

EVALUATION OF HEALING EFFECTS OF NEW HERBAL FORMULATION ON VENOUS LEG ULCER: PILOT STUDY

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Venous leg ulcers represent a significant public health problem that will increase as the population ages. A wide variety of agents are available for the treatment of venous leg ulcers, including ointments and dressings. Numerous herbs and their extracts are potentially conducive to wound healing, including the ability to serve as an antimicrobial, antifungal, astringent and etc.

The aim of the study was to establish the healing effects of herbal therapy on non-infected venous leg ulcers. The major components of the DermaplantG were extract of *Allii bulbosus*, *Hyperici herba* and extract of *Calendulae flos*. In the study were included 18 patients with venous leg ulcers treated by DermaplantG herbal therapy. Our investigation focused on the five controls (baseline, 1st, 3rd, 5th, 7th weeks) of the parameters changes important for ulcer healing: wound surface area and reduction of venous leg ulcer score (fibrin deposits, exudation and eczema). Within-treatment analysis showed that, following DermaplantG herbal treatment, there was a significant decrease in surface leg ulcer and venous leg ulcer score after 7th treatment week ($P < 0.05$). The results of this pilot study demonstrate healing and antimicrobiologic effects of herbal therapy on non-infected venous leg ulcer. *Acta Medica Medianae* 2011;50(2): 39-42.

Key words: DermaplantG herbal therapy, healing, venous leg ulcer

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Introduction

Venous leg ulcers are common chronic disease that significantly influences quality of life and is often difficult to treat (1,2). Generally, therapeutic approaches include prevention of infection, various types of dressings, compression therapy, various physical type modalities, and often, herbal remedies (3). Also, the applied treatments are expensive, often without any effects (3).

Herbal therapy is becoming increasingly popular among patients and physicians. Also, it is used often by physicians in conventional dermatology especially in therapy of disturbed venous circulation and ulcers (4-6). Numerous herbs and their extracts are potentially conducive to wound healing, including the ability to serve as an antimicrobial, antifungal, astringent and etc. (7).

New ointment DermaplantG contains extracts of *Allii bulbosus*, *Hyperici herba* and extract of *Calendulae flos*. This study presents a support of abilities on DermaplantG herbal treatment of venous leg ulcers in clinical practice because there are not enough clinical investigations in this area.

Aim

The aim of the study was to establish the healing effects of DermaplantG therapy on non-infected venous leg ulcers.

Materials and methods

The study was open, randomized and controlled at the Clinic of Dermatology and Venerology, Clinical Centre Niš, Serbia.

There were in total 18 included patients with venous leg ulcers. Our investigation focused on the control of the parameter changes important for ulcer healing: wound surface area, and reduction of venous leg ulcer score (fibrin deposits, exudation and eczema).

To be defined as venous ulcers, all patients needed to have varicose veins with chronic venous insufficiency and clinical diagnosis of venous leg ulcer with the value of ankle brachial index (ABI) > 0.8. Exclusion criteria were patients

suffering from leg ulcers larger than 10cm², ulcer duration longer than two months, with clinical signs of infection, past thrombophlebitis and phlebothrombosis, hyperglycemia, patients with renal diseases and malignancies. All ulcers in this study were located below the level of the knee. All parameters were evaluated five times: at baseline, at the end of 1st, 3rd 5th and 7th weeks of treatment.

Patients were treated twice daily. Ointment was applied two times on the venous leg ulcers and ulcers surrounding. Appropriate care, washing and bandaging of ulcerations were performed every day.

Measurements of venous leg ulcer surface were used with acetate tracing. Surface area of the wound healing epithelisation and degree of reduced surface area were determined on the basis of the ulcer surface in cm² (measuring the half-diameter and calculating the surface according to the formula for circle and ellipse, since most ulcers can be reduced to circle or ellipse).

