Bacterial infections-------- Prof. Dr. Khudair Al-Kayalli

Normal skin flora: are microorganisms include fungi and bacteria that live harmlessly as commensals on the surface of the skin and with in its follicles . Some times the over growth of this resident organisms may cause minor diseases of the skin or its appendages . These flora include :-

**Propionibacterium spp-*anaerobes in the hair follicles .

**Pityrosporoum spp- yeasts in the hair follicles .*

**Staphylococcus spp-* aerobic gram positive cocci – coagulase negative e.g. staph. Epidermidis .

**Micrococcus spp-* Gram positive rods .

**Corynebacterium spp-* coryneforms or diphtheroids .

**Brevibacterium spp-* coryneforms organisms .

**Acinetobacter spp-* the only Gram negative residents .

**Peptococcus saccharolyticus-* is anaerobic staphylococcus .

Gram positive bacteria :

1. Staphylococcus aureus –is coagulase positive staph. , it is the most important cause of skin infections , serious and sometimes fatal systemic disease . The staph. aureus carriers are seen in 35% of population in the **anterior nares , 20% in perineum , 5-10% in axillae and toe webs .**

Staph. Aureus induce variety of skin disorders , which either due to **direct infection** or **indirect effects** of biologically active toxins .

a. **Direct staph. aureus skin infections –** includes: ****primary infections*** – impetigo , ecthyma , folliculitis , furunculosis , carbuncle , sycosis occasionally cellulites and others . ***Secondary infections of*** eczema , infestations , ulcers .
b. **Skin disorders due to indirect effects of staph aureus –** which are due to toxins like epidermolytic toxins , exfoliative toxin and erythrogenoc toxin , which include : staphylococcal scalded skin syndrome (SSSS) , bullous impetigo ,toxic shock syndrome , staph. scarlatina .

2. Streptococci : are Gram positive catalase negative cocci , they can grow aerobically or anaerobically , classified in to at least 18(A-R) , according to group antigens e.g. B-haemolytic , alpha-haemolytic , and non-haemolytic (gama-haemolytic) .

Streptococci can cause skin infections (mostly group A) , through the following ways:-

a. **Direct infections of the skin or subcutaneous tissue which include : *Primary infections-*** impetigo , ecthyma , erysipelas , cellulites , valvovaginitis , perianal infection , streptococcal ulcers , blistering distal dactylitis , necrotizing fasciitis and others. ***Secondary infections*** – eczema , infestations , ulcers .
b. **Indirect skin involvement –** by circulating toxin e.g. scarlet fever , toxic shock like syndrome .
c. **Skin lesions attributed to allergic hypersensitivity to streptococcal antigens , include :** erythema nodosum , vasculitis .
d. **Skin disease provoked or influenced by streptococcal infection (uncertain mechanism) e.**g. psoriasis , especially guttate forms .

The major streptococcal pathogens in humans belong to group A , collectively referred to as *streptococcus pyogenes* . 10% of normal population are carriers of strep.

pyogenes in the throat and less frequently in the anterior nares . The *normal skin* dose not provide a favorable habitant for strep. pyogenes , perhaps due partly to a bactericidal effect of skin lipids , and transient skin carriage is found in only 0.5-1% of individuals . There are skin and throat strains , those throat strain can survive poorly on skin , and small numbers of skin strains may colonize the throat and the nose . Initiation of strep. skin infections usually required skin damage , albeit minor to be developed .

Complication of strep. pyogenes skin infections (pyoderma) are : ***Rheumatic fever*** is rare if at all , ***acute glomerulonephritis , erythema nodosum , psoriasis , scleredema of Bushke .***

Strep. serology –the antistreptolysin –O (ASO) titer is an indication of previous infection by strep. of group A,C,G, the upper limit of normal is 200U/ml , but the ASO response is weak and unreliable guide to diagnosis .

1. Diseases caused by direct involvement of the skin:

Impetigo:

Definition: impetigo is a contagious superficial pyogenic infection of the skin , clinically two main forms are recognized – **non-bullous and bullous impetigo .**

Aetiology and bacteriology:

Non-bullous impetigo – may be caused by both ***staph. aureus and strep.*** , but there has controversy as to the relative importance of the two genera , strep. is more prevalent in warmer climates . **Staph . arueus** may be a secondary invader in strep. impetigo , so in these cases both staph. and strep. are isolated from the infection . Recent publication suggest that the staph . may be the predominant infectious agent in most areas . Group 2 phage types staph. aureus are the predominant strain in both bullous and non-bullous impetigo , and the Lance field group A is by far the commonest strep. strain that cause non-bullous impetigo .

Bullous impetigo – is caused by staph. aureus , which produce epidermolytic toxin , that induce bulla formation , the toxin is produced commonly , but not exclusively by staph. of phage group 2.

