

SKIN & SOFT TISSUE INFECTION

Most commonly: 1. Beta hemolytic streptococci especially Group A streptococcus is the most common cause of skin and soft tissue infection ****MOST COMMON****

Staph aureus causes: abscesses** - why does it cause abscess?

Because it induces neutrophil production (pus)

An organism, which induces pus formation, is called a pyogen

It also causes: Cellulitis

Impetigo

Furuncles and carbuncles

Main cause of osteomyelitis

2. STAPHYLOCOCCUS AUREUS

3. MRSA "methicillin-resistant staphylococcus aureus"

a. Community acquired

b. Hospital acquired

RISK FACTORS FOR DEVELOPING SSTI:

- Breakdown of the epidermis layer. Ex: ulceration, trauma, poor hygiene, And eczema (skin allergy)
- Crowding, and overpopulation Ex: poor areas
- Close contact with person with SSTI (communicable through trauma or contact)
- Venous stasis, lymphedema
- Surgical procedures (contamination)

*Soft tissue infections are COMMON, MILD/MODEST SEVERITY and are ASYMPTOMATIC.

*Easily treated with variety of agents (most superficial SSTI can be managed with topical antibiotic agents) and can be managed on outpatient basis.

*May progress to severe infections to involve muscle, bone, lungs or heart valves (endocarditis) → needs systemic antibiotics

HOWEVER, there are emerging antibiotic resistances among:

Staph aureus (methicillin resistance)

Strep pyogens (erythromycin resistance)

*How to assess the severity of infection? Clinically and it is very crucial.

DIAGNOSIS:

1.history (previous bites)

2.physical examination (severity of infection)

3.biopsy pr aspiration

4.radiographic procedures (level of infection and the presence of gas or abscess)

5.surgical exploration or debridement (diagnostic and therapeutic)

IMPETIGO – PYODERMA

Is a common skin infection of discrete purulent (pus) lesions. Almost always caused by B-hemolytic strept or staph aureus

Affects: children in tropical or subtropical regions (2-5 years)

Usually occurs on exposed areas of the body (face & extremities)

Bullous (blisters usually caused by S.aureus) or nonbullous

No systemic symptoms

By skin colonization (due to hygiene), inoculation by abrasions (wound with damage to skin), minor trauma or insect bite

TREATMENT: mainly Cloxacilin = methacillin GREAT ANTISTAPH (1ST CHOICE)

Erythromycin (if not erythromycin resistant S aureus, s.pyogens)

Penicillin or first generation cephalosporins if not resistant

Topical therapy with mupirocin

ABSCESSSES

Cutaneous abscesses are collections of pus within the dermis layer and deeper skin tissues.

Painful, tender and fluctuant (unstable)

Usually polymicrobial or *S. aureus* alone in 25% of cases

>>do gram stain, culture and check if resistant to antibiotics

SYMPTOMS: multiple lesions

Cutaneous gangrene

Severely impaired host defenses

Extensive surrounding cellulitis

High fever

TREATMENT: incision and evacuation of the pus (is even more important than antibiotics)

Drainage is the best way to treat abscesses

FURUNCLES AND CARBUNCLES

1. Furuncles (boils) are infections of the HAIR FOLLICLES and usually caused by *S. aureus* & pus extends through the dermis into subcutaneous tissue.

2. Carbuncles extension to involve several adjacent follicles with inflammatory mass

Site: back of the neck (specially in **DIABETICS**)

Large furuncles and ALL carbuncles requires incision and drainage ****best treatment****

Systemic antibiotics are usually NOT necessary

OUTBREAKS OF FURUNCULOSIS BY MRSA AND MSSA

It is contagious*

Families/prisons/sports team

Bad hygiene

Repeated attacks (history of furuncles)

Presence of *S. aureus* at **anterior nares 20-40% (external part of the nose) REMEMBER it**

is a normal flora of the nose

TREATMENT: (furuncles are hard to treat)

Mupirocin ointment (topical) it eradicates staph nasal colonizes

ERYSIPELA

Affects the upper dermis layer

Red, tender and painful plaque

In infants and young children

B-hemolytic Strep (group A)

Treatment: penicillin IV or oral

CELLULITIS

Spreading of the skin infections Ex: abscesses may evolve to cellulitis

Involves the deeper dermis layer and the subcutaneous tissue

Most infections are caused by:

**** B- Hemolytic Streptococcus** (group A mainly but may be of group B(diabetics) ,C or G)

Staph aureus (in penetrating trauma)

Haemophilus Influenzae (periorbital 'area around the eye' in children)