Epithelization and granulation of venous ulcers were evaluated on the 0-3 scale (0 – prominent; 1 – moderate; 2 – slight; 3 – absent). For evaluation of other parameters, such as fibrin deposits, exudation, edema, erythema, maceration, desquamation, scleroatrophy, pain and itching, the 0-3 scale was also used (0 – absent; 1 – slight; 2 – moderate; 3 – prominent). In each check-up of the treatment effect the total score was determined for ulcer 0-12 which was separately calculated with ulcer volume; for ulcer vicinity 0-15, for symptoms 0-6 and for total score as a sum of scores of all parameters.

Descriptive statistics was reported as means ± SD. The rate of healing (cm² and percent change per control week) was analyzed using ANOVA. The difference between pre- and post-therapy was calculated using paired t-test. Data were analyzed using analysis of variance for multiple comparisons (SPSS 14 for Windows), with significance set at P < 0.05.

In this study, the protocol used was recommended by manufacturer and guidelines of good clinical practice. Written informed consent was obtained from all patients prior to enrolment.

Results

Demographic information of patients, characteristics of the sex, age, duration and ABPI index are provided in Table 1.

Table 1. Baseline patient characteristics (mean±SD)

Patients characteristic		DermplantG
Sex	M	7 (38.88%)
	F	11 (61.11%)
Age (years)		67.64±3.43
Duration (months)		5.49±1.32
ABPI		0.90±0.08

Final results of venous leg ulcer treatment effects in all groups are provided in Table 2.

Table 2. Analysis on treatment effect in DermplantG group with significance level

DermplantG	Pre-treatment (cm ²)	Epithelisation %			
		I week	III week	V week	VII week
Surface of leg ulcer	32.96±17.56	7.34	14.70	25.55	44.05*
Sc. ulcer	37	57	73	98	100*
Sc. vicinity	35	49	60	76	80*
Sc. symptoms	25	37	62	91	95*
Total score	20	43	65	88	91*

* Statistical significance at p<0.05

Value of pre-treatment (cm²) is mean+SD, epithelisation expressed in percent of epithelisation (%) during therapy.

Within-treatment analysis on DermplantG group showed that, following new herbal therapy treatment, there was a significant decrease in surface leg ulcer and venous leg ulcer scores after the 7th week of treatment (P < 0.05). Two venous leg ulcers (11.11%) completely healed. The total area reduction of ulceration at the end of study was 44.05%. After seven weeks, the improvement of ulcer score (granulation, fibrin deposits, exudation and eczema) was maximal 100% and epithelization was 44.05%. The score symptoms, score vicinity and total score of venous leg ulcer also improved after seven weeks of therapy (p<0.05). Therapy was administered without any side effects.

Discussion

The efficacy of new DermplantG herbal therapy was demonstrated in patients with non-infected venous leg ulcerations with duration no longer than two months. No side effects or adverse reactions were detected during seven weeks of two-daily application of the extract-containing herbal preparations which support the safety and good tolerability of this product.

Dermplant G contains dry water extract of *Allii bulbosus*, dry ethanol extract of *Hyperici herba* and oily extract of *Calendulae flos*. The selected extracts possessed antimicrobial (antiseptic), anti-inflammatory and regenerative properties.

Our results showed that the ointment "Dermplant G" statistically significantly accelerate the process of epithelization and healing of certain venous ulcers without any observed adverse effects during the study and with good skin tolerance. Also, the active principles of the ointment possessed anti-inflammatory and anti-aedematous potentials and influences the healing process.

The total area reduction of ulceration at the end of study was 44.05%. After seven weeks the improvement of ulcer score (granulation, fibrin deposits, exudation and eczema) was maximal

100% and epithelization was 44.05%. The score symptoms, score vicinity and total score of venous leg ulcer also improved after seven weeks of therapy ($p < 0.05$). The beneficial effects on epithelization, all symptoms and healing process can be due to the presence of all three extracts. Recent papers (8) have shown the beneficial effects of "aged garlic solution" on wound closure, epithelization, dermal matrix regeneration and angiogenesis on chicken dorsum skin excisional wound-healing assay after six days. Histological studies have shown an effect on re-epithelization with increase in the number of new loosely packed collagen and maturation of collagen bundles after 4 and 6 days, respectively. Very high and dose-dependent neo-vascularisation was exhibited in all treated groups. Also, the positive effects on burn wound were observed in the study of Das (9).

