

Approaches to Abscess Management

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Abstract

Introduction: An abscess is a collection or pool of pus inside the body. Pus collection can be cutaneous in common skin abscesses or deep in intra-abdominal cases. However, abscesses usually result from a bacterial infection or foreign object entrapped within the body. Therefore, it is essential to drain the abscess and contain its spread. In this review, we will discuss various approaches to abscess management.

Aim of the Work: An overview describes various approaches to abscess management.

Methodology: The review is a thorough review of PUBMED articles from 1985 to 2019 relating to abscess management.

Conclusion: After discussing various approaches to abscess management, it is clear from the literature that an immunocompetent patient can undergo incision and drainage under local anesthesia for abscess management. There is no evidence to either support the culturing of microbial organisms or the use of empirical antibiotics. Maintaining a sterile environment during the surgical procedure is of utmost importance. Thoroughly draining the abscess during surgical exploration without damaging vital structures is also a determining factor in the prognosis. Finally, placing the surgical drain, thick dressing, and regular checkups for at least a week cannot be ignored

Keywords: Abscess; Skin Abscess; Intra-Abdominal Abscess; Incision and Drainage; Percutaneous Drainage; Empirical Antibiotics

Introduction

An abscess is a collection or pool of pus inside the body. Pus is a whitish fluid that typically contains bacteria, immune cells (dead or alive), and remnants of destroyed tissue. Pus collection can be cutaneous in common skin abscesses or deep in intra-abdominal cases. Abscesses usually result from a bacterial infection or foreign object entrapment within the body. Such entrapped infection poses a danger of spreading deeper into other body compartments. Therefore, an abscess is managed immediately either by draining or containing it with antibiotics or both [1].

Clinical features

On examination, a superficial abscess appears with an upstretched skin surface, localized heat, tenderness and pain to touch, red skin, and pus formation; a foul smell is usually present if it has begun to discharge [2]. The abscess symptoms will differ depending on where the abscess is situated in the body. Deeper abscess such as intraabdominal abscess is difficult to diagnose as the patient may present with septic shock to nothing at all. Occasionally, abdominal abscesses can be felt through the abdominal wall, rectum, or vagina [3].



Figure 1: Cutaneous orbital abscess [4].

Diagnosis

Definitive diagnosis of intraabdominal abscesses depends on various imagings. Computed tomography (CT), ultrasound (US), and numerous radioisotope-scanning techniques are utilized. Radioisotope scanning cannot provide the radiologist with information any more than just the location of the abscess, but it is not precise enough to assist in percutaneous drainage. Ultrasound and Computed tomography are good at defining the abscesses’ location, size, and structure. Still, surgeons are more familiar with reading CT scans than ultrasound reports, although the latter is cheaper and carries no harmful x-rays. Although radiological scans can accurately define an abscess, they can be mistaken for sterile fluid collections. The best way to reach a definitive diagnosis is to perform a percutaneous aspiration guided by CT and send the aspirate for gram stain, culture and antibiotic sensitivity [3].