Epidemiology: pure staph. **non-bullous** impetigo is relatively frequent through out the world , and large out breaks often occur , it is **commoner** than the strep. impetigo , in **temperate climates ,** but in **warmer and humid** areas , the strep. type is **predominant** and is endemic , **preschool and young school** age children are most often affected . **Bullous impetigo** is usually sporadic , but clusters of cases may occur in families and other groups , it is most frequent in **summer , occur in all ages**, but **commoner** in **childhood and newborn .**

Pathology: in **bullous** impetigo the epidermis splits just below the stratum granulosum , forming a large blisters , which contain neutrophils , cocci , and occasionally acantholytic cells , in **non-bullous form** the histology is similar , except the blisters formation is slight and transient .

Clinical features:

***Non-bullous impetigo-** the initial lesion is a very thin walled vesicles on an erythematous base , the vesicles raptures rapidly , that is seldom seen as such , the exuding serum dries to form yellowish brown (honey comp) crusts , which are usually thicker and dirtier in strep. form . **Gradual** irregular peripheral extension occurs with out central healing , and multiple lesions , which are usually present may coalesce , the crust eventually dry and separate to leave erythema , which fades without scaring . In sever cases there may be regional adenitis with fever and other constitutional symptoms , the **face** (especially around the nose and the mouth), and the **limbs** are the sites most commonly affected , and the lesions may occur anywhere on the body ,

especially in children with atopic dermatitis or scabies , rarely the mucous membrane is involved . There is a tendency to **spontaneous cure in 2-3 weeks** , but prolong course is common , particularly in patients with parasitic infestations or eczema , or in hot and humid **climates** . In heavily pigmented skin , fading of the lesions may be followed by temporary **hypopigmentation** or **hyperpigmentation .**

*** Bullous impetigo-** the initial lesion is a large bullae , which are less rapidly ruptured and become much larger , about 1-2cm in diameter or larger and persist for 2-3 days , its contents are clear at first , later become cloudy , and after rupture thin , flat , brownish crusts are formed .**Central healing and peripheral extension** may give rise to circinate lesions . Although the **face** is often affected , the lesions may occur anywhere and may be widely and irregularly distributed , often **favoring** the sites of existing **skin diseases ,** specially **miliaria , trivial injuries** such as **insect bites , mucous membrane** may be involved , regional adenitis is rare .

Treatment: **in mild and localized infections** , topical antibiotics alone may suffice e.g. **mupirocin** is effective without adverse effects , **fucidic acid** is also effective against both organisms , but there is a possibility of development of resistance , so its use as first line of treatment is restricted , **neomycin** is effective in staph. infections , but less active against strep. , **bacitracin** has activity against both and used in combination with neomycin .

In widespread or sever , or infection accompanied with lymphadenopath , or if there is reason to suspect a nephritogenic strep. ; an oral antibiotic such as **flucloxacillin or erythromycin** is indicated . Staph. aureus resistance to penicillin , erythromycin and tetracycline is now common even in developing countries .

- Local antiseptic like **chlorhexidine or povidone-iodine** can be used to clean the skin and removal of crusts , with water and soap .
- Identification and eradication of predisposing factors such as insect bites , pediculosis , scabies and minor trauma .

Ecthyma:

Definition- is a pyogenic of the skin characterized by the formation of adherent **crust** , beneath which ulceration occurs .

Aetiology- it is bacteriological infection caused by the same bacteria that cause impetigo , i.e. may be pure strep. pyogenes or staph. or both . Group A strep. is the common causative organism , and coagulase positive staph. is the second organism . **Most** of the cases occur in children in Europe , but in the **tropics** where the disease is very much more common , it may occur at any age . **Poor hygiene and malnutrition** are predisposing factors , and **minor injuries , scabies** may determine the site of the lesions , also seen in **drug addicts .**

Clinical features- the lesions are started as small **bullae or pustules** on an erythematous base , and are soon surmounted by a hard **crust** of dried exudates , which increase in size by peripheral accretion , the base may become indurated and a red oedematous areola is often present . The crust is removed with difficulty , to reveal a purulent irregular **ulcer , healing** occurs after a few weeks with **scaring** . The lesions are usually **few** , but new lesions may develop by autoinoculation over along period , the **buttocks , thighs and legs** are the most commonly affected .

Treatment- improved hygiene and nutrition and the treatment of the underlying disease e.g. scabies , and chose the active antibiotic against both strep. and staph. aureus .

Cellulites and erysipelas:

Definition- **Cellulites** – is strictly an acute , sub acute or chronic inflammation of loss connective tissue , but the term has been applied to **inflammation of subcutaneous tissue** in which an infective , generally bacterial cause is proven or assumed .

Erysipelas – is a bacterial infection of the dermis and upper subcutaneous tissue , it's hallmark is a well –defined , raised edge reflecting the more superficial (dermal) involvement . **However** cellulites may extend superficially and erysipelas deeply , so that in many cases the two processes coexist and it is impossible to make a meaningful distinction , also there is a closely similar bacteriology of the two conditions .

