

## Ideas and Innovations

# Puncture, drainage and irrigation: Is that enough for treating an abscess?

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### ABSTRACT

An abscess is a common occurrence. The gold standard for treatment is incision and drainage. Here a simple technique of a small puncture followed by drainage and irrigation done under local anesthesia is described. Sixty-four patients were treated between 1990 and 2006. Barring two, which were taken off the study, all healed completely without recurrence. The advantages of this procedure are that it is simple, can be done as an office procedure enabling a quick return to work and results in faster, scar free healing. It also allows better pain management.

### KEY WORDS

Abscess, irrigation, puncture and drainage

### INTRODUCTION

For the treatment of skin and soft tissue abscesses, the options available include incision and drainage (I and D), repeated aspiration,<sup>[1]</sup> incision, drainage and primary closure.<sup>[2-6]</sup> Of these, incision and drainage remains the preferred choice<sup>[7]</sup> but it leaves behind ugly scars<sup>[8]</sup> and dressings are painful. Other options include percutaneous catheter drainage for abdominal abscesses,<sup>[9]</sup> liver abscesses<sup>[10,11]</sup> and tubercular psoas abscess,<sup>[12]</sup> drainage and suction aspiration<sup>[13,14]</sup> and suction-irrigation for pancreatic abscesses<sup>[15,16]</sup> and abscesses following spinal surgery.<sup>[17-19]</sup> Thus, percutaneous drainage and irrigation have been proved effective in difficult and routinely inaccessible places.

Scar revision is a common plastic surgery demand, which at times includes scars following I and D. Patients come from a few months to several years after abscess drainage

with a request to obliterate the scars. In such cases even the best attempts cannot remove the scars completely and invariably the patient leaves dissatisfied. What has also been observed is that the patients abhor the packing of the abscess cavities due to the pain it causes.

### MATERIALS AND METHODS

Between 1990 and 2006, a total of 64 patients with abscesses in different areas of the body [Table 1] were treated with the puncture, drainage and irrigation technique. Of these, two cases were abandoned as one showed evidence of osteomyelitis on X-ray and the other, a pregnant woman, complained of pain during the dressing and was withdrawn by the recommending surgeon. Eight patients from this series had diabetes. Six of them were under treatment and two were detected later.

**Table 1: Site of abscess**

<b>Site</b>	<b>Numbers</b>	<b>Results</b>
Face and neck	3	Healed
Breast	15	Healed
Axilla	8	Healed
Gluteal	9	1 abandoned, rest 8 healed
Perianal	3	Healed
Upper extremity	8	Healed
Back and trunk	6	Healed
Lower extremity	11	1 abandoned due to osteomyelitis, 1 healed with scarring
<b>Total</b>	<b>64</b>	

After painting and isolating the area, a number 18/20G needle or a needle with a butterfly grip and an extension tubing attached to a 10-cc syringe is inserted in the abscess at the point where it appears either the softest or tense [Figure 1]. The pus is aspirated as much as possible [Figure 2]. Without taking out the needle, 2% Lignocaine is introduced into the cavity in sufficient quantity to fill the cavity. One must then wait till the patient no longer feels any pain, even on pressure (approximately 5-10 min). The stab knife is inserted over the previously marked most tender, inflamed, soft or tense area to make a 3-5 mm incision. The pus and Lignocaine mix is allowed to drain out spontaneously. A thin probe is inserted to break all possible loculi. A multi-perforated tube (perforations are added to the desired length) is now made from the same extension tubing by cutting off the needle and the butterfly segment or from a sterile infant feeding tube. This tube is introduced into the abscess cavity through the incision and fixed to the skin with an adhesive tape a little away to prevent soakage. The cavity is now irrigated with saline, Povidone iodine and hydrogen peroxide in the ratio of 10:4:1, till no more pus is left. The dressing is done with the irrigation tube *in situ* to be used later [Figure 3]. If necessary, an antibiotic solution may be added to the irrigation solution as per the pus culture and antibiotic sensitivity reports. It is advisable to irrigate the cavity with local anesthetic and wait, prior to every irrigation, to make the dressing painless and comfortable for the patient. Whenever necessary, such as in hand abscesses, the part is temporarily put in an appropriate splint to help support the area, reduce the edema and prevent contractures. The patient is encouraged to mobilise the parts as soon as possible. This is done easily due to pain control with Lignocaine instillation.

