

ORIGINAL ARTICLE

The efficacy of *Helix aspersa* Müller extract in the healing of partial thickness burns: A novel treatment for open burn management protocols

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Abstract

Snail extracts have been increasingly used in numerous dermatologic conditions and recent literature attributes healing, soothing and anti-aging properties to them. This study evaluates the efficacy of *Helix aspersa* extract in an open wound management protocol for deep partial thickness (PT) facial burns and compares it to moist exposure burn ointment (MEBO). A total of 27 adult patients with deep partial thickness facial burns (group A) were treated by application of a snail extract cream twice daily for a maximum period of 14 days or until full epithelialization. Times until debridement and epithelialization of the burn surface were compared with those of 16 patients (group B, control) treated by MEBO. Pain scores were recorded using a visual analogue scale (VAS) on the fourth post-burn day before and 30 min after application. Mean times for eschar detachment were 9 ± 2 days (group A) and 11 ± 2 days (group B) ($p=0.003$) and for burn surface epithelialization were 11 ± 2 days and 15 ± 3 days respectively ($p<0.001$). VAS pain scores after application in group A were significantly lower compared to group B ($p<0.001$). *Helix aspersa* extract is a natural, safe and effective alternative treatment in open wound management of partial thickness burns in adults.

Key words: Burns, open management, snail extract, wound healing

Introduction

Over the centuries several preparations have been topically applied for the treatment of partial thickness burns (1–3). Today it is known that most of these treatments modify the burn wound microenvironment and optimize the wound bed, thus accelerating the healing process (4–8).

Celse proposed crushed snail with its shell as a healing agent and Pliny the Elder thought that snail pulp "is a sovereign remedy to treat pain related to burns, abscesses and other wounds" (9). Since the 18th century, various snail 'preparations' have been recommended for external use with dermatological disorders (9–12).

In 1980, in a farm in Chile breeding edible brown snails, the snail handlers noticed that snail handling

was associated with healing properties (13). A scientific study of secretion from the Chilean snail *Helix aspersa* Müller confirmed that it contained a combination of natural healing agents for the human skin (13).

Elicina® (Locafar, Chile) is a cosmetic repair cream containing 80% snail extract from the terrestrial brown snail's own secretions. This extract was found to contain allantoin, collagen, elastine, glycolic acid (1.6%) and vitamins A, D and E (10–14). Allantoin is a valuable healing agent, which promotes keratolysis, accelerates cell proliferation (15,16), and acts as a chemical debrider of necrotic and scaling tissue, cleansing the areas where it is applied (16,17). Glycolic acid has long been used as a natural peeling agent as it enhances natural skin exfoliation and debridement, thus accelerating detachment of burn eschars (17).

Newly emerging experimental and clinical data suggest that the maintenance of balanced moisture combined with wound dressings optimizes the microenvironment and accelerates healing. In 1999, Xu RongXiang proved that partial burn healing was achieved faster by covering the surface with a special β -sitosterol-based cream, named moist exposed burn ointment (MEBO) (18,19).

Based on the principles of the open, moist management of burns, an ointment containing 80% *Helix aspersa* extract (Elicina) was used in the present study in order to evaluate the healing of partial thickness burns of the face, which, to the best of our knowledge, is an indication not previously reported.

Patients and methods

A total of 46 consecutive patients admitted with deep partial thickness facial burns to Plastic, Reconstructive Surgery and the Burns Unit at the Athens General State Hospital 'G. Gennimatas' were enrolled in this study and were divided in two groups by a random number generator. Three patients were excluded from the study as they were found to have a clinical history of diabetes.

All patients were given a thorough explanation of the study and signed an informed consent. The study was conducted according to the regulations of the Athens General State Hospital 'G. Gennimatas' for clinical studies.

