

The Impact of Skin Grafting on the Quality of Life and Self-Esteem of Patients with Venous Leg Ulcers

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Abstract

Background The assessment of health-related quality of life in patients with venous leg ulcers provides important information for clinical decision making, evaluation of therapeutic benefits, and prediction of survival probabilities.

Methods Health-related quality of life and self-esteem were assessed using the Medical Outcomes Study 36-Item Short Form Health Survey (SF-36) and the Rosenberg self-esteem (RSE) scale, respectively, in patients with venous leg ulcers treated with split-thickness skin grafts. One hundred patients with venous leg ulcers and indication for skin grafting were divided into two groups of 50 patients each: the control group (patients who received conservative treatment) and surgery group (patients who received split-thickness skin grafts).

Results Patients in the surgery group reported significantly higher SF-36 scores (better health status) than controls one month after surgery, as well as 90 and 180 days postoperatively ($p < 0.002$). The mean total RSE score was

significantly lower (indicating higher self-esteem) in the surgery group (mean RSE score, 17.54) than in the control group (mean RSE score, 24.22).

Conclusions Split-thickness skin grafting resulted in better health-related quality of life and self-esteem in patients with venous leg ulcers than did compression therapy with Unna's boot.

Introduction

Leg ulcers have become more common in patients with chronic diseases, particularly those of the circulatory system, emerging as a public health problem [1]. These ulcers can be caused by several factors, including vascular, metabolic, and hematological changes. Venous insufficiency is the main cause of leg ulcers in developed countries. Venous ulcers account for approximately 80–90 % of all leg ulcers. Prevalences of chronic venous insufficiency and chronic venous ulcers range from 2 to 7 % and 0.5 to 1.5 %, respectively, in the adult population [2, 3].

Venous leg ulcers are treated with wound dressings, topical agents, and compression therapy, which contribute to wound healing [4]. Another rapid and efficient treatment option is the use of skin grafts for wound coverage [5–7]. The success of skin grafts in the treatment of venous leg ulcers is related to the condition of the recipient bed, prevention of graft contraction (which is associated with graft thickness), and appropriate coverage of the donor site because donor-site complications may affect the overall outcome of the procedure [7, 8]. Prevention of recurrence may be regarded as an important challenge in the management of patients with venous insufficiency and healed ulcers. The major cause of recurrence of venous leg ulcers is that patients fail to take preventive measures, such as the

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use of graduated compression stockings, bed rest, continuous leg elevation, walking, and skin care [8, 9].

The determination of the effectiveness of different treatments for venous leg ulcers has become increasingly important in the clinical practice. The assessment of health-related quality of life (HRQoL) provides important information for clinical decision making, evaluation of therapeutic benefits, and prediction of survival probabilities [10]. Persons with venous leg ulcers experience changes in their lifestyle; their expectations and values are not always fulfilled and respected, and they may feel socially isolated and embarrassed because of their functional limitations, pain, and smell of the ulcer [1, 10]. The study of the various aspects of HRQoL and self-esteem may provide relevant information, which can contribute to the care of patients with venous leg ulcers and development of preventive and educational strategies to improve their functional and emotional well-being. Therefore, the purpose of this study was to assess the HRQoL and self-esteem of patients with venous leg ulcers after skin grafting.

Patients and methods

This was a prospective, nonrandomized, multicenter, controlled, clinical trial conducted from July 2008 to December 2010. The study was based on a convenience sample (non-probability sample). Patients were consecutively selected in the Wound Care Unit of the Plastic Surgery Outpatient Clinic of the São Paulo Hospital (HSP) and in the Outpatient Wound-Care Clinic of the Sorocaba Hospital Complex (CHS). A history was obtained and physical examination was performed on all selected patients, including ulcer assessment (e.g., size, location, presence of granulation tissue, necrotic tissue, exudate, odor, and infection). All patients signed an informed consent form before their inclusion in the study and anonymity was ensured.