Initially the irrigation may be done 3-4 times a day (even

by the patient or his relative) with the frequency being reduced depending upon the purulent discharge. Usually the discharge turns from purulent to serous to serosanguinous. Once the discharge becomes minimal and the pain score comes to 2 or 1 (see below) the irrigation may be stopped [Figures 4-5]. The patient is observed for 48h to see if any purulent discharge recurs. If it happens the tube can be easily reintroduced and irrigation continued, but this is rarely required.

### **Subjective-objective pain score assessment**

Since the pain threshold and tolerance varies from person to person, the patient was considered as his or her own control, in the score used for the pain assessment.

### **Pain score grade**

5. Excruciating, throbbing pain. Patient is very apprehensive, prefers to keep the affected part immobile and will prevent anyone from touching it.
4. Severe throbbing pain. Patient is anxious, avoids contact, will allow gentle surface touch but is always on the verge of withdrawing the part.
3. Moderate pain. Patient allows touch, withdraws only if pressure is applied.
2. Mild pain. Patient allows touch and permits pressure but will prevent the observer from applying deep pressure.
1. Pain is noticed only when patient's attention is drawn to the area. Tenderness is present on pressure. Patient may allow pressure deep enough but not to the same extent as on the identical opposite side or normal surrounding area.
0. No pain, no tenderness. The pressure tolerance is the same as the opposite side or normal surrounding area.

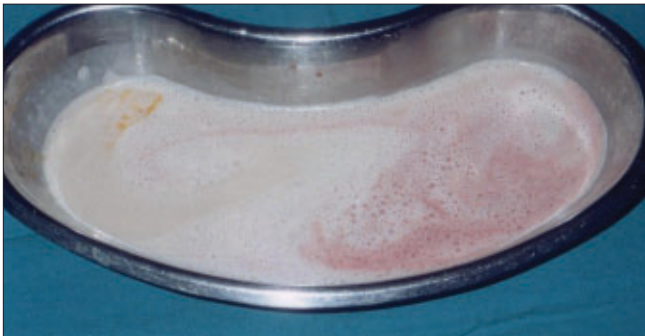
## **RESULTS AND OBSERVATIONS**

The end point of irrigation varied from 24h to 21 days. One patient needed recanulation and reirrigation for a further three days. There were no onsite recurrences after a follow-up period extending from two months to nine years. In six cases pus culture was done. *S. aureus* was cultured in four samples, *E. coli* in one and *Proteus* in one. Most of the patients were already on broad spectrum antibiotics and these were continued.

For many patients with a pain score of 5, cold xylocaine jelly and later Emla cream (xylocaine + prilocaine) was



**Figure 1:** A breast abscess involving the lower half of the right breast



**Figure 2:** Pus drained



**Figure 3:** With the irrigation tubing *in situ*, pus is still pouring out on day 4

applied to achieve some surface anesthesia. This made the patients less apprehensive and allowed insertion of the 18/20G needle and the aspiration of pus. Once the pus was removed the throbbing pain stopped as the pressure within the inflamed cavity was reduced. The patients became comfortable and cooperative. Instilling Lignocaine slowly into the cavity anaesthetized the nerve endings in the wall of the cavity and made probing



**Figure 4:** Drying up on the day 12



**Figure 5:** 15<sup>th</sup> post-op day, an almost invisible scar



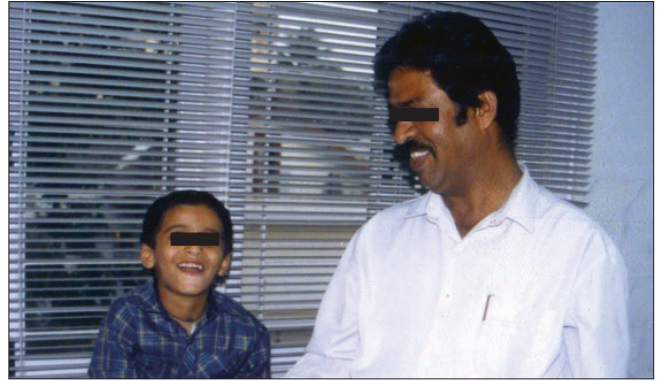
**Figure 6:** Mother, with the breast abscess, feeding her baby. The feeding started within 10 minutes of the procedure

possible. Sometimes anesthesia was not complete and the patient felt slight discomfort but still cooperated. A 3-5 mm puncture wound provided enough space for

