EMLA and Lidocaine Spray: A Comparison for Surgical Debridement in Venous Leg Ulcers

Roberto Cuomo,* Carlo D'Aniello, Luca Grimaldi, Giuseppe Nisi,
Gaia Botteri, Irene Zerini, and Cesare Brandi

Unit of Plastic and Reconstructive Surgery, Santa Maria Alle Scotte Hospital, University of Siena, Siena, Italy.

Roberto Cuomo, MD

Submitted for publication October 21, 2014.
Accepted in revised form December 20, 2014.

*Correspondence: Unit of Plastic and Reconstructive Surgery of University of Siena, Santa Maria Alle Scotte Hospital, Mario Bracci Street, Cap 53100, Siena (SI), Italy
(e-mail: robertocuomo@outlook.com).

Objective: In this study the author proposes to compare eutectic mixture of local anesthetics (EMLA) and an odontoiatric spray solution of 10% Lidocaine (Ecocain) for surgical debridement in venous leg ulcers.

Approach: Fifty patients were recruited and randomly assigned into two groups (A, B). All of them have venous leg ulcer in the medial and/or lateral malleolar region. Group A: topical anesthetic EMLA with film occlusion. Group B: topical anesthesia with Ecocain. The author proceeded to surgical debridement after local anesthesia. A questionnaire and a visual analog scale (VAS) were administered to assess the amount of pain felt during the debridement and during the following 6 h.

Results: The analysis of the VAS revealed no major significant differences statistically. The analysis of the questionnaires showed patients treated with Ecocain took more analgesic drugs. Analysis of the timing and quality of procedure showed that Ecocain reduced the timing of debridement and dressing change, improving the outpatient management and patient compliance.

Innovations: For rapid debridement, the most appropriate is to use Ecocain.

Conclusion: Methods of local anesthesia are multiple and must be identified according to the needs of the patient and the surgeon trying to get the best anesthesia with minimal use of time and resources.

INTRODUCTION

VENOUS LEG ULCERS IS an issue of increasing importance. The increase in the average age of population coincides with an increase in the incidence of this problem.

Pain is one of the most important features of venous leg ulcers that is evoked during the dressing change and often at rest. For this reason it is difficult to make a good surgical debridement of the wound and sometimes it is necessary to use alternative solutions such as enzyme ecc.

On the other hand, several studies have been conducted on the use of topical local anesthetic to promote

pain reduction so as to perform surgical debridement.^{1,2}

CLINICAL PROBLEM ADDRESSED

In this study the authors investigate the use of EMLA and a spray solution of 10% Lidocaine (Ecocain) during the procedure of surgical debridement. In particular, we investigate on the anesthetic power, anesthetic deepness (to promote an effective cleaning of ulcer) and, at last, on the timing of the dressing change procedures.

MATERIALS AND METHODS

For this study, we excluded patients with particular conditions that

obstruct wound healing: diabetes, vasculitis, amyloidosis, systemic sclerosis. Fifty patients were recruited, 35 women and 15 men. The average age was 68 years (range 59–80). All of them had venous leg ulcer in the medial and/or lateral malleolar region. All lesions had no signs of infections at the beginning of the study. These lesions had been present for at least a month.

All ulcers were strongly secreting and evoked pain even at rest. We made two groups (A, B) and randomly assigned every patient to one of these two groups.

We followed this protocol for the management of venous leg ulcers:

1. Disinfection with a solution of iodopovidone.
2. Washing with saline.
3. Topical anesthesia (see below).
4. Surgical debridement.
5. Application of collagenase (if necessary).
6. Cover with adsorbent dressing and sterile gauzes.
7. Inelastic bandaging.
8. Administration of two questionnaires and visual analog scale (VAS).

Before surgical debridement the patients received a topical anesthesia.

Group A: EMLA topical anesthetic with film occlusion was applied.

We used a quantity of EMLA to cover all ulcer surfaces for a thickness of 5 mm.

After 10 min, we proceeded to surgical debridement to remove residues of fibrin and any other necrotic material that prevented the proper healing of the wound.

The smallest ulcer measured 3×2 cm whereas the largest ulcer measured 9×3.5 cm. On an average the ulcers measured 6×4 cm. Surgical debridement was extended to clean the wound bed entirely, until reaching a bleeding tissue.

After this procedure, we continued to follow the algorithm outlined above.

Group B: a topical anesthesia with Ecocain (a spray solution of lidocaine 10%, alcohol 95°, saline) was performed and next we carried the surgical debridement.

