Looped Penrose Drain for Minimally Invasive Treatment of Complex Superficial Abscesses of the Hand

Innovations in Technique

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Abstract Complex superficial abscesses are a common occurrence that traditionally have been treated by making relatively large incisions over the surface of the abscess, in order to ensure drainage and access for packing and dressing changes. The authors outline a minimally invasive technique that can be used for draining complex subcutaneous abscesses that extend over a large surface area. It is a simple technique utilizing multiple small incisions and looped penrose drains. This technique has been found to be very effective in many areas of the body and has multiple advantages over traditional incision, drainage, gauze packing, and dressing changes.

Keywords Penrose · Drain · Hand · Abscess · MRSA · Drainage, minimally invasive · Felon · Paronychia · Fight bite · Collar button

Introduction

The incidence of superficial abscesses has been on the rise with the increased prevalence of community-acquired methicillin-resistant *Staphylococcus aureus* (MRSA) [1,

3–5]. Data from one study estimating the number of annual visits to emergency departments in the USA for cellulitis or abscesses showed over three million visits in 2005, compared to about one million visits in 1993 [4]. Another study looking at the incidence of MRSA in community-acquired hand infections at a single institution between 2004 and 2007 showed that the overall incidence was 60% [5]. The drainage of abscesses is of the utmost importance to obtain a good outcome, even more important than choosing the appropriate antibiotic for the isolated bacteria. One study showed that, as long as the abscess was drained appropriately, the empiric use of an antibiotic ineffective against MRSA did not adversely affect outcome [2].

The ideal drainage procedure for a subcutaneous abscess should be timely, provide a non-contaminated specimen for culture, be as minimally invasive as possible, require the fewest number of surgeries, cause minimum pain to the patient, stay stented open for continued drainage, be low-maintenance to the patient and nursing staff, decrease potentially harmful exposure to bodily fluids, be cost-effective, and be adaptable to different areas on the body.

Indications

Penrose drains have long been used to drain surgical spaces or abscess cavities. They are usually inserted into the space to be drained and then come out of one end of the incision, and either sutured in place or left unsecured. Large, complex, subcutaneous abscesses usually require large incisions or cruciate incisions so that they do not close prematurely and prevent adequate drainage. These are often packed with gauze in order to maintain the opening and ensure drainage. While the initial packing of these wounds with gauze is usually adequate to reach the depths and

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Figure 1 X-ray of right hand and wrist superficial abscess with subcutaneous gas.

lateral extents of the abscess cavity, the subsequent dressing changes, often performed by the nursing staff, are usually more superficial because of discomfort to the patient and inadequately drain the entire abscess cavity. We offer a simple technique that has been used on multiple hand infections including subcutaneous abscesses (Figs. 1, 2, and 3), collar-button abscesses, fight bites, felons, and paronychia (Figs. 4 and 5). This technique is not adequate for washout and treatment of tenosynovitis, nor should it be used when there is any suspicion of a necrotizing infection, which would require more extensive debridement of devitalized and infected tissue.

Technique

The surgical field is prepped and draped in the usual sterile fashion. The area of maximal fluctuance is incised with an incision about 1 to 2 cm in length, oriented along Langer's lines. Cultures are sent once the abscess cavity is entered. The cavity is then gently probed with a hemostat in all directions and any septations are disrupted. With the tips of

Figure 2 Three looped penrose drains placed to fully drain all extents of abscess.

Figure 3 Right hand and wrist after removal of penrose loops, with resolution of cellulitis and edema.

the hemostat advanced to the farthest extents of the cavity, multiple other small incisions are made onto the end of the hemostat. The number of incisions depends on the extent of the abscess. All the incisions are irrigated copiously with saline. A penrose drain, usually one-half inch in diameter for larger abscesses, is then looped through the incisions with the help of the hemostat. The ends are then sutured together on the outside to form penrose loops. This obviates the need for large incisions to completely evacuate and drain large abscesses. The entire area is dressed with gauze.

Postoperatively, the dressing is removed by our team the next morning and the patient is instructed to freely wash the area with soap and water, either by shower or at the sink. After washing, the wound and the looped penrose drains can simply be covered with gauze again. There is no need for packing the wound by the nursing staff, which can be a very painful process for the patient. The patient is usually kept on intravenous antibiotics as an inpatient until initial bacterial sensitivities return from the microbiology lab. The

Figure 4 Left long finger felon and paronychia.

Figure 5 After bilateral midaxial incisions and a volar longitudinal incision, with placement of two small looped penrose drains.

patient is then switched to the appropriate oral antibiotic regimen. If the patient is still in the hospital by the time the cellulitis and induration resolve, the looped penrose can be taken out. However, we often send the patient home with the looped penrose drains, with the same instructions as when they were an inpatient. This obviates the need for a visiting nurse to do dressing changes at home, saving resources and minimizing cost of care. Removal of the drains is simple and can be done in the office by the nursing staff at a follow-up visit once the cellulitis and purulence have resolved. The penrose is cut flush with the skin on one end so as not to drag the entire exterior part of the penrose through the subcutaneous tissue.

This initial drainage is generally performed in the operating room, so as to ensure adequate drainage of all extents of the abscess cavity. However, smaller abscesses can be drained at bedside under local anesthesia and are often tolerated better than traditional drainage and gauze packing.

Conclusion

The small incisions made with this looped penrose technique for abscess drainage heal much faster compared to if large incisions are made, which would need weeks of dressing changes to granulate and close by secondary intention. Since the incisions are smaller, there is less visible scarring once the wounds heal. This technique is very useful over areas of the hand, where large incisions could expose tendons, bones, and joints to dessication. In addition, each dressing change and packing traditionally performed by the nursing staff is a risk of exposure to potentially harmful bodily fluids, and this is avoided with the looped penrose technique. We have used the technique for collar-button abscesses on the palm by looping the penrose drain from the palmar to the dorsal side. For fight bites, we loop the penrose under the tendons and through the joint capsule, which is simpler than an indwelling irrigation system.

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