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.

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
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 pa-
tient 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 pa-
tient. 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, normoten-
sive, and his heart rate was within normal limits. Exami-
nation 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 abnor-
malities to the frenulum of the tongue. There was mild
left anterior cervical lymphadenopathy.

A point-of-care ultrasound examination revealed a hy-
poechoic 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™ de-
vice. Incision and drainage were performed utilizing stan-
dard 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 in-
serted through one incision, and drawn out the opposite
end, as shown in Figure 2. On postoperative day 3, the pa-
tient 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 pa-
tient 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 (pa-
tient 5/5, provider 4/5).

CONCLUSION

Skin and soft tissue infections are extremely common in
emergency medicine practice, and many of these infec-
tions 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,
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.

REFERENCES