Aetiology- all studies confirm the traditional view that cellulites and erysipelas in the immunologically normal patient are predominantly **streptococcal** disease , usually group A , but also other groups especially G , but also C and B may be demonstrated in both conditions . In **cellulites (**as opposed to erysipelas) , **staph. aureus** is occasionally implicated alone or together with a streptococcus , **Haemophilus influenza** type b is an important cause of facial cellulites in young children , **other bacteria** , usually in specific situations of exposure or in immunocompromised patients e.g. strep. pneumoniae , pseudomonas aeruginosa , campylobacter jejuni , staph. epidermidis , Bacteroides fragilis and Yersinia enterocolitica , may cause cellulites .

Clinical features- erythema , heat , swelling and pain or tenderness are constant features . In **erysipelas** the edge of the lesion is well demarcated and raised , but in cellulites it is diffuse . In erysipelas blistering is common and there may be superficial hemorrhage into the blisters or in intact skin , especially in elderly people . Sever cellulites may show bullae and can progress to dermal necrosis and uncommonly to fasciitis or myositis . Lymphangitis and lymphadenopathy are frequent , there is constitutional upset with fever and malaise . Classical erysipelas starts abruptly and systemic symptoms may be acute or sever , but the response to treatment is more rapid . The **leg** is the commonest site , and there is usually a wound , even if superficial , an ulcer or an inflammatory lesion , including interdigital fungal or bacterial infection , which can be identified as possible portable of entry , the next most frequent site for classical streptococcal erysipelas is the **face** , where a traumatic entry site is less commonly seen .

With out effective treatment **complications** are common – fasciitis , myositis , subcutaneous abscesses , septicemia and in some streptococcal cases nephritis , and the more sever infections may be fatal , especially in infants and in debilitated or immunosupressed , sever myocardial depression has been reported in a previously healthy young woman with streptococcal cellulites . Recurrent strep. cellulites or erysipelas is attributed to lymphatic damage , which predispose to farther infection and farther lymphatic impairment manifesting as lymphoedema .

Diagnosis – clinical features should be supported by specimens for bacteriological examination from vesicle fluid or eroded or ulcerated surfaces , in addition to blood culture , serological tests for strep. ASO titer (high) .

D.D ; ***cellulites*** of the leg should be differentiated from deep –vein thrombosis by phlebography and Doppler ultrasound , **fungal cellulites** may occur in the immunocompromised , others D.D are insect bit , plant toxins .

Treatment – appropriate antibiotic should be given in full dose according to the likely causative pathogen(s) . By I.M. or I.V. rout in the more sever cases that are associated

with septicemia , arthritis , or suspected fasciitis , although oral treatment may be suffice for the milder infections .
For **strep. infections :** penicillin is the treatment of choice , given as benzyl penicillin 600-1200mg Iv. Six hourly for at least 10days , amacrolide antibiotic or clindamycine are alternatives .
In recurrent cases long term penicillin 500-2000mg daily can prevent attack some patients may require life long prophylaxes , alternative drugs are used in patients allergic to penicillin .

Inflammatory diseases of hair follicle:

Folliculitis : is inflammation of hair follicle , **staph. aureus** is the common cause of superficial and deep folliculitis (furuncles and carbuncles) , other microbial causes are **pseudomonas aeruginosa , Gram negative bacteria , pitrosporum yeast .** Other causes are *physical and chemical irritation e.g.* ***sycosis barbae , folliculitis cheloidalis , acne necrotica ……etc.***

Superficial folliculitis :

Definition- is subacute or chronic folliculitis , in which the inflammatory changes are confined to the ostium or extend only slightly below it and which heals without scar formation , is an extremely common condition .

Aetiology- it is not always primarily or exclusively **infective** in origin , **physical or chemical injury** to the skin may be associated with folliculitis , in which the pustules are **sterile** or may contain coagulase negative **staph. , e.g. of chemical and physical agents** are mineral oils , tar products , adhesive dressing , epilation and traction .

Clinical features – the lesions started as small follicular papules or pinhead pustules , rarely painful , some times small crust cover a red pouting follicular orifice .

Staph. aureus superficial folliculitis (follicular impetigo of Bokhart) – is an infection of the hair follicle ostium with staph. aureus , topical steroid is a predisposing factor , it is commonest in childhood and occurs mainly on the **scalp or scalp margins or on the limbs .** The individual lesion is a **domed , yellow pustule** , some times with narrow , red areola , the pustules developed in crops and may heal within 7-10days , but some times become chronic , but acute form is the common . The chronic form of the legs has been described mainly in young adult males .

Diagnosis- follicular pustules of folliculitis should be differentiated from non-follicular pustules of **pustular miliaria** , also from follicular pustules of **subcorneal pustular dermatosis (pus level) , ringworm pustules ,acne , follicular psoriasis .**

Treatment- superficial folliculitis of external chemical or physical origin well settle , if the irritant is removed . **Mild staph. folliculitis** is often self-limiting , or may respond to cleansing or topical antiseptic . In **sever** cases , **topical or systemic antibiotics** (e.g. cloxacilline , floxacillin) may be required . If the infection is **persistent or recurrent ,** the usual sites of staph. **carriage** should be sought in the patient and his or her contacts .