Community Acquired MRSA (CA-MRSA)

Carry **PVL gene (panton-valentine leukocidin gene) → releases toxin → severe infection**

More sensitive to antibiotics

RISK FACTORS OF CELLULITIS:

1. Obesity

2. Venous insufficiency

3. Lymphatic obstruction (lymphedema)

4. Pre-existing skin infections like ulceration or eczema

DIAGNOSIS: clinical symptoms: fever, chills, redness, heat, edema, swelling, tachycardia, Hypotension and leukocytosis

The breaks in skin are small affecting the lower legs, arms and face

Blood is more important than aspiration

High WBC

Aspiration and biopsy is not usually helpful except with :

Diabetics, malignancies, animal bites, neutropenia, immunodeficiency

Obesity or renal failure

TREATMENT:

Antibiotics have to cover strept and staph

MSSA

1. ORAL

Penicillin

Dicloxacillin

Cephalexin

Clindamycin **excellent antistaph**

Erythromycin

2. PARENTRAL

For severely ill

Nafcillin

Cefazolin (cephalexin)

Clindamycin or Vancomycin

MRSA

Vancomycin

Clindamycin

Linezolid

CA-MRSA

PVL GENE

Causes infections in patients without history of hospital admission.

SUDDEN OUTBREAKS

Often susceptible to non B-Lactam antibiotics

Ex: Doxycycline, Clindamycin, **trimethoprim-sulfamethoxazole TMP-SMZ**

Vancomycin for severe infections

TREATMENT:

First gram stain and culture for sensitivity to antibiotics

If they are not responding to antibiotics they may progress to Necrotizing fasciitis or myonecrosis or toxic shock syndrome.

NECROTIZING FASCIITIS “FLESH-EATING DISEASE”

Rare deep skin and subcutaneous tissue infection

Polymicrobial or monomicrobial

Most common in the arms, legs and abdominal wall and is fatal in 30-40% of cases

Fournier's gangrene (testicular), necrotizing cellulitis

Caused by: group A strep (pyogens)

Staphylococcus aureus or CA-MRSA

Clostridium Perfringens (gas in tissue)

Bacteroides fragilis

Vibrio vulnificus (liver function)

Gram-negative bacteria: E-coli, Klebsiella, Pseudomonas

Fungi

RISK FACTORS: immune-suppression

Chronic diseases (DM, kidney and liver diseases, malignancies)

Trauma

Recent viral infection rash (ex: chicken pox)

Steroids, alcoholism, malnutrition

Idiopathic

PATHOPHYSIOLOGY:

Release toxins → destruction of skin and muscle

By: streptococcal pyogenic exotoxins and superantigens (non specific activation of T cells, overproduction of cytokines, toxic shock syndrome and other severe systemic illnesses)

SIGNS AND SYMPTOMS:

At first: local at site of trauma (severe or minor trauma) signs of inflammation may not be apparent

Then intense pain with rapid progression

Fever and chills

Swelling, redness, hotness, gas formation

Diarrhea and vomiting (very ill)

Blisters with necrosis

Shock organ failure

Mortality is high (73% if untreated)

DIAGNOSIS:

Early diagnosis is important!!!

Mainly clinical diagnosis

Blood test: CBC-WBC, differential, EST and BUN (blood urea nitrogen)

Surgery Debridement- amputation

Radiographic studies: X-rays, CT or MRI

Microbiology: culture and grams stain (blood, tissue and pus aspirate)

Susceptibility test for antibiotic resistance

TREATMENT:

Patients are hospitalized or admitted to ICU

IV antibiotics immediately

Use broad spectrum antibiotics against:

MRSA, gram (-)&(+) bacilli, and anaerobic bacteria

Antibiotic combination:

Pencillin-clindamycin-gentamycin

Ampicillin/sulbactam

Cefazolin plus MTZ

Piperacillin/tazobactam

Penicillin G for clostridium perfringens

Hyperbaric oxygen therapy (HBO) use of oxygen at higher level than atmospheric pressure to cure anaerobic disease like gas gangrene.

Surgery:

Extensive debridement of necrotized tissue → can reduce morbidity or mortality

Q1: The most common organism causing Abscesses is:

- A. **Staphylococcus aureus**
- B. Staphylococcus epidermidis
- C. Salmonella
- D. E-coli

Q2: Treatment for Necrotizing fasciitis which caused by Group A Streptococci (Pyogens):

- A. Metronidazole + Ketoconazole
- B. Rifampicin + Vancomycin
- C. **Penicillin + Clindamycin**