Bacterial infections of the skin

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Normal bacterial flora of the skin

- Resident flora
- Temporary residents
- Transient flora

Resident flora

Aerobic:

- Gram-positive cocci (Staphylococcus spp., Micrococcus spp.)
- Gram-positive rods (Corynebacterium spp., Brevibacterium spp.)
- Gram-negative (Acinetobacter spp.)

Anaerobic:

- Propionibacterium (hair follicles)
- Staphylococcus saccharolyticus

Resident flora

Modyfying factors:

- humidity and temperature
- location
- age
- sex
- race
- antiseptics

Resident flora

Role:

- Defence against bacterial infection

Gram-positive bacterial infections

Impetigo

- Definition: contagious, superficial pyogenic infection of the skin
- Types: bullous (staphylococcal) and non-bullous (can be both staphylococcal and streptococcal)
- Predisposing factors: over-crowding, poor hygiene, exsisting skin disease, especially scabies
- Transmision: direct contact, equipment, room dust

Impetigo – non-bullous

Clinical features:

- thin-walled vesicle on an erythematous base, ruptures rapidly, the exuding serum dries to form yellowish brown crusts,
- gradual, irregular, peripheral extension without central healing,
- lesions may coalesce
- most commonly affected sites: face, especially around the nose and mouth, the limbs
- tendency to spontaneous cure in 2-3 weeks

Impetigo - bullous

- bullae of a diameter of 1-2 cm, persist for 2-3 days,
- after rupture thin, flat, brownish crusts are formed,
- central healing and peripheral extension may give rise to circinate lesions
- face is often affected, but the lesions may occur anywhere, favouring the sites of pre-exsisting skin disease

Impetigo

Complications:

- poststreptococcal acute glomerulonephritis (after 18-21 days)

- impetigo can be followed by scarlet fever, urticaria, erythema multiforme

Impetigo

Treatment:

- in mild and localized infection: topical antibiotic (e.g. mupirocin)
- in widespread or severe infection with lymphadenopathy: oral antibiotic (local patterns of resistance should be considered)
- antiseptics

Impetiginisation

- secondary bacterial infection of the skin

Ecthyma

- Definition: streptococcal and/or staphylococcal infection of the skin characterized by the formation of adherent crusts, beneath which ulceration occurs

- Predisposing factors: poor hygiene, malnutrition, minor injuries, other skin conditions especially scabies

Ecthyma

Clinical features:

- small bullae or pustules on an erythematous base soon surmounted by a hard crust of dried exudate
- removing crust reveals a purulent, irregular ulcer
- healing occurs after a few weeks
- new lesions may develop by autoinoculation
- most commonly affected sites: buttocks, thighs and legs

Ecthyma

Treatment:

- improved hygiene and nutrition
- treatment of the underlying disease
- antibiotics

Erysipelas and cellulitis

- Erysipelas is a bacterial (usually streptococcal) infection of the dermis and upper subcutaneous tissue, its hallmark is a well-defined, raised edge.

- Cellulitis is an acute, subacute or chronic inflammation of loose connective tissue, mainly applied to inflammation of subcutaneous tissue in which an infective, generally bacterial, cause is proven or assumed.

Erysipelas and cellulitis

- attempts to culture bacteria are often unsuccessful
- predominantly streptococci
- constant features are erythema, heat, swelling, pain or tenderness
- edge in erysipelas is well-demarcated and raised, in cellulitis it is diffuse
- in erysipelas blistering is common
- severe cellulitis may also show bullae and can progress to dermal necrosis and uncommonly to fasciitis and myositis
- lymphangitis and lymphadenopathy are frequent

Erysipelas and cellulitis

- the commonest site is leg
- site of entry: superficial wound, ulcer or inflammatory lesion (e.g. tinea)
- complications: fasciitis, myositis, subcutaneous abscesses, septicaemia, nephritis, in more severe cases can be fatal

Erysipelas and cellulitis

Treatment :

- Penicillinase-resistant antibiotics (i.v. or p.o. In early stages)
- Management of the underlying condition

Furuncle (boil)

- Definition: acute, necrotic infection of a hair follicle with S. aureus
- more common in adolescence and in early adulthood, uncommon in early childhood (except in atopic subjects)
- the infecting strain of Staphylococcus is usually also present in the nares or the perineum
- Predisposing factors: mechanical damage, malnutrition, diabetes, HIV (furunculosis)

Furuncle

Clinical features:

- small, follicular, inflammatory nodule, soon becoming pustular then necrotic
- healing after discharge of a necrotic core leaving a violaceous macule, and ultimately, a permanent scar
- rate of development is variable: days-weeks
- pain, occasionally fever, rarely pyaemia, septicaemia

Furuncle

Common sites:

- face
- neck
- arms
- wrists
- fingers
- buttocks
- anogenital region

Furuncle

Complications:

Cavernous sinus thrombosis is a rare and dangerous complication of the furuncle on the upper lip and cheek.