Inclusion criteria for both groups comprised patients aged ≥ 18 years with a single venous ulcer ≥ 5 cm² in area in one of the legs and indication for wound coverage with a split-thickness skin graft, i.e., formation of granulation tissue at the wound site. Patients with skin lesions other than venous ulcers, those with clinical diseases that contraindicate surgery, and those who had previously undergone skin grafting were excluded from the study.

The sample consisted of 100 patients with venous leg ulcers and indication for skin grafting. To prevent bias, the first 50 consecutive patients who met the inclusion criteria were allocated to the surgery group, and the next 50 consecutive patients were allocated to the control group.

Patients in the surgery group were treated preoperatively with wound dressings and compression therapy with Unna's boot, and received split-thickness skin grafting after the formation of granulation tissue at the wound site. These

patients were instructed to wear light compression stockings from 15 to 60 days after surgery and moderate compression stockings thereafter and were clinically followed up.

Patients in the control group underwent conservative treatment, including the use of wound dressings and compression therapy with Unna's boot and were clinically followed up. Skin grafting was the only difference in the treatment provided for the two groups, so that confounding factors were reduced to a minimum; no other surgical treatment was performed.

Ten patients in the control group and 20 in the surgery group were cared for in the Wound Care Unit of the HSP, and 40 patients in the control group and 30 in the surgery group were cared for in the Outpatient Wound Care Clinic of the CHS.

Data from patients in the surgery group were collected preoperatively (baseline) and 1, 3, and 6 months after surgery, and data from those in the control group were collected on the day that the patient was included in the study (baseline) and 1, 3, and 6 months later. After 6 months of conservative treatment, all patients in the control group were informed that they would be operated on and accepted to undergo skin grafting for venous leg ulcer.

The validated Brazilian-Portuguese versions of the Medical Outcomes Study 36-Item Short Form Health Survey (SF-36) [11] and Rosenberg Self-Esteem Scale (RSE)/UNIFESP-EPM [12] were administered to all patients in a similar manner, in the same environment, and by the same investigator.

The SF-36 is a generic measure of HRQoL that contains 36 items grouped into eight subscales as follows: physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, and mental health. Scores on each subscale range from 0 to 100, with 0 corresponding to the worst health status and 100 to the best health status [11].

The RSE/UNIFESP-EPM scale is 10-item measure of self-esteem scored on a 4-point Likert-type scale ranging from "strongly agree" (0) to "strongly disagree" (3). The total score ranges from 0 to 30, where 0 indicates the highest level of self-esteem and 30 indicates the lowest level self-esteem [12].

Ulcer healing was evaluated using the validated Brazilian-Portuguese version of the pressure ulcer scale for healing (PUSH) [13–15]. The assessment of the ulcer characteristics of surface area, exudate amount, and surface appearance provides an indication of the healing of ulcers over time [15].

Ethical considerations

The study was approved by the Research Ethics Committee of the Universidade Federal de São Paulo (UNIFESP),

Brazil (approval number 0945/08). It was performed in accordance with the ethical guidelines of the 1975 Declaration of Helsinki and its subsequent revisions.

Statistics

Statistical analysis was performed using the Chi square test of independence for categorical variables (demographic and clinical data). The nonparametric Mann–Whitney test was used to compare ordinal variables (SF-36 and RSE scores) between groups at the different time points and the Friedman test was used to assess differences within groups over time. All statistical tests were performed at a significance level of 0.05 ($p < 0.05$).

Results

Most participants were female (both groups, 52 %), older than 60 years (control group, 66 %; surgery group, 68 %), retired (control group, 66 %; surgery group, 62 %), illiterate (control group, 88 %; surgery group, 82 %), and smokers (control group, 76 %; surgery group, 58 %), had diabetes mellitus (control group, 70 %; surgery group, 42 %), hypertension (control group, 76 %; surgery group, 56 %), and visible varicose veins (control group, 82 %; surgery group, 66 %), as shown in Tables 1 and 2.

