

Skin and soft tissue infections

A group of conditions that affect the skin (epidermis, dermis, subcutaneous tissue or superficial fascia)

2 types:

1. Uncomplicated infections - mostly caused by gram positive pathogens (*Staphylococcus*, *Streptococcus*) that infiltrate the skin after minor injuries (e.g. insect bites, scratches)

2. Complicated infections - have a higher tendency to be polymicrobial.

SSTIs primarily present with painful, warm, erythematous (a superficial redness secondary to the dilation of capillaries, may appear a deeper shade of purple or brown on darker skin) skin lesions and may lead to pus collection and/or necrosis (an irreversible tissue injury that results in cellular death and inflammation) of the affected tissue.

Systemic symptoms like fever are a sign of a more severe infection.

Overview of skin and soft tissue infections

1. Impetigo

Highly contagious infection that affects the upper layers of the epidermis

Most common skin infection in children.

MOST COMMON PATHOGENS

a. *Staphylococcus aureus* (bullous and non bullous)

b. *Streptococcus pyogenes* (non bullous)

TISSUE INVOLVEMENT - Superficial epidermis

CLINICAL FEATURES

-highly contagious infection with honey--yellow crust

-bullae formation

Overview of skin and soft tissue infections (cont)

bullae- cutaneous fluid-filled blister >1cm in diameter

2. Staphylococcal scalded skin syndrome (generalized form of impetigo)

Caused by exotoxins of *S.aureus* following a local infection (e.g. pharyngitis, bullous impetigo).

MOST COMMON PATHOGENS - Exotoxin of *S. aureus*

TISSUE INVOLVEMENT -Superficial epidermis

CLINICAL FEATURES

- erythematous rash

- fever

- heals completely

3. Nonpurulent SSTIs

A. Erysipelas

superficial skin infection of the upper dermis and superficial lymphatics.

Most commonly affects the lower limbs

MOST COMMON PATHOGENS - Group A Streptococcus (*S. pyogenes*)

TISSUE INVOLVEMENT - Superficial dermis, Lymphatic vessels

CLINICAL FEATURES

- Sharply demarcated erythematous skin lesion

B. Cellulitis

Rapidly spreading local infection of the deep dermis and subcutaneous tissue.

Commonly appears in areas with broken skin (e.g. due to trauma or another infection).

MOST COMMON PATHOGENS

- Group A Streptococcus (nonpurulent)

S. aureus (purulent)

TISSUE INVOLVEMENT - Deep dermis, Subcutaneous tissue

Overview of skin and soft tissue infections (cont)

CLINICAL FEATURES

- Rapidly spreading infection

- erythematous skin lesions with indistinct margins

- with or without pus

4. Purulent SSTIs

A. Skin abscess

An accumulation of white-yellow pus predominantly consisting of proteins and neutrophils in the dermis or subcutaneous tissue.

MOST COMMON PATHOGENS - *S. aureus* (often MRSA)

TISSUE INVOLVEMENT - deeper layers of skin

CLINICAL FEATURES

- walled-off infection with a collection of pus

B. Folliculitis, Furuncle, Carbuncle

Folliculitis- a localized inflammation of the hair follicle or sebaceous glands that is primarily caused by *S.aureus*. Characterized by erythema, tender papules, and/or pustules at the site of the hair follicles

Furuncle - a well-demarcated, firm, painful, purulent nodule that can develop after folliculitis. Extension into surrounding tissue can cause abscess and/or cellulitis

Carbuncle - a mix of multiple inflamed follicles (i.e., a mix of furuncles) with drainage of pus. Commonly caused by *S. aureus* and *S. pyogenes*

MOST COMMON PATHOGENS

- *S. aureus*

- *Pseudomonas aeruginosa*

TISSUE INVOLVEMENT - Hair follicle

CLINICAL FEATURES



Overview of skin and soft tissue infections (cont)

- localized papules and pustules on the base of the hair follicle
- usually containing a central hair

5. Necrotizing soft tissue infections

A group of life threatening infections characterized by soft tissue destruction and systemic toxicity.

Subtypes include: necrotizing fasciitis, cellulitis, myositis, and clostridial myonecrosis or gas gangrene

MOST COMMON PATHOGENS

- MIXED INFECTION: Group A Streptococci + anaerobic bacteria
- *Clostridium spp.*: Clostridial myonecrosis

TISSUE INVOLVEMENT

- Necrotizing cellulitis: deep dermis and subcutaneous tissue
- Necrotizing fasciitis: superficial fascia
- Necrotizing myositis: muscular tissue

CLINICAL FEATURES

- severe, rapidly progressing infection with necrosis
 - bullae and skin discoloration
 - high risk of systemic complications, high mortality
- Tissue involvement of SSTI (from superficial to deep): impetigo (superficial epidermis), erysipelas (superficial dermis and lymphatic vessels), cellulitis (deep dermis and subcutaneous tissue), necrotizing fasciitis (subcutaneous tissue including superficial and deep fascia)

Risk factors for skin and soft tissue infections

LOCAL FACTORS	SYSTEMIC FACTORS	INCREASED EXPOSURE TO PATHOGENS
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| 1. Chronic lymphedema (edema associated with lymphatic obstruction and reduced fluid clearance) | 1. Diabetes mellitus | 1. Prolonged hospitalization, surgery (nosocomial pathogens) |
| 2. Local skin defects (e.g. tinea pedis) | 2. Immunosuppression (HIV, asplenia, chemotherapy) | 2. Water exposure (sea water, hot tubs) |
| 3. Circulatory disorders: arteriovenous insufficiency, chronic edema, stasis | 3. CKD (leads to chronic edema) | 3. Long term IV devices |
| 4. Peripheral neuropathy | 4. Obesity, poor nutritional status | 4. Trauma (open wounds, exposed fractures) |
| | 5. Drug or alcohol use disorder | |
| | 6. Older and younger age | |

Complications

1. Local spread of infection
2. Systemic involvement with fever and possible sepsis
3. Spread of infection to distant sites (Staphylococcal infections)

