The Journal of Emergency Medicine, Vol. 56, No. 3, pp. 298–300, 2019

0736-4679/$ - see front matter

https://doi.org/10.1016/j.jemermed.2018.12.009

Techniques and Procedures

A NOVEL SILICON DEVICE FOR THE PACKING OF CUTANEOUS ABSCESSES

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☐ **Abstract—Background: Superficial skin abscesses are commonly encountered in emergency medicine practice. Standard treatment includes incision, drainage, and often packing with a gauze strip. The packing component of the procedure has several negative potential outcomes, is painful, and necessitates a return visit for removal. Discussion: Here we report the first case in which a novel silicon packing device was utilized. The patient presented with a facial abscess, which was incised and drained. The novel device was inserted, and removed by the patient independently, without complication. Both patient and provider reported satisfaction with the novel procedure, and noted low pain scores. Conclusions: This device has the potential to replace traditional packing, and will require further study through a controlled trial to assess for safety and efficacy.** © **2018 Elsevier Inc. All rights reserved.**

☐ **Keywords—abscess; skin and soft tissue infection; loop drainage; wound packing**

INTRODUCTION

The number of soft tissue and skin infections drastically increased from 1.2 million to 3.5 million between the years 1993 and 2005 (1). Within this increase, the proportion of abscesses rose disproportionately, likely related to the increased prevalence of community-acquired methicillin-resistant *Staphylococcus aureus* (1,2). The standard of care for treating abscesses is incision and drainage. Packing (the insertion of a strip of gauze tape in the open wound) is commonly performed as well, to maintain the wound opening, thus preventing reformation of the abscess. Although some studies raise doubt as to the utility of this component of the procedure, it remains frequently utilized, specifically for larger abscesses, as evidenced by its inclusion in a recent large, randomized trial of antibiotics for abscesses (confirmed by personal communication with the author) (3–5).

Packing can be painful and uncomfortable for patients, and necessitates a second visit to a health care provider for removal. Additionally, cases of toxic shock developing from packing strips that were not removed in a timely manner have been reported (6,7). Several alternatives have been proposed, such as the loop drain technique, which replaces the gauze with a silicon vessel loop. The vessel loop is inserted through two holes, and is hand tied externally to the skin. Although this technique has been shown to be safe and effective in both children and adults, it is not yet widely utilized, secondary to lack of availability of the vessel loop in emergency departments (EDs) and the absence of specific procedural guidelines (8–11).

Addressing one of the above-mentioned limitations, a novel silicon abscess packing device was developed, the Derma-Stent™ (Mar-Med, Grand Rapids, MI). As shown

Conflicts of Interest: AB – Received salary support for performance of this study from the device manufacturer, Mar-Med; JG and DM – None; JM – Employee and partial owner of Mar-Med, company that developed the device; holds the patent for the device.

Received: 1 May 2018; Final submission received: 15 October 2018;
Accepted: 8 December 2018

in Figure 1, this device has side arms to hold it in place, it does not require a second incision or the tying of a knot. Additionally, the device can be configured at bedside to match the size and shape of the abscess. Finally, the patient can potentially remove the device autonomously, thus obviating the need for a second health care visit in selected, uncomplicated cases. We hereby describe the first documented use of the Derma-Stent™ in a human patient. This case was performed in the context of a device trial, for which institutional review board approval was obtained. The entire trial is registered with clinicaltrials.gov, NCT03171714.

CASE PRESENTATION

The patient was a 27-year-old man, presenting with a chief complaint of an abscess on his left lower jaw. He noticed that the sore developed after he nicked himself while shaving 6 days prior. He described the abscess as swollen and tender, and there was no spontaneous drainage. The patient denied difficulty breathing or swallowing; he also denied any systemic symptoms, such as fever, chills, or nausea. His past medical history was negative for diabetes or other immunodeficiency disorders.

On examination, the patient was afebrile, normotensive, and his heart rate was within normal limits. Examination of the face revealed swelling and induration along the left mandibular region, approximately 3 cm × 2 cm, without an obvious central area of fluctuance. The patient was noted to have poor dentition, specifically of tooth #27, without elevation of the floor of the mouth or abnormalities to the frenulum of the tongue. There was mild left anterior cervical lymphadenopathy.