Overall, ulcer area ranged from 5 to 30 cm². All ulcers in patients who received split-thickness skin grafts were healed 30 days after surgery. Twenty-five (50 %) patients in the control group and 27 (54 %) in the surgery group had the ulcer from 7 to 8 years, and 8 (16 %) patients in the control group and 7 (14 %) in the surgery group had the ulcer from 5 to 6 years (Table 3).

The mean scores on all SF-36 subscales for the control and surgery groups are listed in Tables 4 and 5. For both groups, baseline SF-36 scores were low on all subscales, with significant differences between groups. A significant increase in mean SF-36 scores on all subscales was observed in the surgery group 30, 90, and 180 days after skin grafting compared with baseline. There also were significant differences in SF-36 scores between groups at the three time points ($p = 0.0001$).

Patients in both groups had high total RSE scores (low self-esteem) at baseline (control group, 25.5; surgery group, 25.86). Mean RSE scores were significantly lower in the surgery group at the 30-day follow-up (control group, 24.22; surgery group, 17.54), as well as at the 90- and 180-day follow-up visits compared with the control group ($p = 0.0001$), indicating an increase in the self-esteem of patients who received split-thickness skin grafts (Table 6).

Discussion

The increase in life expectancy in Brazil has led to an increase in the number of people with chronic diseases and conditions associated with chronic wounds. This has prompted health care professionals to focus not only on the prevention and treatment of chronic wounds but also on the improvement of the quality of life and functional status of this population [16, 17].

Venous leg ulcers are among the most common vascular complications; they may have a negative impact on the patient's social functioning, family life, and work activities. The incidence of venous leg ulcers increases with age [9, 10]. Participants in our study had a mean age of 60.18 years in the control group and 60.96 years in the surgery group. This is in agreement with the findings of previous studies on the functional status of patients with venous leg ulcers, reporting mean ages >61 years [18–20]. Studies for the development of interventions that can improve the HRQoL of elderly patients with chronic

Table 1 Demographic characteristics of patients in the control and surgery groups

Variables	Control group (n = 50)		Surgery group (n = 50)		p value
	n	%	n	%	
Age group (year)					
20–40	2	4	4	8	0.6309
41–60	15	30	12	24	
>60	33	60	34	68	
Sex					
Women	26	52	26	52	1.000
Men	24	48	24	48	
Color					
Caucasian	38	76	42	84	0.3173
Non-Caucasian	12	24	8	16	
Marital status					
Married	26	52	23	46	0.2832
Single	11	22	10	20	
Divorced	5	10	12	12	
Widowed	8	16	5	10	
Occupational status					
Retired	33	66	31	62	0.1044
Unemployed	13	26	8	16	
Other	4	8	11	22	
Education level					
Illiterate	44	88	41	82	0.7065
Incomplete primary	3	6	3	6	
Complete primary	2	4	2	4	
Incomplete secondary	1	2	4	8	

Chi square test of independence ($p < 0.05$)

Table 2 Clinical characteristics of patients in the surgery and control groups

Variables	Control group (n = 50)		Surgery group (n = 50)		p value
	n	%	n	%	
Diabetes mellitus					
Yes	35	70	21	42	0.0048
No	15	30	29	58	
Arterial hypertension					
Yes	12	24	22	44	0.0348
No	38	76	28	56	
Varicose veins					
Yes	41	82	33	66	0.0682
No	9	18	17	34	
Smokers					
Yes	38	76	29	58	0.0556
No	12	24	21	42	

Chi square test of independence ($p < 0.05$)

Table 3 Age of the wound for patients in the surgery and control groups

Age of the wound (year)	Control group		Surgery group		p value
	n	%	n	%	
1 to 2	3	6	4	8	0.0058
3 to 4	4	8	4	8	
5 to 6	8	16	7	14	
7 to 8	25	50	27	54	
9 to 10	5	10	3	6	
More than 11	5	10	5	10	
Total	50	100	50	100	

Chi square test of independence ($p < 0.05$)

diseases, especially of those with venous leg ulcers, are of major scientific and social importance. Investigations addressing the relationship between aging and well-being, and the association of aging with illness may contribute to the improvement of HRQoL in the elderly population [16].