A total of 27 adult patients, 15 male and 12 female, aged 22–69 years (mean age 48.5 ± 12.2 years) with deep partial thickness facial burns (group A) were treated by application of the cream containing *Helix aspersa* extract, Elicina, twice daily and for a maximum period of 14 days or until full epithelialization of the burn surface. The times until burn eschars were detached by gentle washing and until epithelialization of the burn surface were recorded and compared with those of 16 patients, 10 male and six female, aged 20–70 years (mean age 45.6 ± 11.5 years) (group B, control group) also treated by the open method using MEBO (Julphar Gulf Pharmaceutical Industries, UAE), twice daily for 14 days. Swab cultures were obtained from all patients in both groups every fourth day.

Pain scores were recorded by each patient on the fourth post-burn day before and 30 minutes after cream application by the use of a 1–10 visual analogue scale (VAS). All patients were digitally photographed and clinically evaluated every alternate day until full epithelialization by two residents blinded to the cream used by each patient (Figures 1–3).



Figure 1. (A) Partial thickness burns in a 62-year-old patient and (B) 8 days after open management with Elicina cream.

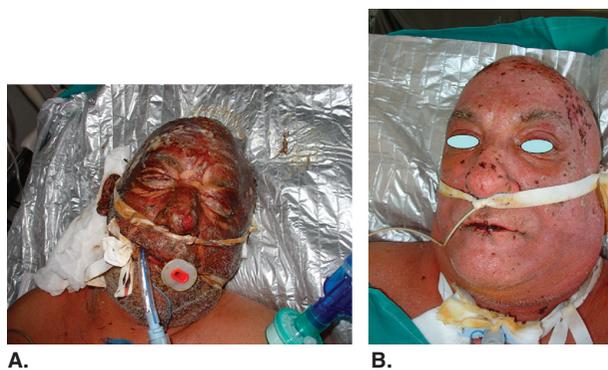


Figure 2. (A) A deep partial thickness burn in a 69-year-old patient and (B) 10 days after open management with Elicina cream.

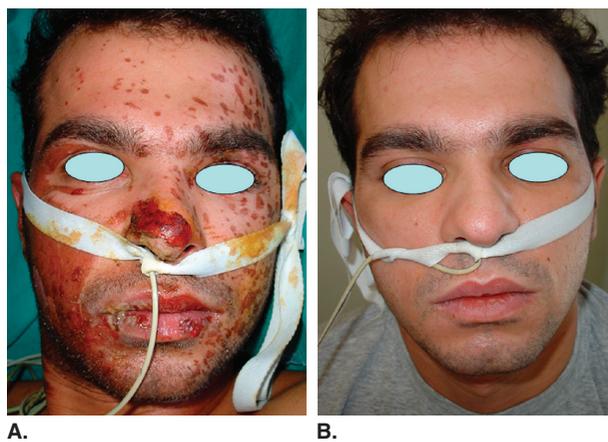


Figure 3. (A) Partial thickness burns in a 26-year-old patient and (B) results after 12 days of application of Elicina cream.

Statistical analysis of data was performed using the Statistical Package for the Social Sciences (SPSS), version 11.0 (SPSS, Inc., Chicago, IL, USA). The normality of continuous variables was tested with the Shapiro-Wilk test. Normally distributed quantitative

variables were expressed as the mean \pm standard deviation.

Student's *t*-test was used to determine differences of demographic characteristics and VAS pain scores between the two groups of patients, while the paired samples *t*-test was used to assess the changes of pain scores within each group. The chi-squared test was used to evaluate any potential association between categorical variables. The two-way mixed ANOVA was performed to assess the interaction between the two groups of patients and the change of VAS pain scores over time. All tests were two-tailed and statistical significance was considered for *p*-values less than 0.05.

Results

There were no significant differences between the two groups of patients regarding sex ($p=0.655$) and age ($p=0.446$). Burn swab cultures of the burn surfaces revealed bacterial colonization in all patients consisting of *Streptococcus*, *Staphylococcus aureus*, *Staph. epidermidis*, *Pseudomonas aeruginosa*, *Acinetobacter*, *Enterococcus* and *Klebsiella*. However, owing to an absence of signs of systemic infection, no systemic or topical antibiotic treatment was used in any patient. Further swab cultures were not obtained after burn epithelialization.