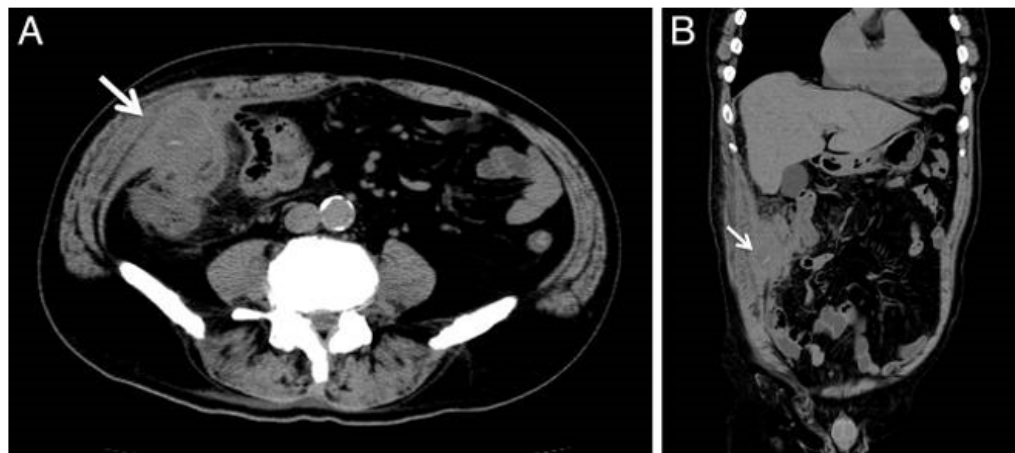


Figure 2: Transverse (A) and coronal (B) sections on computed tomography. The white arrow indicates the intra-abdominal abscess with fish-bone [5].

Analgesia

Any surgical procedure to drain the abscess is quite painful and unbearable to the patient. An observational study reports that patients rated surgical abscess drainage in the emergency room as very painful despite local anesthetics [6]. This is probably because local anesthetics work poorly in the low pH environment of the abscess. Thus, it is sometimes recommended to anesthetize the peripheral region of the abscess for better pain control, while others suggest using vapocoolant sprays. There are also reports of using more robust pain control methods such as nitrous oxide sedation and general anesthesia. In short, adequate analgesia is of profound importance during surgical drainage of abscesses because patient comfort during the procedure will ensure proper inspections, drainage and care [7].

Empirical antibiotics

It is pretty common to prescribe empirical antibiotics against commonly known microorganisms before surgical drainage. Traditionally conservative management of multiple hepatic abscesses due to portal pyemia was treated with antibiotics. Recent reports also claimed that conservative treatment with prolonged antibiotics was successful in the pediatric population who developed abdominal abscesses after an appendectomy for acute appendicitis. The only problem with these studies was that the abscess was never proven to be present in the first place. They were just diagnosed using ultrasound and MR Imaging, where critiques suggested they might have been sterile collections that never needed treatment [8].

Surgical management

The most popular surgical management remains incision and drainage of the abscess. Some authors recommend needle aspiration before I&D, although there's no evidence supporting this procedure [3].

Indications for I&D

- Palpable and pointing abscess in the skin (has a 'head').

Contra-indications for I&D

- Hard lump - surgically exploring a hard lump may spread the infection to other tissues.
- Large abscesses which require a widespread incision, debridement, or irrigation.
- Deep abscesses beyond superficial instruments' reach (artery forceps).
- I&D in case of abscesses near big arteries must be avoided and not attempted in a primary health care setting [2].

Materials and instruments

- Universal precaution materials (gloves, drapes, aprons, disposable syringes).
- Local anesthetic.
- Antiseptic solution.
- Scalpel blade with a handle.
- Haemostat, artery forceps, and scissors.

- Gauze, tape [2].

Pre-procedure steps

- Take informed consent and inform the patient of possible complications.
- Describe the steps of the procedure to the patient.
- Explain the need for follow-up, dressing change, etc [2].

Procedure

- Prepare surgical field appropriately (shaving, painting with antiseptic, and draping).
- Inject local anesthetic (using 1 - 2% lidocaine without epinephrine) around the area.
- Illicit pain with a hemostat to check for anesthesia.
- Place an incision on the most dependant area considering the anatomy of underlying vital structures and postoperative scar.
- The incision should be of appropriate size according to abscess size.
- For larger abscesses, two or more parallel incisions can be placed.
- Apple pressure on either side of the abscess to make the pus eject.
- Carefully explore the abscess with the hemostat to break the locules, if any.
- It may be required to pack the wound with Nu-Gauze or Calcium Alginate.
- Attach a surgical drain to avoid premature closure of the surgical opening and let the abscess drain for at least a week.
- The wound should be dressed with a bulky gauze dressing to absorb fluid which needs to be changed every other day and inspected every time.
- After a week, recall the patient to check for serosanguineous material from the surgical site. If serosanguinous material has stopped, remove the drain and let the wound heal by secondary intention. If serosanguinous hasn't stopped, wait until it has before removing the drain [2].