During the 2 years of the study, we have assessed HRQoL and self-esteem in 100 patients with venous leg ulcers treated either with split-thickness skin grafting or compression therapy with Unna's boot. Most participants were retired (control group, 66 %; surgery group, 62 %) or unemployed (control group, 26 %; surgery group, 16 %). Venous leg ulcers lead patients to unemployment or retirement because the lesion usually remains open for months or years, representing a high social and economic impact on the patient's life and treatment costs [19, 20].

In both groups, most patients were illiterate (control group, 88 %; surgery group, 82 %). The level of patient

education may affect self-care, especially in patients with chronic diseases who may need to follow complex drug regimens, diets, and instructions for wound dressings. High educational levels are associated with more job opportunities, better income, and better adherence to treatment, which is usually performed by specialists [1, 21–23]. Knowing the education level of patients helps health professionals to provide adequate information to patients about venous leg ulcers, the treatment, and how to prevent complications. Due to the high percentage of illiterate patients with venous leg ulcers, the use of appropriate interventions is essential for the treatment of this population. Interventions should be designed to assess patient's knowledge on the condition, provide educational information, and encourage self-care and changes in life style that could improve their quality of life [21].

Most patients in both groups were smokers (control group, 76 %; surgery group, 58 %). Smoking causes oxidative damage to tissues, reduces immune responses, increases susceptibility to infection, inhibits collagen synthesis, and impairs the healing process [23, 24]. Smoking also decreases the concentration of functional hemoglobin in the blood, causes pulmonary dysfunction, and impairs oxygen delivery to tissues. Nicotine causes vasoconstriction, which increases the risk of ischemia and development of venous ulcers [23–25].

The study participants had chronic diseases and conditions, including diabetes mellitus (control group, 70 %; surgery group, 42 %), hypertension (control group, 24 %; surgery group, 44 %), varicose veins (control group, 82 %; surgery group, 66 %), and history of venous thrombosis (control group, 30 %; surgery group, 26 %). Varicose veins and history of venous thrombosis have been described as risk factors for venous leg ulcers [24]. Although the patients were consecutively assigned to either the control group or surgery group to avoid bias, there were differences between groups at baseline, which is a limitation of the study.

Skin grafting is the most commonly used surgical procedure for coverage of skin wounds, including burns, traumatic injuries, venous leg ulcers, and other chronic conditions [8, 26]. This is an effective and low-cost procedure that may reduce pain and improve HRQoL and functional status [8, 18, 27]. HRQoL is an important indicator of patient response to treatment for patients with venous leg ulcer. This parameter reflects the fact that these patients may have venous leg ulcers present for many years resulting from chronic recurrent diseases or conditions [8]. Several aspects must be considered in the assessment of HRQoL in patients with wounds, including physical, psychological, and social well-being, pain, functional status, degree of optimism, and outlook on life [16].

In this study, there was a progressive increase in SF-36 scores on all subscales in the surgery group within the

Table 4 Mean SF-36 scores on the physical functioning, body pain, role physical, and general health subscales for the control and surgery groups at different time points

Descriptive statistics	SF-36 subscales								<i>p</i> value
	Control group (<i>n</i> = 50)				Surgery group (<i>n</i> = 50)				
	Baseline	30 days	90 days	180 days	Baseline	30 POD	90 POD	180 POD	
Physical functioning									
Mean	16.1	16.42	16.52	17.8	30.34	69.38	82.4	88.38	0.0003
SD	14.42	15.04	14.88	16.77	14.46	13.21	13.21	14.38	
Bodily pain									
Mean	32.54	32.38	32.54	30.38	36.30	56.6	69.84	73.88	0.0001
SD	19.75	19.84	19.29	21.69	8.37	9.35	8.97	12.86	
Role physical									
Mean	13.18	12.8	14.48	5.16	29.1	74.16	85.84	94.4	0.0001
SD	19.3	19.09	21.06	10.73	21.87	19.83	16.56	16.13	
General Health									
Mean	28.02	28.22	29	16.88	36.64	59.58	67.7	72.78	0.0001
SD	18.44	18.62	18.54	18.54	8.9	20.17	8.12	16.28	