The mean times for burn eschar detachment were 9 ± 2 days for group A and 11 ± 2 days for group B ($p=0.003$). Burn surface epithelialization was clinically evaluated in both groups and was completed within 14 days for all group A patients (mean time for epithelialisation: 11 ± 2 days), but only three group B patients (mean time for epithelialization: 15 ± 3 days) ($p<0.001$).

Two-way mixed ANOVA showed that the interaction between the two creams and the change of pain scores was marginally significant ($F_{1,41}=3.421$, $p=0.072$). While mean VAS pain scores before cream application did not differ significantly between the two groups (6.22 ± 1.25 in group A and 6.50 ± 0.89 in group B, $p=0.442$), the post-application mean VAS pain scores in group B were significantly higher than in group A (4.50 ± 0.52 vs 3.52 ± 0.80 , $p<0.001$) (Figure 4). Mean pain reduction after application was found to be significant in both groups of patients (2.70 ± 1.35 , range 0–5, $p<0.001$ in group A; 2.00 ± 0.89 , range 1–3, $p<0.001$ in group B).

No allergic reactions were recorded in any patient. In a 2-year follow-up period, all patients of both groups developed stable epithelial coverage of the burn surfaces without scars.

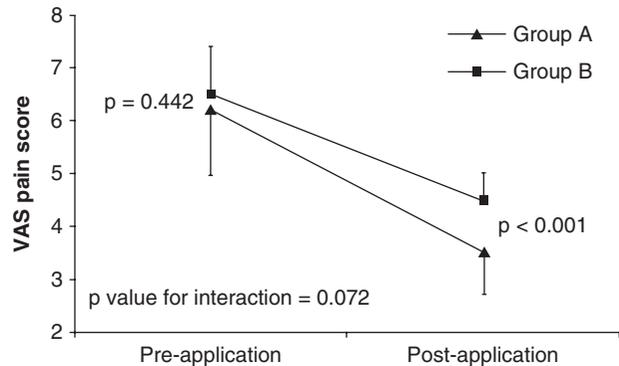


Figure 4. VAS pain scores before and half an hour after application of Elicina (Group A) and MEBO (Group B) in patients with deep partial thickness burns of the face.

Discussion

In this study, the efficacy of a cream containing snail extract is compared to MEBO in an open, moist burn management protocol in deep partial thickness burns of the face. The efficacy was evaluated in terms of burn eschar detachment, epithelialization and pain relief.

In the present study, the cream containing snail extract was tested in an open moist protocol, as it has been shown that facial burns heal faster when managed without dressings and under conditions of controlled moisture (14,15). Regarding burn wound microbiology, surface flora was managed by daily gentle washing, which also removed gradually burn debris. Elicina cream was found to accelerate the removal of debris and burn eschar detachment as well as epithelialization of facial deep partial thickness burns.

Pain was assessed by patients on the fourth day, when intravenous analgesia is stopped, rendering pain scores reliable. Elicina was found to significantly relieve pain compared to MEBO when applied to the burn surface.

Although food allergy has been reported due to ingestion of *Helix aspersa* snails (14,20), no allergic reaction was observed in any patient after local external application of the cream containing snail extract.

There are certain limitations of this study. First, the relatively small number of patients studied might be a source of bias; however, statistically significant differences in all studied parameters of efficacy may answer such criticism. Furthermore, wound bioburden was not assessed, as long as pathogens did not clinically interfere with the progress of burn healing; therefore, this study cannot make suggestions on the comparative efficacy of Elicina versus MEBO in terms of bioburden reduction in burn areas. Further studies in patients

not covered by systemic antibiotic treatment are needed in order to evaluate any potential efficacy of the snail extract cream in the prevention of infection and/or conversion of deep partial thickness to full thickness burns, a progression that dramatically delays healing and increases morbidity.

In conclusion, a cream containing *Helix aspersa* extract is a natural purified product accelerating apoptosis of burn eschars and epithelialization of partial thickness facial burns. This study suggests that it also has a soothing effect on post-burn pain. It is a safe alternative to creams used in open wound management protocols and may be used as a topical treatment in partial thickness burns in adults.

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