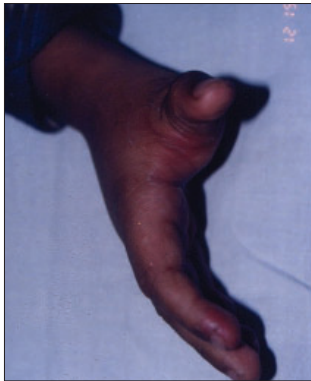




**Figure 7:** 8-year-old child with a hand abscess. The Lateral view, with an irrigation tubing *in situ*



**Figure 11:** 10<sup>th</sup> day. The pain score is almost '0' as father is seen pressing the site



**Figure 8:** 10<sup>th</sup> day post treatment, the lateral view



**Figure 12:** Right axillary abscess



**Figure 9:** Hand abscess, the palmer view



**Figure 13:** The 3<sup>rd</sup> post treatment day. Quick healing, no painful wound, no discharge, no dressing, daily routine continued. Patient was a waiter in a hotel



**Figure 10:** 10<sup>th</sup> day post-treatment, the palmer view. Note minimal redness and swelling



**Figure 14:** Large wounds following incision and drainage of two abscesses

insertion of a probe or a thin scoop, insertion of an irrigation tube and egress of pus and irrigation fluid. Even thick pus became thinner due to irrigation fluid. Hydrogen peroxide made it easy for the fluid to reach into the finer crevices and remove the debris. Once the pus was removed, the patients became quite comfortable and were keen to resume their daily activities.

The Lignocaine requirement varied, mostly between 2-25cc and rarely even up to 60cc. It was instilled gradually, at intervals. In all these patients, no Lignocaine toxicity was observed. In this study there were seven breastfeeding women with breast abscesses. The earliest that the breastfeeding was started from the same breast was within 10 minutes of the procedure. Precaution was taken to isolate the puncture site and the tubing from the nipple-areola complex. It is preferable, whenever possible, to make the puncture away from the areola. None of the infants thus fed had fever/diarrhoea or other problems. The mothers who could breastfeed early were quite content, as there was no breast engorgement and pain, as well as no interruption in breastfeeding [Figure 6].

A child with an abscess, at the junction of healed skin graft and normal skin, had breakdown in skin-grafted area. The small wounds eventually healed, with some scarring at the site. Rest of the patients had almost imperceptible scarring.

One pregnant patient with a gluteal abscess complained of pain during irrigation very early in this series and was withdrawn by the recommending surgeon. On analysis it was found that the pain was due to excessive hydrogen peroxide and rapid introduction of irrigation fluid in the cavity, which led to sudden foaming of pus and acute distension of the abscess cavity causing severe pain. Thereafter, instilling the cavity with Lignocaine and reduced concentration of Hydrogen Peroxide made the procedure painless. In fact instilling Lignocaine or even Bupivacaine, even postirrigation, into the cavity made some patients quite comfortable. Most of the patients resumed their activities on the same day or the next, except those who were hospitalized to observe the daily effect of irrigation. Even patients with large gluteal abscesses with more than 150cc of pus could sit and work at the desk for hours or drive their vehicles. Probably the puncture site with the irrigation tube *in situ* provided enough egress to the accumulating discharge.

The healing time was short and often painless. Patients came down to a pain score of 2 and below fairly quickly. In the patients with diabetes the irrigation time was prolonged, yet regardless of blood glucose level, healing took place. One patient with blood sugar of 340 mg% refused to believe he had diabetes and started anti-diabetic treatment only six weeks after the healing was over.