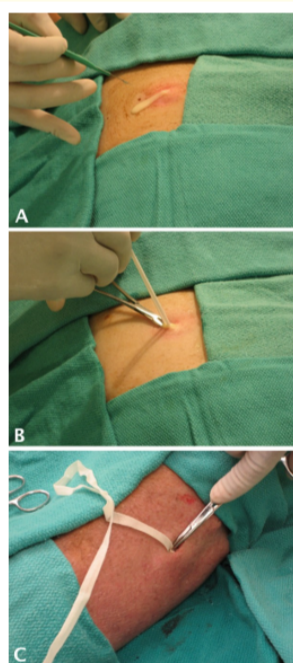


Figure 3: Using the Abscess Model for Incision and Drainage. The completed abscess model is ready for incision and drainage. A) A scalpel is used to incise the simulated abscess of the abdominal wall, which leads to realistic drainage of the abscess contents. B) Hemostats and a culture swab are used to sample the interior of the abscess cavity. C) A simulated abscess cavity of the lower leg is filled with wound packing material to complete the incision and drainage procedure [9].

Percutaneous vs. open surgical drainage (intra-abdominal abscess)

Some authors suggest that complex abscesses (e.g. multiple, multiloculated, associated with tissue necrosis, enteric communication, or tumor) do better with open surgical drainage while poorly responding to PC drainage. On the other hand, most simple abscesses respond well to percutaneous drainage. Other authors hold a different opinion and presume no contra-indications exist with percutaneous drainages [10].

PC drainage vs. open drainage [11]

	PC drainage	Open drainage
Surgically accessibility	“Hostile abdomen”	Accessible
PC accessibility	Yes	No
Source controlled	Yes	No
Location	Visceral	Interloop
Number abscesses	Single	Multiple
Loculated	No	Yes
Communication with bowel	No	Yes
Associated necrosis	No	Yes
Associated malignancy	No	Yes
Contents	Thin	Thick debris
Invasive radiologist	Available	Non-available
Severity off illness	“Stable”	Critically ill
Failed PC drainage	No	Yes

PC drains

Although certain simple cases may resolve without placing PC drain after percutaneous drainage, it is generally recommended to place one with level II evidence. Drains should be set of large bore trocar catheters. To keep the drains patent, regular flushing with saline is recommended. PC drains are usually removed after a week or less than 25 ml of the drainage [12].

Re-imaging

Clinical progress is usually seen within 24 to 72 hours following percutaneous drainage. If fever or leukocytosis persists on the 4th day, it is likely a case of failure. Such cases require re-imaging with water-soluble contrast material inserted via the drain. With re-imaging, surgeons and radiologist must consider their options of continuing with PC drainage or going for surgical drainage [13].

Exploratory laparotomy vs. “direct” surgical approach (intra-abdominal abscess)

Although a blind exploratory laparotomy is a thing of olden days, it may sometimes be required if percutaneous procedure assisted with CT failed to drain the abscess. Specific criteria can be used to select a method [14].

	Exploratory laparotomy	“Direct” open drainage
Abscess accurately localized on CT	No	Yes
Early postoperative phase	Yes	No
Late postoperative phase	No	Yes
Single abscess	No	Yes
Multiple abscesses	Yes	No
Lesser sac abscess	Yes	No
Interloop abscess	Yes	No
Source of infection uncontrolled	Yes	No
Subphrenic/subhepatic	No	Yes
Gutter abscess	No	Yes
Pelvic	No	Yes

Table 2: Exploratory laparotomy vs. “Direct” open drainage [11].