Psedofolliculitis:

Aetiology and definition- it is an inflammation of the perifollicular tissue , which results from penetration of sharp tips of shaved hairs into the skin . If **shaven** too long or if it escapes shaving for a few days , the hair may **curve back words** after emerging from the follicular orifice , to penetrate the adjacent skin , **conversely if the hair cut very short** , so it retracts into the follicle , it may directly penetrate the follicular wall . **Curly** hair is more liable to both of these aberrations , so that the condition is very common and more sever in black people . It may affect **any shaved**

surface in either sex , but the male's beard area is naturally the most common , there is evidence of genetic predisposition , plucking may cause it . Coagulase negative staph . may some times be grown from the lesions , but the condition is not primarily infective .

Clinical features- the patient complain of minor discomfort and cosmetic embarrassment from papules and pustules on shaven skin . The **beard area** (the skin of the neck and over the jaw) is most commonly affected , also in **black people** lesions on the **checks** are also frequent . **The papules** may be large in black individuals , scaring , keloid formation and hyperpigmentation may ensue . It is generally possible to identify some penetrating hairs , but they may not be visible in all cases . This condition may also affect **shaved scalp and cut nasal hairs .**

Treatment- the only certain cure is to *stop shaving for minimum of 4-6weeks , but resumption of shaving will lead to relapse , *lifting out of reentrant hairs with a needle is helpful but tedious , * brushing with abrasive sponge or toothbrush is less effective but quicker . Hairs should be left about 1mm long , by specially designed razors or electric clippers , avoid pluking , use of topical **steroid-antimicrobial combinations** combined with intensive use of emollients .

Furuncle:

Definition- it is an acute usually necrotic infection of a hair follicle with **staph. aureus .**

Aetiology – furuncle is relatively uncommon in early childhood in temperate climate except in atopic subjects , but increased rapidly in frequency with the approach of puberty , and in adolescence and early adult life is a common disability . In **adolescence , boys** are affected more than girls , and the peak incidence parallels that of acne vulgaris . **The predisposing factors are:**

***It occurs** mostly during the early winter months .

*** Seldom** impairment of the immune response , possibly neutrophil .

***Staph. Carriers** are more liable to develop infection .

***Mechanical damage** to the skin , even the friction of collar and belt may determine the distribution of the lesions .

***Malnutrition , diabetes** are important predisposition .

***HIV** infection .

***Hyper IgE syndrome .**

***Pathology-* it is an** abscess of the hair follicle , usually of vellus type , followed by necrosis with destruction of the follicle and perifollicular abscess formation .

Clinical features- a furuncle first presents as a small follicular inflammatory nodule , soon becoming pustular and then necrotic , and healing after discharge of a necrotic core to leave a violaceous macule and ultimately a permanent scar . **The necrosis** may occur with in 2 days or only after 2 or 3 weeks , **tenderness** is invariable , and in more acute and large lesions , there may be throbbing pain , and lesions of the nose or external ear canal can cause very sever pain . **The lesion** may be **single or multiple** and tend to appear in crops , **occasionally** there may be **fever and mild constitutional** symptoms , **pyaemia and septicemia** are favored by malnutrition , on the upper lip and cheek ,**cavernous sinus thrombosis** is a rare and dangerous complication . **The site commonly** involved are the **face , neck , arms , wrists , fingers , buttock and the anogenital region . Attack** may consist of a single or multiple **crops** , at irregular intervals or without period of freedom .

Diagnosis – it should be differentiated from **superficial folliculitis , herpes simplex , pustules of acne , hidradenitis supurativa , mayiasis and Baghdad boil .**

Prognosis- some patients suffer only one attack , while others continue to develop recurrence over months or years , with or without periods of freedom .
Treatment- systemic **flucloxacillin** or an other penicillinase – resistant antibiotic , a topical antibacterial agent reduce contamination of the surrounding skin , occlusive dressing should be avoided . **In recurrent** disease , **predisposing** factors should be excluded , and **carrier state** should be sought .

Carbuncle:
Definition and aetiology – it is deep infection of a group of contiguous follicles with **staph. aureus ,**accompanied by intense inflammatory changes , in the surrounding and underlying connective tissue , including the subcutaneous fat . It occurs predominantly in **men ,** and usually in **middle or old** age , more **common** in the **diabetic , malnutrition , cardiac failure , drug addiction , sever generalized dermatosis** such as **exfoliative dermatitis , pemphigus** and **during prolonged steroid therapy .**
Clinical features- the term is derived from the latten world for a small fiery coal , and describing the painful , hard , red lump , that is the initial stage of the infection . **At first** the lesion is smooth , dome –shape , acutely tender , increase in size for a few days to reach a diameter of 3-10cm or occasionally more , **suppuration** begins after some 5-7days , and **pus discharged** from the multiple follicular orifices . **Necrosis** of the intervening skin leaves a yellow slough surmounting a crateriform nodule , some times the necrosis develops more acutely without a preliminary follicular discharge , and the entire central core of the lesion is shed to leave a deep ulcer with a purulent floor . **The sites of predilection are** the **back of the neck , shoulders , hips and thighs ,** although usually **solitary** , they may be **multiple** or associated with one or more **furuncles . Constitutional symptoms** may accompany , or even precede by some hours , the development of the carbuncle , high **fever , malaise , and prostration** may be extreme if the carbuncle is large , or the patient general condition is poor . In favorable cases **healing** slowly take place to leave a scar , in the **frail and ill , death** may occur from toxemia or metastatic infection .
Diagnosis – anthrax present the only important problem , but haemorrhagic crust and the vesicular margin are quite unlike the carbuncle and diagnosed by swap study .
Treatment – flucloxacillin or another penicillinase-resistant antibiotic **should be given** and predisposing factors should be sought .