A point-of-care ultrasound examination revealed a hypoechoic lesion over the left mandible, with cumulative dimensions (maximal transverse + vertical + depth) of 5.24 cm. The decision was made to proceed with an incision-and-drainage procedure. Informed consent was obtained and the patient was enrolled as the first patient in the single-arm, pilot study of the Derma-Stent™ device. Incision and drainage were performed utilizing standard technique of anesthesia and sterile preparation. Two small incisions were made at the medial and lateral poles of the abscess. Approximately 2 mL of purulent drainage was expressed. The abscess was probed and irrigated with normal saline. A Derma-Stent™ packing device was inserted through one incision, and drawn out the opposite end, as shown in Figure 2. On postoperative day 3, the patient was seen in the ED for packing removal and follow-up. The abscess had greatly decreased in size and a repeat ultrasound revealed a 1.07-cm hypoechoic lesion. The patient was successfully able to remove the packing device on his own. Both patient and provider visual analog scale for pain assessments (patient 2/10, provider 3/10) and overall satisfaction scores with the device were high (patient 5/5, provider 4/5).

CONCLUSION

Skin and soft tissue infections are extremely common in emergency medicine practice, and many of these infections involve abscesses that require incision and drainage. Packing of the abscess cavity remains a standard element of the procedure, despite questions about its benefit. Gauze packing can be painful and difficult to remove,

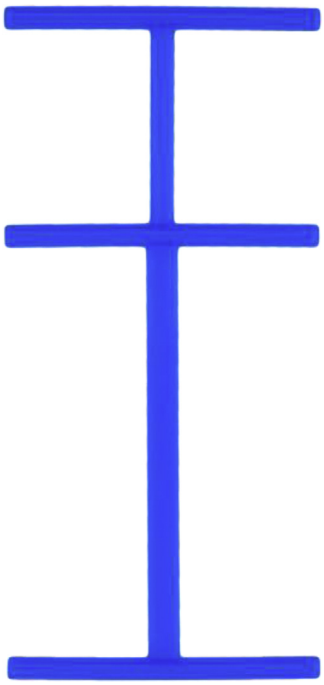

Figure 1. Derma-Stent™ silicon abscess packing device (Mar-Med, Grand Rapids, MI).

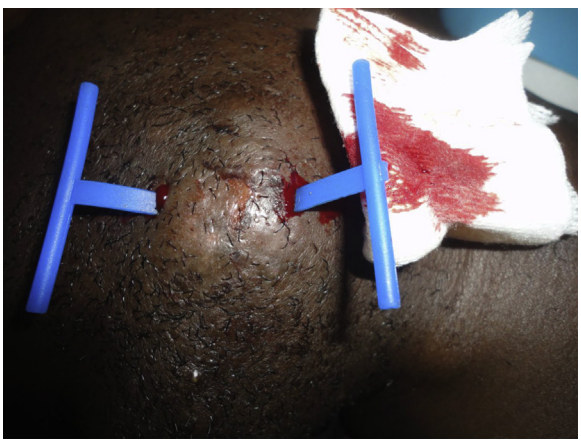

Figure 2. Derma-Stent™ deployed in abscess cavity. In this case, the device was modified by cutting off the distal end and crosspiece, to fit the size of the abscess.

thus, alternative methods, primarily the loop drain, have been proposed. The first use of an innovative modification of the loop drain technique, the Derma-Stent™, is described here.

In this single case, the provider found the device easy to use and noted that it did not extend the time of the procedure. The device was well tolerated by the patient and the patient was able to remove the device independently. Although formal cost comparison analysis was not performed, the cost of the Derma-Stent™ device is roughly comparable with that of the alternatives, gauze packing, and silicon vessel loop ties. This case illustrates the feasibility of the Derma-Stent™ silicon abscess packing device. Further study of this device is underway in the form of a single-arm pilot study; pending results, a randomized control trial is planned to further assess feasibility.

Acknowledgments—This study was funded through a development matching grant from Mar-Med Company and the State of Michigan Corporate Relations Network, Small Company Innovation Program. The first author had final discretion over the content.

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