SD standard deviation, *d* days, *POD* postoperative days

Mann–Whitney test and Friedman test

Table 5 Mean SF-36 scores on the social functioning, role emotional, vitality, and mental health subscales for the control and surgery groups at different time points

Descriptive statistics	SF-36 subscales								<i>p</i> value
	Control group (<i>n</i> = 50)				Surgery group (<i>n</i> = 50)				
	Baseline	30 days	90 days	180 days	Baseline	30 POD	90 POD	180 POD	
Social functioning									
Mean	36.53	36.97	37.17	24.36	39.25	57.16	61.29	63.39	0.002
SD	18.73	19.27	18.69	24.12	11.56	8.41	12.78	16.29	
Role emotional									
Mean	16.45	16.49	17.48	16.08	30.24	65.97	86.41	87.11	0.0001
SD	20.24	20.22	20.93	16.87	21.32	14.62	15.03	19.20	
Vitality									
Mean	32.08	31.46	32.6	30.2	38.14	53.54	77.66	80.54	0.0001
SD	17.27	16.98	16.8	19.73	9.69	8.56	9.8	10.69	
Mental health									
Mean	34.58	34.64	35.66	22.70	50.82	61.68	67	69.1	0.0001
SD	17.97	18.05	17.62	21.71	8.02	13.17	14.86	17.66	

SD standard deviation, *d* days, *POD* postoperative days

Mann–Whitney test and Friedman test

180 day-study period, indicating an improvement in the HRQoL of these patients. However, no significant differences in SF-36 scores on all subscales were found in the control group during the study period. Our results are consistent with the findings of other study on the use of skin grafting in the treatment of venous leg ulcers that reported improvement in HRQoL in 90 % of cases [28].

The physical functioning subscale assesses the patient's ability to perform activities of daily living, including

dressing, bathing, and walking, and the degree of help needed to perform these activities [18, 26, 29]. Our results showed a significant improvement in physical functioning scores from baseline (control group, 16.1; surgery group, 30.34) to the end of the study (control group, 17.8; surgery group, 88.38) in the surgery group. Therefore, patients who were treated with split-thickness skin grafts were better able to perform everyday life activities than controls, which is in agreement with the literature [28, 30].

Table 6 Mean RSE/UNIFESP-EPM scores for the control and surgery groups at different time points

Descriptive statistics	Control group (<i>n</i> = 50)				Surgery group (<i>n</i> = 50)				<i>p</i> value
	Baseline	30 days	90 days	180 days	Baseline	30 POD	90 POD	180 POD	
Mean	25.5	24.22	23.2	22.6	25.86	17.54	10.72	5.18	0.0001
SD	2.33	2.08	2.44	3.1	3.54	2.45	2.18	2.47	

SD standard deviation, *d* days, *POD* postoperative days

Mann–Whitney *U* test and Friedman test

Many patients with venous leg ulcers suffer from persistent pain throughout the day, and some experience severe pain during dressing changes. Wound pain increases at night, causing sleep disturbances [31, 32]. Pain is a serious problem for patients who suffer from chronic venous leg ulcers. It may lead to impaired wound healing, decreased quality of life, difficulty in performing daily activities, changes in lifestyle, and increased frustration and immobility, which may result in social isolation [31, 32]. The bodily pain subscale assesses the level of pain experienced by the patient and functional limitations caused by pain. A significant reduction in bodily pain scores were observed from the beginning (control group, 32.54; surgery group, 20.38) to the end of the study (control group, 29.38; surgery group, 73.88) in the surgery group. This indicates that patients who underwent skin grafting experienced pain reduction.