Treatment

- systemic
- penicillinase-resistant antibiotic
- topical antibacterial agent (reduces contamination of the surrounding skin)

Carbuncle

- Definition: deep infection of a group of contiguous follicles with S. aureus, accompanied by intense inflammatory changes in the surrounding and underlying connective tissues

- Occurs predominantly in men, of middle or old age

- Predisposing factors: diabetes, malnutrition, cardiac failure, drug addiction, severe generalized dermatoses, prolonged steroid therapy

Carbuncle

Clinical features:

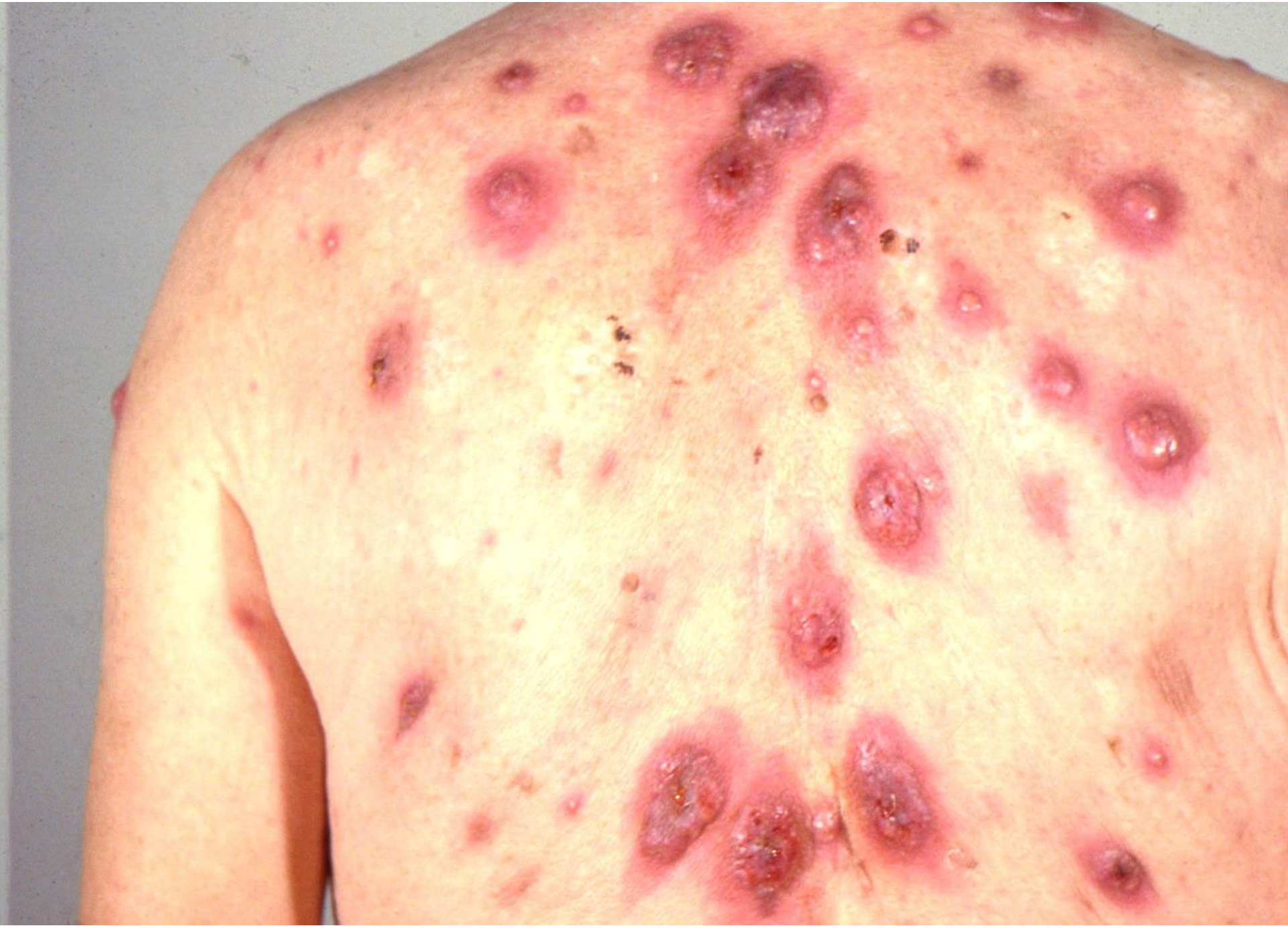
- Painful, hard, red lump
- Firstly smooth, dome-shaped and tender
- increases in size for a few days to reach a diameter of 3-10 cm or more
- Suppuration begins after 5-7 days
- Pus is discharged from multiple follicular orifices
- Necrosis leaves a crateriform nodule
- Most lesions are on the back of the neck, shoulders, hips and thighs
- High fever, malaise, prostration can occur