We used one spray every 3 cm² of surface. Each spray contained 100 µL of solution, equal to 10 mg of lidocaine.

The smallest ulcer measured 2.5×4 cm, whereas the largest ulcer measured 8.3×5 cm. On an average the ulcers measured 4.5×5.5 cm. Surgical debridement was extended to clean the wound bed entirely, until reaching a bleeding tissue.

We again applied Ecocain spray (one or two puffs on the area of treatment), if patients of group B felt pain during debridement.

After the inelastic bandage, we administered a VAS to assess the amount of pain felt during the debridement and one questionnaire (Appendix) to evaluate the pain during the following 6 h of debridement.

VAS was composed of a sheet with a straight line in which were marked two points: one point to the left indicating no pain and a point to the right indicating unbearable pain. Graph paper was placed on the back of the paper. Patients marked on a straight line the pain felt. The corresponding values on the grid on the back of the paper were collected and analyzed.

These data were collected on the day following medication. Questionnaire used was structured from Caraceni *et al.*³ specially modified for this study and is included in the Appendix.

RESULTS

VAS analysis

The analysis of the VAS revealed no major significant differences statistically (Student *t* not relevant). The average value obtained was 6.34 and 6.48 for EMLA for Ecocain spray.

Questionnaire analyses

The analyses of the questionnaires showed that six patients treated with Ecocain spray took low-dose analgesics (ibuprofen, ketoprofen, dexibuprofen) in the 6 h following the procedure of debridement. The pain disappeared or was alleviated within an average of 4 h and had little impact on the overall life of the patient.

On the contrary, only one patient treated with EMLA took ibuprofen and the pain disappeared or was alleviated within 5 h and did not affect the overall life of the patient.

Timing and quality of procedure

Overall, the ulcers in both groups followed a similar healing process. The major differences were noted in terms of the course of surgical debridement, which, however, has been successfully performed in both groups.

In the group A (EMLA) the local anesthetic had to remain in contact for 10 min at least before performing the procedure of debridement. After this time, the anesthesia reached deep enough to allow a good cleaning without the need of having to rerun the application of topical anesthetic. Also the cleanliness of the margins was effective and the patients were satisfied because they felt little or no pain.

In group B (Ecocain Spray), the anesthetic spray did not need to be left in place as the anesthetic effect was almost immediate, but remained very superficial. During the procedure of surgical debridement, in fact, we had to repeat topical application.

Ecocain spray allowed a significantly shorter timing for debridement and it was not necessary to have to wait for the anesthetic effect, improving the outpatient management and patient compliance.

DISCUSSION

One of the main problems of venous leg ulcers is pain.⁴ The pain is often referred like unbearable and significantly affects the quality of life of patients. Another problem is the difficulty in management of some of these ulcers; it is essential that the wound bed is clean from necrotic tissue and fibrin, therefore, thorough cleaning is often required. To date there are more ways to get a cleaning of the bed of the ulcer, but for several years in our unit we prefer, where possible, the surgical cleaning with a scalpel. The effectiveness of cleaning with a scalpel is burdened by a strong painful stimulation.⁵ We have always paid special attention to the management of pain in our patients.⁶ Local anesthesia in the treatment of venous leg ulcers and is effective and performed in many clinics and hospitals in the world.⁷ Of considerable importance is that the EMLA, with its formulation also allows good management of pain at rest, therefore, it is used in medications to counteract the pain response of these ulcers. The proper management of pain felt during the debridement procedures helps increase the chance of success in the treatment of pain at rest, improving the quality of life of patients. The decrease in the amount of pain in the surgery improves long-term pain (Persistent pain: a long-term dolor) and results in a lower intake of anti-inflammatory drugs, which are associated with significant side effects.^{8,9} On the other hand, a good cleaning of the wound bed increases significantly the speed of healing of ulcers.

In the present study, we compared two techniques of local anesthesia with good results. Both have led to an advantage in terms of cleaning the wound and, consequently, in terms of healing. The local anesthetic EMLA has the advantage to penetrate into the tissues when applied under occlu-

KEY FINDINGS

- Ecocain spray determines a more immediate anesthetic effect, but also more superficial, reducing the times of dressing
- EMLA penetrates into the tissues when applied under occlusion with film, but requires a longer waiting time

sion with film, but requires a longer waiting time. Ecocain spray instead, determines a more immediate anesthetic effect, but also more superficial, reducing the times of dressing. Based on our experience, we can say that the topical application of local anesthetics should always be carried out for better cleaning of venous ulcers of the lower limbs. The advantage in applying the spray consisted in not having to wait 10 min before proceeding with surgical debridement, with a consequent saving of time. For a saving in running costs, it is recommended to use spray anesthetics in alcoholic solution. In selected patients, however, the spray does not give sufficient anesthesia, so anesthetic creams with film occlusion can be used. Methods of local anesthesia are multiple and must be identified according to the needs of the patient and the surgeon trying to get the best anesthesia with minimal use of time and resources.