Treatments for venous leg ulcers commonly involve the continuous wearing of compression stockings or bandages and other devices, which lack aesthetic appeal. Another problem faced by these patients is the smell of the ulcer, which discourages social interaction, isolating the individuals from friends and family, and interfering with their jobs, as many fear prejudice [33]. The social functioning subscale measures the extent to which physical and emotional health interferes with normal social activities. Patients in both groups reported low scores on social functioning at baseline (control group, 36.53; surgery group, 39.25). However, patients in the surgery group were participating in social activities 90 days after skin grafting and showed improvement in their physical condition. The role emotional subscale assesses the impact of emotional health on work and other activities. At the beginning of the study, the participants had low scores on the role emotional subscale (control group, 16.45; surgery group, 30.24). But again, patients in the surgery group showed improvement in emotional health 90 days postoperatively.

The way patients react to the burden of having venous leg ulcers affects all aspects of their life. Their reactions and feelings interfere with everyday life activities and their social, professional and family life, resulting in low self-esteem, quality of life and self-image [10, 34]. The role physical, general health, vitality, and mental health

subscales measure the extent to which physical health interferes with patients' work activities, outlook on life, and willingness to perform daily tasks, and the effect of anxiety, depression, happiness, and tranquility on daily life. Low mean scores on these subscales were found in both groups at baseline, but patients in the surgery group reported higher scores than controls 90 days after surgery, indicating that the use of split-thickness skin grafts for coverage of venous leg ulcers led to a significant improvement in physical and mental health, outlook on life, and optimism of patients.

Venous leg ulcers impact the physical and psychological functioning of the patients, causing social isolation, affecting sexuality, and impairing quality of life. Major contributing factors include pain, immobility, sleep disorders, lack of energy, worries, frustration, and low self-esteem and self-concept [4, 10, 16, 19, 33–35].

The difference in HRQoL found between groups can be explained by the fact that all ulcers in patients who received split-thickness skin grafts were healed 30 days after surgery, whereas no ulcer in the control group was completely healed during the 180-day study period. In a study on HRQoL conducted by our research group [36], 50 patients with venous leg ulcers were treated with wound dressings and compression therapy with Unna's boot. The patients were assessed at inclusion and after 4, 8, and 12 months of Unna's boot therapy. Complete ulcer healing was achieved in only 4 (8 %) patients after 8 months of Unna's boot therapy and in 42 (84 %) patients after 12 months of treatment, which is consistent with our findings in the present study. The prolonged healing time in the control group may be attributed to the fact that 70 % of patients had diabetes or that patients did not rest sufficiently as instructed or to the large size of some ulcers (up to 30 cm²) and amount of necrotic tissue and debris at the wound site.

Patients in both groups had a mean RSE score of 25 at baseline. No significant difference in mean RSE scores was found during the study period in the control group. However, a significant gradual decrease in RSE scores ($p = 0.0001$) was observed over the study period in the surgery group, indicating an improvement in self-esteem in these patients (Table 4). Self-esteem and body image are

part of the multiple dimensions of self-concept. Self-concept is defined as the perception of one's self in relation to others and the environment. It reflects an integration of conscious and unconscious feelings, attitudes, sense of self-worth, and physical self-perception profile [37]. Although the importance of self-esteem in social and individual well-being is internationally acknowledged, there are few studies on this subject in Brazil, especially population studies. One of the obstacles to an epidemiological approach to the study of self-esteem is the lack of measures validated on different Brazilian populations, making it difficult to scientifically investigate this topic [38]. The assessment of self-esteem in patients with venous leg ulcers is important and necessary, because these patients experience changes in their body, feelings, and lifestyle, which may lead to rapid changes in their body image, adversely affecting their mental well-being [12, 39, 40].

The lack of homogeneity between groups (i.e., differences in the prevalence of diabetes, hypertension, varicose veins, and smokers), lack of photographic documentation, and sample size are limitations of the study. Further studies overcoming these limitations are necessary to extend our results and to investigate the long-term recurrence of venous leg ulcers in patients with superficial venous reflux either receiving or not receiving superficial venous surgery before skin grafting for ulcer closure, as well as the combined effect of these surgical procedures on pain control, self-esteem, and quality of life of this patient population.

In conclusion, split-thickness skin grafting resulted in better HRQoL and self-esteem in patients with venous leg ulcers than did compression therapy with Unna's boot.

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