

Evaluation and Management of Skin Infections and Abscesses

Carol O'Mara DNP, APRN, FNP-C
Robert Hieger, MSN, APRN, FNP
September 2019

Objectives

- ▶ Discuss the diagnosis of skin abscess
- ▶ Discuss other common "mimickers" of skin abscess
- ▶ Discuss the pathophysiology of abscess
- ▶ Discuss the Emergency Department management of skin abscess
- ▶ Discuss the guidelines of management by the Infectious Disease Society of America (IDSA)
- ▶ Discuss the role of antibiotics
- ▶ Discuss the role of MRSA

Abscess Definition

- ▶ An skin abscess is a tender mass on the skin that is generally made up of a consolidation of pus in a cavity in the body
- ▶ An abscess can be found anywhere on the body
- ▶ A cutaneous abscess is a collection of pus in the dermis and/or deeper structures
- ▶ The abscess is generally surrounded by an area of coloration from pink to deep red.
- ▶ The center elevation and/or the entire area of coloration is generally painful and warm to touch.

Abscess Definition

An abscess is an enclosed collection of liquefied tissue, known as pus, somewhere in the body. It is the result of the body's defensive reaction to foreign material.

Types of Abscesses

Septic

- ▶ Can occur anywhere in the body
- ▶ Required elements
 - ▶ Germ and immune response of host
- ▶ Produce enzymes to attack the germ
- ▶ Digest the germ but also body tissue
- ▶ Result: the thick yellow liquid pus that contains digested germs, tissue, wbc's and enzymes
- ▶ 4 cardinal signs
 - ▶ Heat, swelling, erythema, pain

Sterile

- ▶ A milder form of the same process
- ▶ Caused by nonliving irritants (drugs) rather than germs
- ▶ Remaining drug causes irritation of the tissues
- ▶ Same response but results in sterile abscess
- ▶ Will often turn into hard, solid lumps as they scar, rather than remaining pockets of pus

Causes of Abscess Formation

Causes

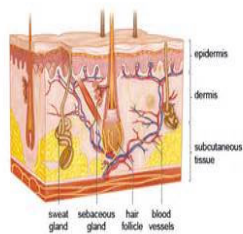
- ▶ The obstruction of oil (sebaceous) glands or sweat glands
- ▶ Inflammation of hair follicles
- ▶ Breaks or punctures of the skin - may be microscopic

Epidemiology

- ▶ Bacteria gets under the skin surface and into the sebaceous glands
- ▶ The body's defense mechanism is to mount an inflammatory response in an attempt to kill the bacteria
- ▶ Visits to the Emergency Department for cutaneous abscesses more than doubled from 1.2 million to 3.3 million from 1996 to 2005

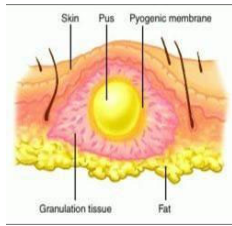
Pathogenesis of an Abscess

- ▶ Middle of the abscess liquefies and contains dead cells, bacteria and debris
- ▶ The area begins to enlarge in reaction to the inflammatory response
- ▶ This enlargement will cause increased tension under the skin and increase the inflammatory response
- ▶ The body defense mechanism continues to attempt to destroy the bacterial cells.
- ▶ The pressure and inflammation are responsible for the increasing pain



Pathogenesis of an Abscess

- ▶ Typical organisms
 - ▶ Staphylococcus aureus
 - ▶ Group A & B Streptococcus
 - ▶ Streptococcus pyogenes
 - ▶ Mixed aerobic and anaerobic
- ▶ In deep abscesses:
 - ▶ Gram negative particularly E coli
 - ▶ Anaerobes (eg: Bacteroides)



▶ <http://www.unitedhealthdirectory.com>

Characteristics/Risk factors for Abscess development

- ▶ Individuals with weakened immune system
- ▶ Chronic steroid use
- ▶ Chemotherapy
- ▶ Diabetes
- ▶ Cancer
- ▶ AIDS
- ▶ Peripheral Vascular Disease
- ▶ Severe burns
- ▶ Alcoholics/IV drug users
- ▶ Environmental
- ▶ Exposure to unclean environments
- ▶ Exposure to persons with skin infections
- ▶ Poor Hygiene
- ▶ Poor circulation in living space

Physical exam

- ▶ Skin surface
 - ▶ Redness
 - ▶ Pain
 - ▶ Swelling
 - ▶ Fluctuance
 - ▶ May have “pointing” or “tenting” of the skin in the center
- ▶ Ultrasound
- ▶ Incision and Drainage

