KUMH was very similar to the data of other researchers: in the majority of cases the cause was the illnesses of veins (7, 18). However, we did not analyze the data of patients who were treated using conservative methods or were operated on due to other origin ulcers in the legs.

Females suffered more frequently than men. This corresponds to the global tendency where the cause mentioned most frequently is former pregnancies (6). We found comparatively small difference on the basis of male/female division; possibly due to small number of patients and strict selection criteria.

The majority of study patients were elderly people, as was noted in the articles by other authors as well (8, 10).

Despite a variety of modern medicaments and means of treatment, the curing of trophic leg ulcers remains a very expensive and long process. According to our data the mean duration of the illness was 10.74 years what shows a large amount of money spent for the treatment of ulcers. The high cost of the treatment of trophic ulcers is often mentioned in other articles as well (6),

especially if ulcers were treated conservatively. The patients spent on average 18.93 days in hospital. If compared to the data of other researchers (7, 8), skin grafting not only let to cure the trophic ulcers, which were not successfully treated by conservative means, but also to reduce the duration of treatment herewith saving part of means.

A complete rejection of the transplant has not occurred in any of the cases. This fact supports the opinion of the authors who argue that a part skin thickness skin graft transplanted on the renewed fundus of the ulcer accelerates healing (13).

Before the operation all the ulcers were dressed in hydrocolloid Granuflex bandages, and after the operation none required additional surgery due to suppuration, which does not support the statement that the prescription of antibiotics is inexpedient (17).

Conclusions

Skin graft transplantation is efficient in treatment of trophic venous leg ulcers larger than 50 cm². Skin grafting cured the trophic leg ulcer of vein origin completely in 2–3 weeks for 64.81% patients.

Kojų trofinių opų gydymas autodermoplastika

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Raktažodžiai: odos persodinimas, kojų opos, hidrokoloidiniai tvarsčiai.

Santrauka. Kojų trofinės opos – tai opos, kurių randasi ant blauzdos, jos neužgyja šešias savaites ir ilgiau. Įvairios kilmės kojų opos sukelia negalią 0,8–1 proc. planetos gyventojų. Nustatyta, kad daugiau nei 80 proc. opų priežastis yra kojų kraujagyslių ligos, iš jų net 65 proc. atsiranda dėl venų ligų. Lietuvoje veninių trofinių opų turi apie 8 tūkstančiai žmonių. Nepaisant modernių gydymo metodų, kojų opų gydymas yra ilgas procesas ir labai brangus. Trofinių opų gydymas kainuoja daugiausia iš visų chirurgų gydomų žaizdų, be to, ligoniai tam išleidžia daug asmeninių pinigų.

Norėdami įvertinti autodermoplastikos veiksmingumą, gydant dideles veninės kilmės kojų trofines opas, atlikome prospektyvųjį 111 ligonių, gydytų Kauno medicinos universiteto klinikų Plastinės chirurgijos ir nudegimų skyriuje nuo 2001 m. sausio iki 2004 m. sausio mėn. ligos eigos tyrimą. Nagrinėjome ligos duomenis tik operuotų pacientų, kurių opos buvo veninės kilmės, neužgyjančios ilgiau nei 6 mėn., o jų plotas didesnis nei 50 cm². Minėti ligoniai operacijai ruošti perrišant opas hidrokoloidiniais granuflekso tvarsčiais ir operuoti

transplantuojant 0,2–0,3 mm dalies odos storio lopą. Operacijos rezultatus vertino operaciją atlikęs chirurgas, pakeisdamas pirmąjį tvarstį po operacijos bei ligonį išrašydamas iš stacionaro. Nustatėme, kad autodermotransplantatas visiškai prigijo 35 (64,81 proc.) ligoniams, dalis transplantato neprigijo 19 (35,19 proc.) ligonių. Kad visiškai neprigytų odos transplantatas, tokio atvejo nepasitaikė. Tyrimo metu padarėme išvadas, kad odos persodinimo operacija yra veiksminga gydant didesnes nei 50 cm² veninės kilmės kojų trofines opas. Visiškai sugyja veninės opos per 2–3 savaites 64,81 proc. ligonių.

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