## DISCUSSION

In 1990, a case of multiple pyaemic abscesses with Fournier's gangrene, who had undergone multiple incision and drainage procedures, was referred for skin grafting of multiple sites. While the patient was being taken into the operation theatre one of the attendants observed bogginess in the left calf area. On examination, there appeared to be fluid collection and aspiration showed frank pus. The bogginess extended from the knee to 10 cm above the ankle, yet the skin surface appeared normal. One felt reluctant to take the customary 'adequate incision', as the previous incisions were long enough. Instead, 1-cm slits were taken at the upper, middle and lower ends. The abscess was subfascial. All loculi were broken with a urethral dilator. A multi-perforated suction tube (used as an irrigation cannula) was inserted. A continuous irrigation was started with Povidone-iodine, saline, eusol, metronidazole solution and antibiotic solution. The pus continued to appear for 12 days and then stopped. The irrigation was continued for another two days and the wound healed by the 17<sup>th</sup> day. There was no recurrence. This averted a major wound, painful dressings, further surgery and scarring, reduced protein and blood loss and achieved quicker and better healing compared to the patient's previous wounds following incision and drainage.

Over a period of time it has been observed that as against the time-honored method of adequate incision and dependent drainage, puncture, drainage and irrigation worked more effectively. The procedure could be done under local anesthesia as an office procedure, even in small children [Figures 7-11]. As the technique could be easily understood, irrigation could be done by the patients or their relatives. Dressings were painless, recovery and healing was quick and scars were almost absent. Patients resumed their daily work very early, in some cases immediately [Figures 12-13]. A 3-5 mm puncture mark on a stretched skin became 2-3 mm when healed. As against this, incision and drainage usually

requires general anesthesia and dressings are painful, especially when deep cavities are packed with gauze. In addition, packing keeps the walls of the cavity apart and this delays healing, leaving large wounds [Figure 14]. Delayed healing leads to prolonged discharge and protein loss, more induration and prolongation of the painful period. Due to excessive fibrosis there are adherent, puckered or stretched, unpleasant scars.<sup>[8]</sup> Sometimes 'back to normal,' takes weeks. All this can be avoided with the technique described here.

Though not included in this series, a case of a burst abscess in the thigh with a large cavity, four cases of diabetic foot with multiple sinuses and a large parascapular abscess with a 25 cm long incision (the incision was sutured and an irrigation catheter was inserted in a closed cavity) were also treated successfully. The diabetic foot required prolonged (four weeks or even more) irrigation and removal of slough through the sinus opening without incising the overlying skin which protects the tendons and bones from getting exposed and desiccated.

There was no Lignocaine toxicity observed. The reason probably is that not much of Lignocaine was absorbed. Since Lignocaine was only instilled into the cavity and not injected, most of the Lignocaine was drained out with the pus. What one achieved was only a surface anesthesia.

In addition to incision and dependent drainage, abscesses have also been treated with multiple aspiration or incision drainage and primary suturing, with the purpose of faster healing. To reduce the recovery time, Ellis<sup>[2]</sup>, Benson<sup>[3]</sup> and others advocated primary suturing of the incision over a drain to let out pus. The deep sutures on an inflamed skin leave further crosshatch marks apart from the original mark of incision and are cosmetically more difficult to treat later. In large abscesses, repeated aspiration may not be adequate. Repeated needle insertion can also be quite painful.

Percutaneous drainage or irrigation suction have been done for routinely inaccessible or deep seated abscesses, with satisfactory results.<sup>[15-19]</sup> One can therefore use the same principles for skin and soft tissue abscesses, with the added advantage of quick scar free healing and better pain management. Also, at any time it is possible to convert it into an open incision and drainage system,

remembering that patience and persistence pays. One of the indications for this conversion to open technique of I and D would be persistent high fever, high white blood cell counts and signs of septicemia. One should be cautious though in using this technique in cases where one suspects necrotizing fasciitis, osteomyelitis etc. Abscess in skin-grafted area may have breakdowns. Puri *et al.* achieved complete cure rate of 84.6% with percutaneous drainage of tubercular ilio-psoas abscesses in a small series of 26 cases. In this series cold abscesses have not been treated and clinical studies may be needed to prove or disprove the technique's effectiveness.