Indications for Incision and Drainage

- ▶ Abscess on the skin which is palpable
- ▶ Enlarged abscess
- ▶ Evidence at the abscess site of erythema and/or pus
- ▶ Exceptional tenderness at / or adjacent to the abscess
- ▶ Incision and drainage is a definitive treatment
- ▶ Antibiotics alone are ineffective

Contra-indications to Incision and Drainage

- ▶ Extremely large abscess which requires extensive incision, debridement or irrigation
- ▶ Deep abscess in very sensitive area (suprlevator, ischioanal, perirectal) which require a general anesthetic to obtain proper exposure
- ▶ Palmar space abscess
- ▶ Deep plantar space abscess
- ▶ Abscess in the nasolabial folds
- ▶ Abscess of surgical incision (relative)

The Abscess “mimicker”

- ▶ Spider bite
 - ▶ There are > 37,000 species of spiders
 - ▶ Local reactions:
 - ▶ Erythema, swelling, itching, pain
 - ▶ Continues to worsen > 24 hours
- ▶ Black widow
 - ▶ Fang marks identifiable
 - ▶ Systemic symptoms of chills, muscle cramps, body aches, tachycardia
- ▶ Brown recluse
 - ▶ Occurrence April to October
 - ▶ No erythema & wound is dry
 - ▶ Evidence of necrotic tissue

Black widow



Brown recluse



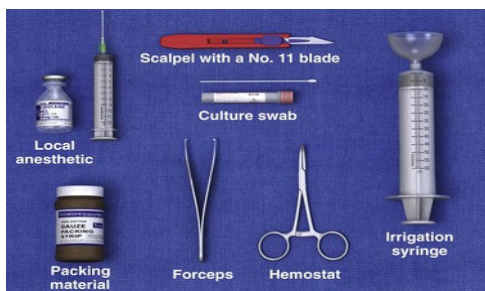
Pharmacology of Local Anesthetics

- ▶ **Lidocaine:**
 - ▶ short onset (1-2 minutes) and 1-2 hour duration
- ▶ **Bupivacaine, Marcaine, Sensorcaine:**
 - ▶ 10-15 min onset and 2- 6 hr duration
- ▶ These anesthetics are part of the hydrophilic amide group
- ▶ Amide is heat stable
- ▶ Work by interfering with sodium influx across the nerve membrane
- ▶ High lipid solubility allows for neural sheath solubility
- ▶ Drug passes through lipid membrane if unionized
- ▶ Alkaline environment required for drug to be unionized

Incision and Drainage Procedure

- ▶ **Incision and Drainage:**
 - ▶ Use curved hemostat to break up loculations
 - ▶ If purulent drainage large, can use Yankauer to suction out drainage
- ▶ **Irrigation**
 - ▶ With normal saline
 - ▶ Vigor of cleansing
- ▶ **Packing - To pack or not to pack ??**
 - ▶ Purpose is to keep the wound open
 - ▶ No advantage with iodoform over plain
 - ▶ Follow up in 48 hours

Abscess drainage - needed tools



Types of incisions

- ▶ Simple linear:
 - ▶ Carry the incision the entire length of the cutaneous abscess (controversial)
 - ▶ Allows for more complete drainage
 - ▶ Facilitate break up of loculations
- ▶ Timid "stab" incision:
 - ▶ May produced pus after initial stab
 - ▶ Not adequate for complete drainage of the abscess
- ▶ Cruciate:
 - ▶ Use in specialized areas ONLY
 - ▶ An elliptical skin incision
 - ▶ Should be AVOIDED in routine care of simple cutaneous abscesses
 - ▶ Tips of the flaps are more susceptible to necrosis - resulting

PROCEDURE

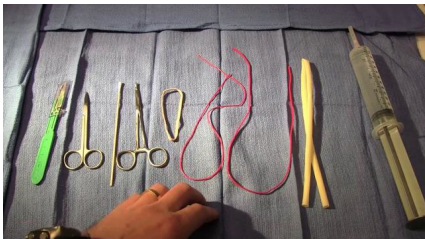
- Clean and drape
- Give adequate local anaesthesia
- Make a cruciate incision at most fluctuant area



Video for I & D Abscess

- ▶ Cruciate:
 - ▶ <https://www.youtube.com/watch?v=sqYchX00PnQ>
- ▶ I & D
 - ▶ <https://www.youtube.com/watch?v=XV1j0-EaNO4>
- ▶ Loop:
 - ▶ <https://www.youtube.com/watch?v=df4k085Z-JM>