The more documented effects in wound-healing had *Hypericum perforatum* and *Calendula officinalis*. They are traditionally used for healing wounds and burns. Also, several studies have shown their pronounced effects in healing wounds separately or in combination (10-12) partly due to the antibacterial activity and anti-inflammatory effect (13). The most likely

mechanism is through the stimulation of fibroblast collagen production and activation of fibroblast cells into polygonal shapes, which play important role in repair and closing the wounds by *H. perforatum* extracts (14). The *Calendula* extracts possessed wound-healing, as well anti-inflammatory properties, so they are used for treatment, but also in cosmetics concomitantly with other types of therapy such as electro-iono therapy (15,16,17).

Conclusion

The results of this pilot study demonstrate healing effects of new *DermpalantG* herbal therapy on non-infected venous leg ulcer. These are preliminary observations that raise the need for appropriately designed clinical studies to demonstrate and to evaluate inherent properties of herbal preparations desirable to achieve venous leg ulcers healing.

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References

- Briggs M, Flemming K. Living with leg ulceration: a synthesis of qualitative research. *J Adv Nurs*. 2007 Aug;59(4):319-28. [[CrossRef](#)] [[PubMed](#)]
- Valencia IC, Falabella A, Kirsner RS, Eaglstein WH. Chronic venous insufficiency and venous leg ulceration. *J Am Acad Dermatol*. 2001 Mar;44(3):401-21. [[CrossRef](#)] [[PubMed](#)]
- Robson MC, Cooper DM, Aslam R, Gould LJ, Harding KG, Margolis DJ, et al. Guidelines for the treatment of venous ulcers. *Wound Repair Regen*. 2006 ;14(6):649-62. [[CrossRef](#)] [[PubMed](#)]
- Leach MJ. A critical review of natural therapies in wound management. *Ostomy Wound Manage*. 2004 Feb;50(2):36-40. [[PubMed](#)]
- Binić I, Janković A, Janković D, Janković I, Vrućinić Z. Evaluation of healing and antimicrobiological effects of herbal therapy on venous leg ulcer: pilot study. *Phytother Res*. 2010 ;24(2):277-82. [[CrossRef](#)] [[PubMed](#)]
- Janković A, Binić I, Vrućinić Z, Janković D, Janković I, Jančić S. Can you combine herbal therapy with physical agents in the treatment of venous leg ulcers? Evaluation of healing and antimicrobiological effects: a pilot study. *Forsch Komplementmed*. 2010 ;17(5):266-9. [[CrossRef](#)] [[PubMed](#)]
- Duran V, Matic M, Jovanović M, Mimica N, Gajinov Z, Poljacki M, Boza P. Results of the clinical examination of an ointment with marigold (*Calendula officinalis*) extract in the treatment of venous leg ulcers. *Int J Tissue React*. 2005 ;27(3):101-6. [[PubMed](#)]
- Ejaz S, Chekarova I, Cho JW, Lee SY, Ashraf S, Lim CW. Effect of aged garlic extract on wound healing: a new frontier in wound management. *Drug Chem Toxicol*. 2009 ;32(3):191-203. [[CrossRef](#)] [[PubMed](#)]
- Das S. Garlic burn: the real facts. *Burns*. 2009 ;35(8):1193. [[CrossRef](#)] [[PubMed](#)]
- Saddiqe Z, Naeem I, Maimoona A. A review of the antibacterial activity of *Hypericum perforatum* L. *J Ethno pharmacol*. 2010 ;131(3):511-21. [[CrossRef](#)] [[PubMed](#)]
- Reuter J, Merfort I, Schempp CM. Botanicals in dermatology: an evidence-based review. *Am J Clin Dermatol*. 2010 ;11(4):247-67. [[CrossRef](#)] [[PubMed](#)]
- Lavagna SM, Secci D, Chimenti P, Bonsignore L, Ottaviani A, Bizzarri B. Efficacy of *Hypericum* and *Calendula* oils in the epithelial reconstruction of surgical wounds in childbirth with caesarean section. *Farmaco*. 2001 ;56(5-7):451-3. [[CrossRef](#)] [[PubMed](#)]
- Süntar I, Akkol EK, Keleş H, Oktem A, Başer KH, Yeşilada E. A novel wound healing ointment: A formulation of *Hypericum perforatum* oil and sage and oregano essential oils based on traditional Turkish knowledge. *J Ethnopharmacol*. 2011 ;134(1):89-96. [[CrossRef](#)] [[PubMed](#)]
- Oztürk N, Korkmaz S, Oztürk Y. Wound-healing activity of *St. John's Wort* (*Hypericum perforatum* L.) on chicken embryonic fibroblasts. *J Ethnopharmacol*. 2007 ;111(1):33-9. [[CrossRef](#)] [[PubMed](#)]
- Preethi KC, Kuttan R. Wound healing activity of flower extract of *Calendula officinalis*. *J Basic Clin Physiol Pharmacol*. 2009 ;20(1):73-9. [[CrossRef](#)] [[PubMed](#)]
- Mantle D, Gok MA, Lennard TW. Adverse and beneficial effects of plant extracts on skin and skin disorders. *Adverse Drug React Toxicol Rev*. 2001 Jun;20(2):89-103. [[PubMed](#)]
- Jankovic A, Stanojevic M, Binic I. Electro-ionotherapy-a new pattern of venous ulcers healing. *Acta Medica Medianae* 2005; 44(2):67-71.

