



Incision and loop drainage: a minimally invasive technique for subcutaneous abscess management in children

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Abstract

Purpose: The aim of the study was to evaluate outcomes after a minimally invasive approach to pediatric subcutaneous abscess management as a replacement for wide exposure, debridement, and repetitive packing.

Methods: A retrospective study was performed of all children who underwent incision and loop drainage for subcutaneous abscesses between January 2002 and October 2007 at our institution.

Technique: Two mini incisions, 4–5 mm each, were made on the abscess, as far apart as possible. Abscess was probed, and pus was drained. Abscess was irrigated with normal saline; a loop drain was passed through one incision, brought out through the other, and tied to itself. An absorbent dressing was applied over the loop and changed regularly.

Results: One hundred fifteen patients underwent drainage procedures as described; 5 patients had multiple abscesses. Mean values (range) are as follows: age, 4.25 years (19 days to 20.5 years); duration of symptoms, 7.8 days (1–42 days); length of hospital stay, 3 days (1–39 days); duration of procedure, 10.8 minutes (4–43 minutes); drain duration, 10.4 days (3–24 days); and number of postoperative visits, 1.8 (1–17). Bacterial culture data were available for 101 patients. Of these, 50% had methicillin-resistant *Staphylococcus aureus*, 26% had methicillin-sensitive *Staphylococcus aureus*, and 9% streptococcal species. Of the 115 patients, 5 had pilonidal abscesses, 1 required reoperation for persistent drainage, and 1 had a planned staged excision. Of the remaining 110 patients, 6 (5.5%) required reoperation—4 with loop drains and 2 with incision and packing with complete healing.

Conclusion: The use of loop drains proved safe and effective in the treatment of subcutaneous abscesses in children. Eliminating the need for repetitive and cumbersome wound packing simplifies postoperative wound care. Furthermore, there is an expected cost savings with this technique given the decreased need for wound care materials and professional postoperative home health services. We recommend this minimally invasive technique as the treatment of choice for subcutaneous abscesses in children and consider it the standard of care in our facility.

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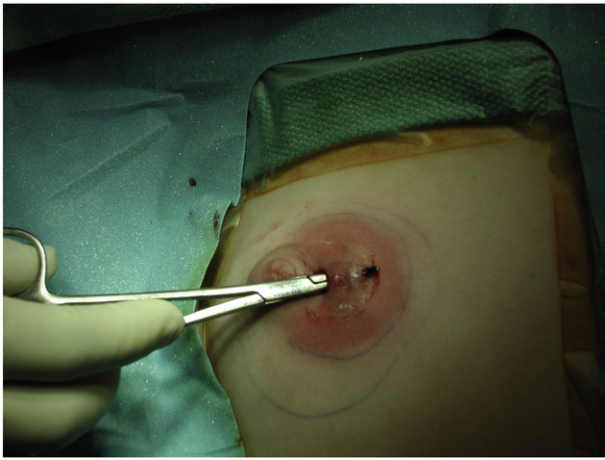


Fig. 1 A hemostat is inserted between 2 small incisions after loculations are disrupted.

Subcutaneous abscess is a problem frequently encountered in both adult and pediatric populations. Standard treatment of these abscesses is universally accepted as incision and drainage, followed by packing. This can be cumbersome for adult patients and extremely difficult in frightened and combative children. Herein, we present an alternative technique for the treatment of subcutaneous abscesses that is equally successful while being more convenient for both the patient and the care providers.

1. Methods

Local institutional review board approval was obtained, and charts of all patients who underwent surgical drainage procedures for subcutaneous abscesses between January 2002 and October 2007 were reviewed retrospectively. The procedures were performed by 3 pediatric surgeons and general surgical residents at Children's Hospital of Illinois



Fig. 2 A large-bore intravenous plastic catheter is inserted to irrigate the abscess cavity with sterile warm saline.

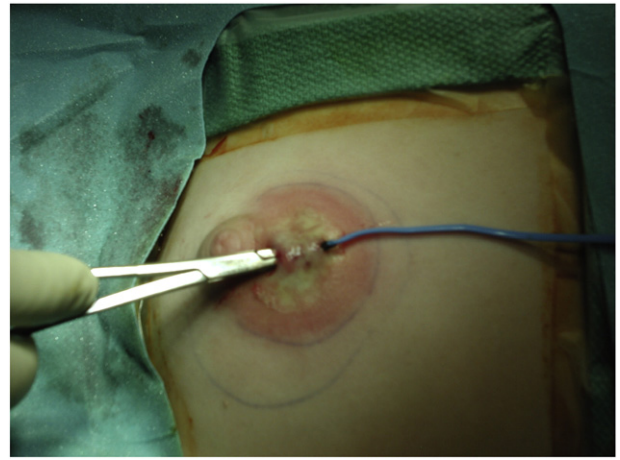


Fig. 3 A sterile loop drain is passed into the abscess cavity through one incision and brought out through the other.

(Peoria, Ill). Of the 3 surgeons, 1 had prior experience with the described technique. Data obtained included demographic information, duration of symptoms, location of abscess, type of drain, length of procedure, cultured bacteria, drain duration, antibiotic use, and complications.