Nature heals abscesses by draining the pus out. The point at which it bursts through the skin is not necessarily the most dependent portion, but is the site that offers the least resistance. No doubt dependent drainage is better. But it is the drainage that is the most important need. In the above technique the puncture site consequently is kept patent with the irrigation cannula *in situ* which provides easy and continuous drainage. Irrigation further assists in removing the pus from the non-dependent part as well as crevices, thereby reducing the bacterial load. Further, the wall remains collapsed and comes together causing less scarring, as there is less fibrin deposition with tissues in contact. The edema subsides quickly, reducing the pain. Instillation of Lignocaine, when necessary, provides an effective pain control.

## CONCLUSION

In the treatment of an abscess, repeated and adequate irrigation through a small puncture site is not only enough but also gives excellent, quick, painless and scar-free healing and may well provide an alternative to the current popular practice of incision and drainage.

## REFERENCES

1. Dixon JM. Repeated aspiration of breast abscesses in lactating women. *Br Med J* 1988;297:1517-8.
2. Ellis M. The new treatment of ischiorectal abscess. *Univ Leeds Med J* 1953;2:84-6.
3. Benson EA, Goodman MA. Incision with primary suture in treatment acute puerperal breast abscess. *Br J Surg* 1970;57:55-8.
4. Page RE. Treatment of axillary abscesses by incision and primary suture under antibiotic cover. *Br J Surg* 1974;61:493-4.
5. Jones NA, Wilson DH. The treatment of acute abscesses by

- incision, curettage and primary suture under antibiotic cover. *Br J Surg* 1976;63:499-501.
6. Stewart MP, Laing MR, Krukowski ZH. Treatment of acute abscesses by incision, curettage and primary suture without antibiotics: A controlled clinical trial. *Br J Surg* 1985;72:66-7.
  7. Durkin WT Jr. Abscess. *EMedicine.com* Last revised, Aug. 9 2001.
  8. Khanna YK, Khanna AA, Singh SP, Laddha BL, Prasad PP, Jhanji RN. Primary closure of gluteal injection abscess (a study of 100 cases). *J Postgrad Med* 1984;30:105-10.
  9. Johnson WC, Gerzof SG, Robbins AH, Nasbeth DC. Treatment of abdominal abscesses: Comparative evaluation of operative drainage versus percutaneous catheter drainage guided by computed tomography or ultrasound. *Ann Surg* 1981;194: 510-20.
  10. Gerzof SG, Johnson WC, Robbins AH, Nabseth DC. Intrahepatic pyogenic abscesses. Treatment by percutaneous drainage. *Am J Surg* 1985;149:487-94.
  11. Kapadia S, Duttaroy D, Ghodgaonkar P, Maru S. Percutaneous catheter drainage of liver abscesses. *Indian J Surg* 2002;64: 516-9.
  12. Puri SK, Panicker H, Narang P, Kumar N, Dhall A, Gupta SB. Percutaneous drainage of tuberculous abscesses. *Indian J Radiol Imag* 2001;11:13-6.
  13. Edward KC, Barry KT, Woods C. Continuous, gentle suction apparatus for abscess drainage. *Radiology* 1982;145:537.
  14. Nagata K, Ohashi T, Ariyoshi M, Sonoda K, Imoto H, Inoue A. Percutaneous suction aspiration and drainage for pyogenic spondylitis. *Spine* 1998;23:1600-6.
  15. Gouzi JL, Bloom E, Julio C, Labbe, F, Sans N, el Rassi Z, *et al.* Percutaneous drainage of infected pancreatic necrosis: An alternative to surgery. *Chirurgie* 1999;124:31-7.
  16. Farkas G. Pancreatic head mass: How can we treat it? Acute pancreatitis: Surgical treatment. *JOP* 2000;1:138-42.
  17. Jeanneret B, Margel F. Treatment of osteomyelitis of the spine using percutaneous suction/irrigation and percutaneous external spinal fixation. *J Spinal Disord* 1994;7:185-205.
  18. Levi AD, Dickman CA, Sonntag VK. Management of postoperative infections after spinal instrumentation. *J Neurosurg* 1997;86:975-80.
  19. Hanaoka N, Kawasaki Y, Sakai T, Nakamura T, Nanamori K, Nakamura E, *et al.* Percutaneous drainage and continuous irrigation in patients with severe pyogenic spondylitis, abscess formation and marked bone destruction. *J Neurosurg Spine* 2006; 4:374-9.