UTVRĐIVANJE TERAPIJSKIH EFEKATA PREPARATA NA BAZI LEKOVITOG BILJA U LEČENJU VENSKIH ULKUSA NOGU: PILOT STUDIJA

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Venske ulceracije nogu predstavljaju značajan problem zdravstvene zaštite koji se stalno uvećava sa povećanjem broja starijih bolesnika. Za lečenje venskih ulkusa nogu dostupan je veliki broj terapijskih modaliteta kao što su masti i sredstva za previjanje. Brojni ekstrakti lekovitih biljaka i preparati na njihovoj bazi potencijalno indukuju epitelizaciju rana, jer se baziraju na antimikrobnim, antifungicidnim i adstrigentnim svojstvima.

Cilj studije bio je utvrđivanje terapijskih efekata preparata na bazi lekovitog bilja u lečenju neinficiranih venskih ulkusa nogu. DermalantG hidrogel je preparat na bazi lekovitog bilja u čiji sastav ulazi *Allii bulbosus*, *Hyperici herba* e ekstrakt *Calendulae flos*. U studiju je bilo uključeno 18 bolesnika sa venskim ulkusom potkolenice koji su lečeni DermalantG preparatom na bazi lekovitog bilja. Istraživanje je obuhvatilo 5 kontrolnih pregleda (na početku, I, II, V i VII nedelje) i kontrolu parametara koji su značajni za epitelizaciju: smanjenje površine i smanjenje skora venskog ulkusa (depozit fibrina, eksudacija i ekcem). Poređenje rezultata unutar same grupe pokazuje da DermalantG terapija značajno smanjuje površinu venskog ulkusa i skor venskog ulkusa posle VII nedelja lečenja ($P < 0.05$).

Rezultati ove pilot studije pokazuju efekat epitelizacije, kao i antimikrobni efekat kod ulceracija koje prethodno nisu inficirane. *Acta Medica Medianae 2011;50(2):39-42.*

Ključne reči: *DermalantG biljna terapija, epitelizacija, venski ulkus potkolenice*