Sycosis:-
Definition- it is a subacute or chronic pyogenic infection involving the whole depth of the follicle , if the follicles are destroyed with clinically evident scaring , the term **lupoid sycosis is applied , many sites may be involved in the same individual .**
Aetiology- it occurs only in **males** after puberty and commonly involves the follicles of the **beard , most cases** began in the third or fourth decade . The infecting organism is **staph. aureus** , the same phage type of which can be isolated from nose , indoor workers are affected more than those who work in the open air .
Pathology- follicle is packed with polymophonuclear leukocytes , which infiltrate it's wall , around the follicle there is a chronic granulomatous infiltrate (lymphocyte , plasma cells , histocytes and foreign body giant cells .
Clinical features- the essential lesion is an oedematious , red , follicular papule or pustule , centered on a hair , the individual papules remain discrete , but if the neighboring follicles are involved the perifollicular oedema may coalesce , to produce the raised **plaque** studded with pustules , which suggest the appearance of a ripe fig ,

which coined the term sycosis . In common **subacute forms** , the lesions may be scattered irregularly over the beard , or grouped especially on the upper lip and below the angles of the jaw , attacks of varying duration occur at irregular intervals over months or years . In more **chronic forms** , the lesions are typically clustered in to plaques especially on the upper lip and chin , and may persist for very long periods , nearly 20 years in one case , with crusting and scaling , but the hairs are retained and there is no scaring . In **lupoid sycosis , the follicles are destroyed** by scaring , and active papules and pustules fringe the advancing margin around a pink atrophic scar , granulomatous inflammatory changes may give the papules a lupoid appearance . The process usually begins infront of one ear or under the chin and extends irregularly in any direction , the scalp may extensively involved , rarely axillary , pubic hair , lower legs , thighs and arms are involved .

***Diagnosis* –** from psedofolliculitis , mycotic sycosis (kerion) and lupus vulgaris .

Treatment- subacute forms are relatively easily controlled by antibiotic ointment , **chronic** forms are controlled by using a steroid-antibiotic ointment , and resistant cases a 10-14days course of systemic antibiotic .

2. Diseases caused by indirect involvement of the skin :

Staphylococcal-toxin-mediated diseases :

Staphylococcal scalded syndrome (SSSS):

Definition- it is an exfoliative dermatosis in which most of the body surface becomes erythematous and the necrotic superficial epidermis strips of . The syndrome was first described in **children** , but adult may be affected , especially those who had renal failure , malignancy , immunosuppression and alcohol abuse .

Aetiology- the epidermal changes are produced by the exfoliative (epidermolytic) toxin of the staphylococci , mainly phage group two , but other phage groups have been described.

Clinical features- the initial event is usually a localized **staph.** infection , which may be in the skin or at a distant or occult ' site , a few days later , patients develop **fever , irritability and skin tenderness ,** and a widespread **erythematous eruption** follows , which progresses rapidly to **blister formation , the tender skin becomes** gathered into folds and as it shrinks , leaves **raw areas** which are extremely ***painful* .** The condition usually **heals** within 7-14days , usually the skin swabs from the blisters for staph. are negative , but the original septic site is usually positive for staph. , the toxin is disseminated haematogenously .

Pathology- there is splitting *of the epidermis between* the granular and spinous layers , with superficial perivascular lymphocytic infiltrate .

Prognosis- is good in children , and if antibiotic are administered early , the mortality rate is low , children usually recover within 7days , in adult , the over all mortality rate seems to be higher .

***Treatment* –** parenteral antibiotics , such as **methicillin , flucloxacillin , cephalosporin or erythromycin** are required .

Toxic shock syndrome (TSS):

Definition- it is characterized by fever , and skin rash , followed in 1-3weeks by desquamation , circulatory shock and multisystem diseases , which is mediated by one or more staph. aureus toxins .

Aetiology- nearly all cases have been infected or colonized by staph. aureus , **staph.** infection of any severity , at any site , at any age and either sex may cause TSS . However , in most of the early cases the organism was isolated from the **vagina** of menstruating women using tampons in the USA , with symptomatic vaginitis .