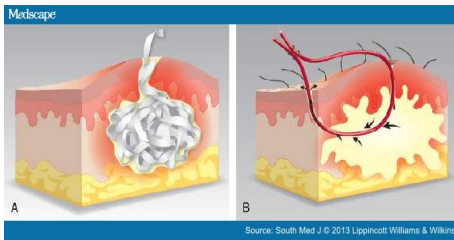
Abscess drainage by incision and loop Needed tools

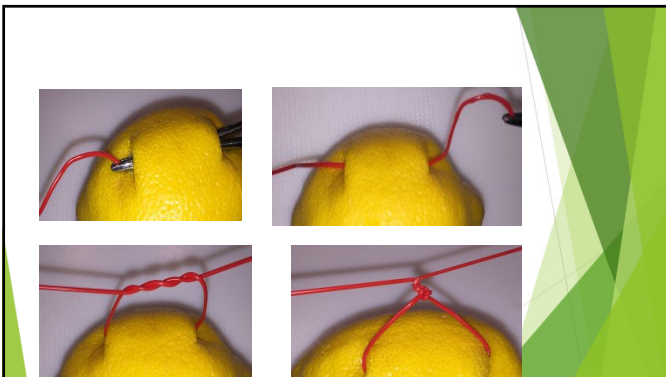


Incision and Loop Drainage

- ▶ **Pros:**
 - ▶ Better tolerated by patient
 - ▶ More patient involvement in self care
 - ▶ Better cosmesis
 - ▶ More cost effective
 - ▶ **Cons:**
 - ▶ Second incision
 - ▶ Patient must remember to move the loop
 - ▶ More dressing care/changes
- ▶ Video of Incision and loop drainage:
▶ <https://www.bing.com/videos/search?q=abscess+incision+and+loop+drainage&qpvt=abscess+incision+and+loop+drainage&view=detail&mid=0B02F2D30E63D7AF6A940B02F2D3DE63D7AF6A94&FORM=VRDGAR>

Packing versus Loop Drainage





Antibiotics: To give or not to give

- ▶ Very little evidence that skin abscess cause bacteremia
- ▶ Bacteriology is polymicrobial
- ▶ Antibiotics NOT recommended
 - ▶ For immunocompetent patients
- ▶ If must use antibiotics,
 - ▶ include those that have activity against MRSA
 - ▶ In the presence of cellulitis
 - ▶ Immunocompromised patient, diabetic patient, pilonidal cysts
 - ▶ Prophylaxis against infective endocarditis

The spider bite



MRSA wounds

MRSA Day 1-2



MRSA Day 3-4



MRSA abscess

Day 3 Multiple heroin injections



Neck abscess

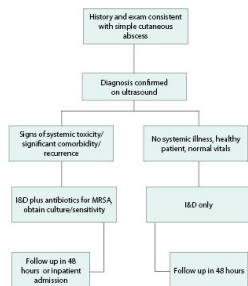


The Pack/No-pack Controversy

- ▶ Based on the literature currently available:
 - ▶ Research studies in 2009 (n=48), Kessler et al 2012 (n=57)
 - ▶ Review of the literature in 2014 by D. Baalman MD
 - ▶ Insufficient evidence to support routine packing of subcutaneous abscess
 - ▶ No evidence of increased recurrence of abscesses
 - ▶ Positive evidence of increased pain to patient
 - ▶ Packing small abscesses less than 5 cm is not warranted
 - ▶ This excludes the immunocompromised, diabetic population, & pilonidal cysts
 - ▶ Packing does not decrease the need for re-intervention or follow-up
 - ▶ It often increases the pain for patients, necessitating pain (opioid) medications
 - ▶ If packing: Pack loosely and minimal to moderate amount
- ▶ Limitations to current research:
 - ▶ All studies were small in number of participants
 - ▶ All patients with the above co-morbidities were excluded from the study

Algorithm

Thornton & Hellmich, 2016



Infectious Disease Society of America: Skin & Soft Tissue Infections (SSTI) Guidelines

- ▶ **Purulent infections:**
- ▶ **Mild, purulent infections** - I & D
- ▶ **Moderate, purulent infections** --- I & D / C & S
 - ▶ Presence of systemic signs of infection (fever, abnormal WBC, etc)
- ▶ **Severe, purulent infections** - I & D / C & S
 - ▶ Empiric tx with vancomycin or daptomycin (cubicin) or linezolid (zyvox) or Televancin (Vibativ) or Ceftaroline (Teflaro)
- ▶ If Methicillin Resistant Staph Aureus (MRSA)
 - ▶ continue empiric treatment
- ▶ If Methicillin Sensitive Staph Aureus (MSSA)
 - ▶ give nafcillin or cefazolin or clindamycin