AUTHOR DISCLOSURE AND GHOSTWRITING

The author has nothing to declare. All authors contributed actively to the realization of this article. No ghost writers were used to write this article.

ABOUT THE AUTHORS

Roberto Cuomo, MD, Resident in Plastic and Reconstructive Surgery, University of Siena. **Carlo D'Aniello, MD**, Director of Unity of Plastic and Reconstructive Surgery, University of Siena. **Luca Grimaldi, MD**, Professor in Plastic and Reconstructive Surgery, University of Siena. **Giuseppe Nisi, MD**, Doctor in Plastic and Reconstructive Surgery, University of Siena. **Gaia Botteri, MD**, Collaborator of Department of Plastic and Reconstructive Surgery, University of Siena. **Irene Zerini, MD**, Resident in Plastic and Reconstructive Surgery, University of Siena. **Cesare Brandi, MD**, Doctor in Plastic and Reconstructive Surgery, University of Siena.

REFERENCES

1. Agrifoglio G, Domanin M, Baggio E, Cao P, Alberti AN, Borin AR, et al. EMLA anaesthetic cream for sharp debridement of venous leg ulcers: a double masked placebo controlled study. *Phlebology* 2000;15:81–83.
2. Domanin M. A multi-centre, double-blind, placebo-controlled study of a lidocaine/prilocaine cream (EMLA 5%) used as a topical anaesthetic for sharp debridement of venous leg ulcers. 9th European Conference on Advances in Wound Management, Harrogate, United Kingdom, 1999, 9–11 November.
3. Caraceni A. et al. A validation study of an Italian version of the Brief Pain Inventory-Pain 1996 Apr;65(1):87–92. (PMID 8826494).
4. Briggs M, Flemming KA. Living with leg ulceration: a synthesis of qualitative research. *J Adv Nurs* 2007;59:319–328.
5. Hansson C, Holm J, Stefan L, Syren A. Repeated treatment Topical agents or dressings for pain in venous leg ulcers with lidocaine/prilocaine cream (EMLA) as a topical anaesthetic for the cleansing of venous leg ulcers. *Acta Derm Venereol* 1993;73:231–233.
6. Cuomo R, Zerini I, Botteri G, Barberi L, Nisi G, D'Aniello C. Postsurgical pain related to breast implant: reduction with lipofilling procedure. *In Vivo* 2014;28:993–996.
7. Stein C. Morphine A local analgesic. *Int Assoc Study Pain Clin Updat* 1995;3:1–8.
8. Gottrup F, Jorgensen B, Karlsmark T, Sibbald RG, Rimdeika R, Harding K, et al. Less pain with Biatain Ibu: initial findings from a randomised, controlled, doubleblind clinical investigation on painful venous leg ulcers. *Int Wound J* 2007;4(Suppl 1):24–34.
9. Gottrup F, Jorgensen B, Karlsmark T, Sibbald G, Rimdeika R, Harding K, et al. Reducing wound pain in venous leg ulcers with Biatain Ibu: a randomised controlled double blind clinical investigation on performance and safety. *Wound Repair Regen* 2008;16:615–625.

Abbreviations and Acronyms

EMLA = eutectic mixture of local anesthetics
VAS = visual analog scale

Appendix

Questionnaire for Pain

1. After the dressing change, how much time before the pain disappeared or was alleviated?
2. Have you taken analgesics within 6 h after the medication? Yes/No
 - a. If you answered YES to the previous question, please indicate who has taken the drugs and dosage: _____
3. Does the pain felt during the procedure and debridement within 6 h after affect your ability to walk? Yes/No
4. Does the pain felt during the procedure and debridement within 6 h after affect your ability to work? Yes/No
5. Does the pain felt during the procedure and debridement within 6 h after affect your ability to sleep? Yes/No
6. Does the pain felt during the procedure and debridement within 6 h after affect the taste of living? Yes/No
7. Does the pain felt during the procedure and debridement within 6 h after affect the relationship with other people? Yes/No
8. Does the pain felt during the procedure and debridement within 6 h after affect your mood? Yes/No