TSS toxin -1 is produced by 80-90% of staph. aureus isolated from the affected cases , other toxins , including staph. enterotoxins A-D and H have also been implicated in the pathogenesis of some cases .

Clinical features- the onset is acute with fever and rash , vomiting and diarrhea are common early features , and involvement of muscle , liver , kidneys and CNS may follow , circulatory shock may be sever and the mortality rate is about 7% . The rash may be the presenting feature or may develop within the first day , which consists of **widespread macular erythema** , some times faint and cleared within 3days , **scarlatiniform and papulopustular** eruptions are also described . **Oedema of hands and feet** may be marked , there is generalized **mucous membrane erythema** , especially intense in the **conjunctiva** , under which there may be haemorrhage , **oral , oesophageal , vaginal** and **bladder mucosa may ulcerate .** Occasionally **vesicles and bullae** may form . **To wards the end of the second week** the majority of the patients develop a widespread **itchy , maculopapular ,** sometimes **urticarial rash ,** thrombocytopenia may cause **purpura . Desquamation** is highly characteristic , it occurs within 10-21days after the onset , and may be confined to the fingertips , may affect all the palmer and planter skin or may be generalized . **Reversible patchy alopecia** or **telogen effluvium** and **transverse ridging** and **partial loss of nails** are latter non-specific findings .

Pathology- there is no specific histological features , in cases with blister formation , the split is subepidermal .

Diagnosis- is primarily clinical , supported by the confirmation , in great majority of cases of staph. infection , **D.D.** are septic shock and other infections , Kawasaki disease (prolong fever , cardiac involvement , generalized lymphadenopathy and absence of peripheral shock) , staph. scarlatina may represent milder cases of TSS .

Treatment **–** appropriate systemic antibiotic therapy , with intensive general supportive measures are essential .

Streptococcal-toxin mediated diseases:

Scarlet fever – SYN. SCARLATINA:

Definition and aetiology- it is an acute infection caused by strains of strep. pyogenes producing pyrogenic exotoxin (erythrogenic toxin , erythrotoxin) , of which there are three antogenically unrelated types , A,B and C toxin , which are produced exclusively by group A strep. . The disease occurs throughout the world , but the full syndrome is uncommon in the tropics .The upper respiratory tract is the usual portal of entry and although infection of surgical and other wounds may some times be responsible , most of the cases occurs between the age of 1-10years , and infections are rare in infancy and old age .

Clinical features- after an incubation period , which is usually 2-5days , **fever , anorexia , and vomiting** with acute **follicular or membranous tonsillitis** , if the throat is the portal entry , if the infection has **entered a wound** , there may be increased **tenderness** and some **serous discharge .**

The rash which appears on the second day , firstly on the **upper trunk** is a finely punctuate **erythema** , which become generalized within a few hours or over 3-4days , transverse red streaks in the skin folds due to capillary fragility are known as **Pastia's lines .** The **face** is flashed , but rarely shows punctuate erythema , and relatively **pallor** around the **mouth** is characteristic , the lower **legs** are involved last and least . After 7-10days the **rash** is succeeded by **desquamation ,** branny in most areas , but in large , lamellar scales on the **palms and soles .**

The oral mucosa is **bright red ,** and there may be deeper red punctae on the palate , the **tongue** is at first heavily coated , but by the second or third day scattered , swollen , red papillae give the **white strawberry** tongue appearance , as the epithelium is shed , the tongue become smooth and **dark red (red strawberry)** , before returning to normal .
Fever usually settles in 7-10days , in sever toxic form the eruption is very intense and may be **purpuric , fever is high ,** patient is **delirious or comatose and myocarditis** is often present . In the **septic forms** , there is sever local pharyngeal lesions with extensive **oedema , otitis media** and **peritonsillar abscess .**
Complications are caused either by **toxin** or by **bacterial invasion** of tissues , directly or through haematogenous dissemination , include – **myocarditis , arthritis , meningitis** , **osteomylitis , rheumatic fever** and **glomerulonephritis .**
***Diagnosis- is by* clinical** criterias , which is supported by culture of a haemolytic strep. , raised ASO titer and positive **Schultz –Charlton test** (blanching of the rash around the point of injection of **antitoxin**) and polymorphonuclear leukocytosis in the **peripheral blood . D.D , rubella ,** early stage of **smallpox** and **some drug reactions ,** can simulate scarlet fever , also **staph. scarlatiniform erythema .**
***Treatment* – penicillin** should be given in full dosage for 10days , as soon as the diagnosis is suspected , and management of complications if occurs .