2. Technique

A standard technique is used by all participating surgeons. Two small (4-5 mm each) incisions are made, as widely separated as possible within the borders of the abscess (Fig. 1). In cases of very large abscesses, occasionally 3 or even 4 incisions are made. Pus is evacuated, and the abscess cavity is probed to breakdown loculations if any. A large-bore intravenous plastic catheter is inserted to irrigate the abscess cavity with sterile warm saline (Fig. 2). A sterile rubber band, vessel loop, or rarely, Penrose drain is then



Fig. 4 The 2 ends of the loop drain are affixed to each other without tension.

passed into the abscess cavity through one incision and brought out through the other (Fig. 3). The 2 ends are then affixed to each other, without tension (Fig. 4). Drain selection is made by surgeon preference, depending on incision size and location of the wound. The drain keeps the skin incisions open allowing continued drainage. A simple absorbent dressing is applied over the drain. The overlying gauze dressing was changed as needed, when saturated, or at least twice a day for the first 3 days. This required no additional sedation or analgesia. The patient is advised to bathe or shower twice daily for the first 3 days to promote continued drainage. Drains are left in place until drainage stops and cellulitis improves, usually occurring 7 to 10 days postoperatively.

3. Results

One hundred fifteen patients underwent 120 drainage procedures for subcutaneous abscesses by the technique described above. The procedures were performed under general anesthesia in the operating room except for one patient who had the procedure performed under intravenous sedation. Thirteen of these patients were lost to follow-up. Male-to-female distribution was 44:71, respectively. Racial distribution was 62 whites, 39 African Americans, 3 Asians, and 1 Hispanic. The average age was 4.25 years (range, 19 days to 20.5 years; SD, 4.88). Mean duration of symptoms was 7.8 days (range, 1-42; SD, 8.95). Mean length of hospital stay (LOS) was 3 days (range, 1-39 days; SD, 3.83). Length of hospital stay was 1 day or less for 34 patients. Mean duration of the surgical procedure was 10.8 minutes (range, 4-43 minutes; SD, 4.96). Penrose drain was used in 21 (18%) procedures, rubber bands in 56 (48%), and vessel loops in 42 (36%).

Bacterial culture data were available for 101 patients. Of these, 50 patients (50%) had methicillin-resistant *Staphylococcus aureus*, 26 (26%) had methicillin-sensitive *Staphylococcus aureus*, and 9 (9%) had streptococcal species. No consistency was observed in the type or duration of antibiotic use before surgical drainage. Of the 115 patients, 66 received antibiotics before admission, and 104 received antibiotics at some point during their hospitalization. One hundred three patients were prescribed oral antibiotics upon discharge. The average drain duration was 10.4 days (range, 3-24 days; SD, 4.78), and the mean number of outpatient postoperative visits was 1.8 (range, 1-17; SD, 1.85). Of the 115 patients, 5 had pilonidal abscesses. One pilonidal abscess required reoperation for persistent sinus drainage. Another required a planned staged excision of the sinus tract. These outcomes were anticipated and discussed with parents of children with pilonidal disease.

Of the remaining 110 patients, 6 (5.5%) required reoperation related to their initial abscess. These patients were similar to the entire study population in that their

average initial operative time was 10.8 minutes, and 50% of these patients grew methicillin-resistant *Staphylococcus aureus* on culture. Differences in this subgroup included race, age, and LOS. These patients were all white, mean age was 5.3 years, and mean LOS was longer at 4.2 days. Two of these were labial abscesses, 2 were in the neck/chin area, and 2 were in the lower extremities. Two of these patients received antibiotics before admission, and all were prescribed antibiotics at the time of discharge. Of these 6 patients, 4 received loop drains to treat their recurrent abscesses and the other 2 were treated with wide incision and packing. All eventually healed and required no further surgery.

4. Discussion

Draining abscesses has been an important part of a surgeon's role from the time of Hippocrates, well into the time of the Barber Surgeon in England, and still today. It is often said surgeons are at their best when draining pus. Although subcutaneous abscess drainage is simple, postoperative care with packing can be challenging when treating children. Pain and distress are caused by the disease process as well as the treatment and subsequent wound care. Most children are unable to perform their own wound care, and caretakers often struggle with wound packing and dressing changes. To simplify the care of these abscesses, we developed a minimally invasive technique that obviates the need for painful postoperative care. This technique is safe and effective for treatment of subcutaneous abscesses in all locations, with the added benefit of improved cosmesis. In addition, the procedure itself is technically simple and quickly performed, with one third of our patients managed in the outpatient setting. In-hospital monitoring of the patient is often required for resolution of extensive cellulitis or fever but is not related to wound care. In our series, there was an acceptably low rate of recurrence requiring reoperation, 5.5% (6/110), with no reliable predictor of the need for reoperation. The drains are well tolerated by the patients, as is removal (which is painless). In our early experience, Penrose drains were used exclusively. After the first 2 years, Penrose drains were used only in managing very large abscesses. The choice between using a vessel loop and a rubber band was primarily based on surgeon preference. Vessel loops were used in patients with known latex allergy by all surgeons.

Although open drainage and packing is considered the gold standard in the treatment of subcutaneous abscesses, little data regarding the true effectiveness of this modality are available. Definitive texts such as Sabiston textbook of surgery simply state, "an abscess will not resolve unless the pus is drained or evacuated [1]." Other publications similarly recommend surgical drainage of abscesses, but little is mentioned about technique and wound care [2-5].

The universally accepted technique has always been open drainage and packing, with incision size approximating the entire length of the abscess. A German article recommends incision and drainage and mentions the success of primary skin closure after drainage and curettage, but no specific data are given as to the results of this technique [6]. A randomized Scandinavian trial compared linear incision and curettage to deroofing and draining and found linear incision plus curettage with single-dose antibiotic coverage was a safe method, with a healing time of 9 days vs 15 for deroofing [7].

Our data suggest the use of a loop drain is safe and effective in the treatment of subcutaneous abscesses in children. Drain duration is comparable to wound packing or unroofing with much smaller incisions and decreased trauma and pain to the child, both in placement and in postoperative care. Furthermore, there is an expected cost savings with this technique given the decreased need for wound care materials and professional postoperative home health services. We recommend this minimally invasive technique as the treatment of choice for subcutaneous abscesses in children

and foresee its potential application in the adult population as well.

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