Carbuncle

Treatment

- penicillinase-resistant antibiotic
- look for diabetes and other underlying conditions

Furunculosis



Sycosis

- Definition: subacute or chronic pyogenic infection involving the whole depth of the follicle
- Usually affects males after puberty in 3-4 decade
- commonly involves the follicles of the beard
- usually caused by S. Aureus
- many patients are seborrhoeic, with greasy complexion and chronic blepharitis

Sycosis

Clinical features

- Oedematous, red, follicular papule or pustule centred on a hair
- Lesions may coalescence producing raised plaques studded with pustules
- May be chronic
- Lupoid sycosis- follicles are destroyed with scarring

Sycosis

Treatment

- antibiotic ointments
- if nasal swab indicates chronic S. aureus carrier state- antibiotic should be applied to nasal vestibules
- chronic forms: sometimes combination of steroids and antibiotics is efficient
- resistant cases: 10-14 course of systemic antibiotic

Folliculitis keloidalis

- Definition: chronic, inflammatory process involving the hair follicles of the nape of the neck and leading to hypertrophic scarring in papules and plaques

- affects males after puberty, most frequently between the ages of 14 and 25 years, especially black males

- S. aureus is often implicated

Folliculitis keloidalis

Clinical features

- follicular papules and pustules on the nape of the neck, just below the hairline
- papules may remain discrete or may fuse into horizontal bands or irregular plaques
- in other cases: abscessess and discharging sinuses
- chronic

Folliculitis keloidalis

Treatment

- bacterial infection should be treated if present
- antiseptics
- intralesional or topical potent steroids
- excision
- laser

Perifolliculitis capitis (abcedens et suffodiens)

- dissecting cellulitis of the scalp
- Definition: rare, chronic, suppurative perifolliculitis of the scalp
- occurs predominantly between ages of 18 and 40,
- exclusively in men (more common in black males)
- infective origin is supposed, but evidence is inconclusive

Perifolliculitis capitis

Clinical features

- Firm, tender nodules, usually developing in close groups at short intervals
- Hairs overlying the nodules are soon shed and are easily extracted and the follicular openings discharge pus
- Nodules may coalesce to form roughly cerebriform ridges, devoid of hair on their summits
- Eventually the nodules may cover the greater part of the scalp and may persist for years

Perifolliculitis capitis

Treatment

- cultures often negative
- long treatment with antibiotics is often disappointing
- substantial but temporary improvement after isotretinoin
- fucidic acid
- zinc sulphate
- laser

Staphylococcal scalded skin syndrome

- Definition: an exfoliative dermatosis in which most of the body surface becomes erythematous and the necrotic superficial epidermis strips off.

- The syndrome was first described in children, but adults may be affected.

- Predisposing factors: renal failure, malignancy, immunosupression, alcohol abuse

SSSS

Clinical features:

- the initial event is usually a localized staphylococcal infection
- a few days later patients develop fever, irritability and skin tenderness
- a widespread erythematous eruption follows, which progresses rapidly to blister formation, which leave extremely painful raw areas
- the condition usually heals within 7-14 days

SSSS

- swabs and cultures do not usually grow the staphylococci, as the blisters are mediated by the exfoliative toxins which are disseminated haematogenously

- The staphylococci may be isolated from the original septic site

SSSS

- Splitting of the epidermis between the granular and spinous layer
- Exfoliative toxins cause disruption of the desmosomes by cleaving desmoglein 1

SSSS

Treatment:

- Systemic antibiotics
- Children usually recover within 7 days

Coryneform bacteria

- *Corynebacterium*
- *Propionibacterium*
- *Listeria monocytogenes*
- *Erysipelothrix rusiopathiae*

Erythrasma

- Definition: mild, chronic, localized superficial infection of the skin caused by a group of closely related aerobic coryneform bacteria, usually C. Minutissimum
- Predisposing factors: warm, humid climate, diabetes
- More common in adults, but can occur in any age
- Sites: toe clefts, groins, axillae, intergluteal and submammary flexures

Erythrasma

Clinical features

- irregularly shaped patches, sharply marginated, at first red, than brown
- new lesions are smooth, but older tend to be finely creased or scaly
- most lesions are symptomless

Erythrasma

- coral-red fluorescence in Wood's light, attributable to coproporphyrin III
- scrapings from the affected skin may show bacteria and fine filaments stained with Gram or Giemsa

Erythrasma

Treatment

- azole antifungal agents, such as clotrimazole, miconazole, erythromycin, antiseptics
- usually 2-week treatment
- for more extensive lesions topical fucidic acid and oral tetracycline
- good results after single dose of 1 g clarithromycin
- tendency to relapses

Gram-negative bacterial infections

Gram-negative bacteria

- Meningococcal infection
- Gonococcal infection
- Acinetobacter infection
- Moraxella infection
- Chancroid
- Salmonella infection
- Pseudomonas infection

Pseudomonas infection

- P. aeruginosa is an aerobic, Gram-negative rod,
- transient resident, mainly in anogenital region, axillae and external ear,
- it occurs in soil and water
- present in the intestine of a small percentage of adults and a high proportion of infants

Pseudomonas infection

- Periumbilical infection in infants
- Perionychial pustules
- Green discoloration of nails

Borreliosis

Borreliosis/Lyme disease

- B. burgdorferi is a spirochaete transmitted to humans by tick bites
- small mammals are necessary hosts for immature stages in the life cycle of the thick
- about 50% of patients recall a tick bite

Erythema chronicum migrans

- in about 90% of patients at the site of inoculation
- appears 1-36 days after the bite
- due to local spread of the spirochaete
- ring formation enlarging at a rate of several centimeters per week
- in some cases erythema is intense
- if untreated the lesion fades, usually within a few weeks, but the duration may vary between 1 day and 14 months
- regional lymphadenopathy and mild constitutional symptoms

Borreliosis/Lyme disease

- dissemination of the infection may occur within days or weeks of inoculation
- arthritis, neural involvement (meningitis, cranial nerve palsies, peripheral radiculonephritis), cardiac involvement (myocarditis, pericarditis, conduction defects)
- migratory joint pains, myositis, conjunctivitis, hepatitis, generalized lymphadenopathy, splenomegaly

Borreliosis/Lyme disease

Other cutaneous manifestations:

- Secondary lesions of ECM in 10% of patients
- Malar erythema
- Diffuse maculopapular rash
- Localized urticaria
- Generalized urticaria
- Urticarial vasculitis
- Septal panniculitis
- Lymphadenosis benigna cutis (solitary lymphocytoma)
- Acrodermatitis chronica atrophicans- late cutaneous manifestations

Borreliosis/Lyme disease

Diagnosis

- Serology – can be negative within the first few weeks

- Available tests: ELISA, indirect immunofluorescence, Western blot

Borreliosis/Lyme disease

Treatment

- Doxycycline: 100 mg 2-3 times daily
- Amoxicillin 500-1000 mg 3 times daily
- 14-21 days

Mycobacterial infections

Tuberculosis

- M. Tuberculosis complex
- Exogenous inoculation (primary inoculation tuberculosis, tuberculosis verrucosa cutis)
- Endogenous spread (lupus vulgaris, scrofuloderma, metastatic tuberculosis absces, acute miliary tuberculosis, orificial tuberculosis)
- Treatment: standard multidrug regimens

Leprosy (Hansen disease)

- M. leprae
- Chronic granulomatous disease principally acquired during childhood/young adulthood
- Site of infection: skin, peripheral nervous system, upper respiratory tract, eyes, testes
- Types of leprosy: tuberculoid, lepromatous, borderline, indeterminate forms, transitional forms

Leprosy- types

- Tuberculoid- localized skin involvement and/or peripheral nerve involvement; few organisms
- Lepromatous: generalized involvement including skin, upper respiratory mucous membrane, reticuloendothelial system, adrenal glands, testes
- borderline: features of both

Thank you for your attention