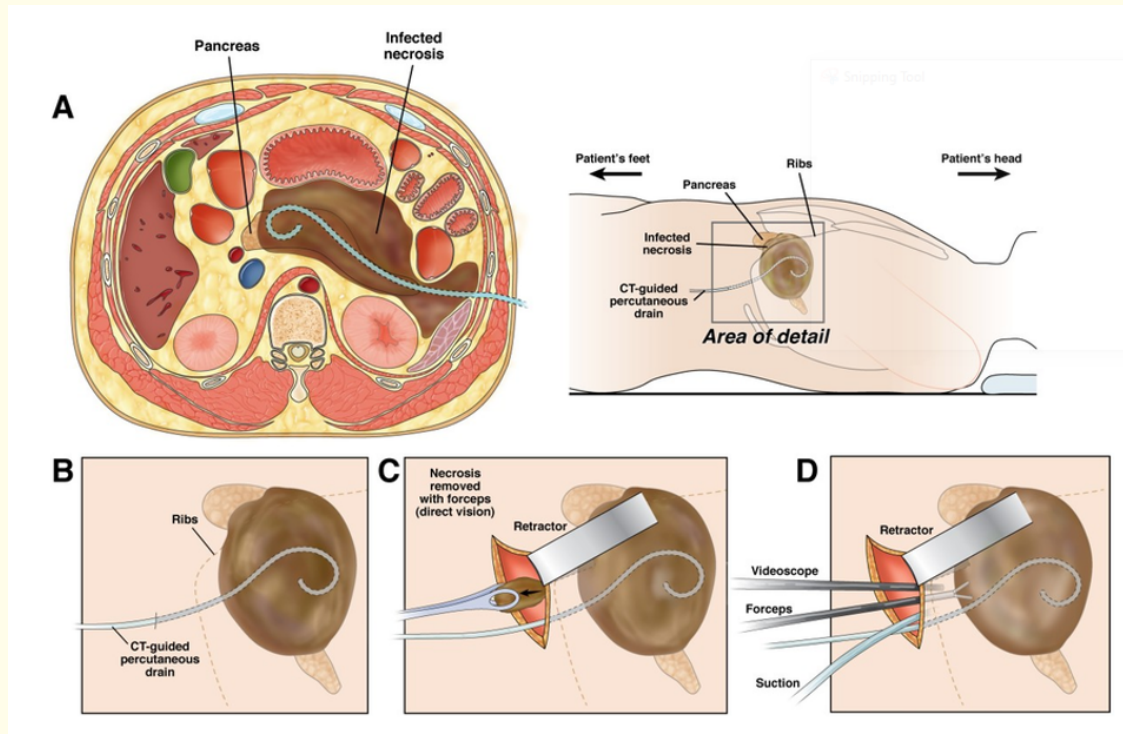


Figure 4: Surgical step-up approach. Surgical step-up approach consisting of percutaneous catheter drainage (PCD) and video-assisted retroperitoneal débridement (VARD). (A) Cross-sectional image and torso depicting a peripancreatic collection. The preferred route is through the left retroperitoneal space between the kidney, spleen and descending colon. A percutaneous catheter drain is inserted in the collection to mitigate sepsis and postpone or even obviate necrosectomy. The area of detail is shown in (B). (C) A 5 cm subcostal incision is made and the percutaneous drain is followed into the collection. The first necrosis is removed under direct vision with a long grasping forceps, followed by further debridement under video assistance (D) [15].

Free drainage vs. primary closure

In the 1950s, primary closure was advocated following surgical drainage with large mattress sutures that would obliterate the abscess cavity. However, studies have shown this procedure to be quite painful, and some even reported abscess recurrence. There is a shortage of enough evidence to promote either of the two.

Conclusion

After discussing various approaches to abscess management, it is clear from the literature that an immunocompetent patient can undergo incision and drainage under local anesthesia for abscess management. There is no evidence to either support the culturing of microbial organisms or the use of empirical antibiotics. Maintaining a sterile environment during the surgical procedure is of utmost importance. Thoroughly draining the abscess during surgical exploration without damaging vital structures is also a determining factor in the prognosis. Finally, placing the surgical drain, thick dressing, and regular checkups for at least a week cannot be ignored.

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