Streptococcal toxic shock syndrome :
Definition- it is **fever , myalgia** and **flu-like** symptoms are followed by **pain in an extremity** or in the **abdomen** , a **rash** followed by **desquamation , circulatory shock and multisystem diseases .**
***Aetiology* –** this disorder has been associated with the resent –re-emergence of **invasive group A streptococcal** infections , this strep. produced pyrogenic exotoxin –A , and other toxins that are likely to be responsible for this condition .
***Clinical features* –** this disease may occur in immunocompetent children and adults , the disease is similar to **staphylococcal TSS** , although there may be some differences. **Surgical wounds , throat infections , vaginal infections , postpartum or soft tissue infections** , due to group A strep. may be followed by the STSS . The disease is associated with higher **mortality** rate than staph. TSS , complications include : **myositis , endophthalmitis , peritonitis and renal failure .**
***Diagnosis* –** blood cultures are frequently positive , and swabs from the site of clinical infection almost yield group A strep. M types 1,2,3,12,and 28 .
Treatment – penicillin , erythromycin or clindamycin would be the treatment of choice .

Coryneform bacteria;

Are Gram- positive , non-spore forming , rod shape organisms commonly referred to as **diphtheroids** . It embraces Corynebacterium diphtheria , Cutaneous aerobic coryneforms , Corynebacterium , Brevibacterium , anaerobic Propionibacterium spp. , two animal species (Listeria monocytogenes and Erysipelothrix insidiosa) may cause human diseases .

Erythrasma:
Definition- it is a mild , chronic , localized , superficial infection of the skin caused by a group of closely related aerobic coryneform bacteria , usually **Corunebacterium minutissimum .**

Aetiology- it is caused by C. minutissimum , isolated from the scales of erythrasma . A worm , humid climate is a predisposing factor , clinical infection may occur at any age , but is more common among adults than children .
Clinical features – erythrasma as detected by **Wood's light** examination , involves the **toe's clefts** more frequently than any other sites , but as **clinically** manifested lesions , it occurs most commonly in the **groins , axillae , intergluteal and sub mammary flexures** , lesions on the groins affects the area of one or both thighs in contact with the scrotum , glans penis and area beneath the purpuce have rarely been involved . **The lesions** are **patches** of irregular shape , sharply marginated , at first red , but latter become brown , new lesions are smooth , but older lesions tend to be finely creased or obviously scaly . In **generalized** form , the sharply marginated , reddish brown plaques may cover extensive areas of the trunk and limbs .
In temperate climates , most lesions are symptom less , but in the tropics particularly , irritation of the lesions in the groins may lead to scratching and lichenification , **toe's clefts infections** are often a symptomatic , rarely C. minutissimum may cause **recurrent abscess or endocarditis .**
Diagnosis- clinical diagnosis should be supported by **Wood's light** examination , which give **coral-red fluorescence** , due to **coproporphyrin three .** Erythrasma should be differentiated from : **pityriasis versicolor** (occurs predominantly on the upper trunk) , **tinea cruris** on the thighs and groins , **tinea pedis and candidasis** on the toe's clefts . With out treatment erythrasma tends to persist indefinitely , **scraping** from the affected areas may show bacteria and fine filaments if stained with **Gram or Giemsa stain** or even with simple KOH clearance , **culture** on tissue culture **medium 199 .**
Treatment- it responds well to most of topically applied **azole antifungal agents** , such as **clotrimazol** and **miconazol** for about 2weeks , for more extensive lesions **erythromycin** orally is the most effective approach , alternatives include **: topical fucidin and oral tetracycline .**

Trichomycosis axillaries –SYN. TRICHOMYCOSIS NODOSA .
Definition and aetiology- it is a superficial infection of the axillary and pubic hairs , with the formation of adherent granular nodules (yellow, black, or red) on the hair shaft , which consist almost exclusively of tightly packed bacteria . Cultural studies have shown a variety of different biochemical types of aerobic **Corynebacteria** to be involved .
Clinical features- it occurs in both temperate and tropical climates , and not limited by race or sex . It is usually asymptomatic and the patient is often unaware of its presence , **yellow , black or red concretions** are present on the hair shaft and these may be hard , or soft and nodular or more diffuse , in nodular varieties , the hair may be brittle and easily broken , the underlying skin is normal . The axillary sweat may be yellow , black or red , according to the coloure of the concretions , and clothing may be stained , the **yellow** type is the most common and the black is the rarest , its prevalence , axillary type was 27% in male students , 42% in adult males and only 7% in women , due to absence of axillary hair , pubic infection is less common .
Diagnosis – in D.D. **pediculosis pubis , piedra ,** Wood's light examination is helpful , and microscopical confirmation by KOH mounts , show the bacteria as narrow bacillary organisms , in yellow or red concretions , they are **Gram positive rods .**
Treatment- clipping of the affected hairs and the application of an antimicrobial ointment such as **benzoic acid compound** ointment or 1%aquous formalin are

effective . The use of an effective **antiperspirant** such as **anhydrous aluminum chloride** is rapid means of therapy .

Pitted keratolysis :

Definition and aetiology : **it is a superficial** infection of the skin apparently caused by a species of **Corynebacterium** , and producing circular **erosions** on the soles , the organisms are easily detected in **Gram – stained scraping .**

Clinical features- there are numerous superficial erosions of the horny layer of the sole and the undersurfaces of the toes , the lesions consists of conspicuous **discrete , shallow , circular lesions** , with a punched out appearance , coalesce in places to produce irregular erosions , there is occasionally green or brown discoloration of the horny layer , hyperhydrosis is often associated , some times with maceration and foul odor , most of the patients are unaware of the condition , but under battle conditions , soreness and pain have been reported , in sever cases similar changes may affect the palms , but on rare occasions .

Diagnosis- the lesions are easily recognizable , but simple hyperhydrosis , erythrasma and tinea pedis have to be considered .

Treatment- include treatment of hyperhydrosis , topical fucidin ointment , other antibiotic and imidazol .

Anthrax:

Definition and aetiology- it is a specific infection with *Bacillus anthracis* , a Gram-positive , aerobic , encapsulated organism , which can survive as spores for over 20years in soil . It is primarily an infection of **herbivorous animals** , but occasional outbreaks occurs in other species , animal infections occurs by ingestion of spores . It is a serious problem in Africa , Pakistan , India , Iran , Middle East and parts of Russia . **Adults male** are most at risk and infection most often follows occupational exposure during care of livestock or the handling of products of animals . **Human resistance** to infection is normally high , Cutaneous infection is favaoured by minor trauma or preexisting skin lesions , pulmonary and intestinal forms results from the inhalation or ingestion of spores .

Clinical features- Cutaneous lesion (**malignant pustule)** , commonly occurs on exposed skin , especially the **face , neck , hand , arms** and is usually single but may be multiple . 1-5days after infection an irritable papule develops at the site of inoculation , a bulla on a red oedematous base soon follows , which raptures and form haemarrhagic crust around which is a zone of oedema and erythema , in which there may be several small vesicles . The surrounding tissue are oedematous , and although the regional lymph glands may be tender , but their involvement is slight in relation to the severity of the lesion and lymphangitis is unusual , on the face the oedema may be extreme and the localized pustule inconspicuous or absent .

Constitutional symptoms may begin 3or4days after the onset of the pustule , include: malaise , high fever , toxemia , prostration , delirium and coma .

The mortality of untreated Cutaneous anthrax is between 5-20%, with early and adequate antibiotic treatment all cases cured .

Other forms are respiratory and GIT varieties .

Diagnosis **–** staph. infection , vaccinia , cat scratch disease , North American blastomycosis and spirotrichosis may need exclusion , **by clinical criteria of the disease and bacteriological confirmation by Gram-stain , of fluid** from the Cutaneous lesion . **Blood cultures** confirms systemic infections , **serological tests** are also available , but the antibody levels are often very low .

Treatment- for Cutaneous anthrax , oral **ciprofloxacin (500mg 3/day) doxycyclin(100mg 2/day) or amoxicillin (500mg 3/day) for 7-10days .** For systemic disease , treatment should not be withheld until bacteriological confirmation has been obtained , **penicillin G** should be given I.v. for 7-10days (4million units 6-hourly , for the first 3-4days , **tetracycline or erythromycin** can be given in the presence of allergy to penicillin , or in very rare cases in which the bacillus is resistant to penicillin . **Vaccination** gives some protection , but prevention should be directed primarily at control of the disease in animals and its products disinfection .

Erysipeloid:

Definition and aetiology- it is an acute , rare , chronic , infection with **Ertsipelothrix rusiopathiae (formerly known as E. insidiosa) .** The organism is widespread in nature as a commensal or pathogen in a wide varieties of animal species , can survive in soil (survive in mammals , birds , fish and shellfish) , is a non-motile , non-spore forming Gram-positive bacillus . Human infection is contracted by direct contact , occasionally from living animals , Slaugheremen , Butchers , Cooks , Fishermen , Farmers and Veterinary Surgeons are the most likely affected by this disease .

Clinical features- three clinical syndromes have been distinguished in humans : ***localized Cutaneous (the most common , called erysipeloid of Rosen Bach) , *generalized Cutaneous and *systemic form (**in which skin lesions may occur) .

Most human infections are **localized** and self-limiting , about 3days after inoculation , a hot **violaceous , and tender erythema** develops around the inoculation site and extends centrifugally , but irregularly , with a sharp and some times gyrate border , which may be vesicular , most of lesions are on the **hand , fingers , forearms and any exposed areas may be involved .** Extension for 3or4days rarely for as long as a week , but the area eventually involved is seldom more than 10cm in diameter , without **treatment , healing normally occurs** spontaneously in 2weeks , without desquamation or suppuration . **Constitutional symptoms** are present in only some 10% of cases .

The widespread skin lesions are rare , described as violaceous , with a variable , pink , advancing border and with central resolution , there may be systemic symptoms , but blood cultures are negative , this form is also usually **self-limiting ,** but runs a more protracted course with the possibility of recurrences .

The commonest manifestation of the rare systemic E. rusiopathiae infection is endocarditis , but joint , bone , brain and plural involvement have been described , skin lesions are localized Cutaneous swelling with central necrosis , or scattered perifollicular papules , blood cultures are usually positive .

Diagnosis- of Cutaneous disease is mainly clinical , , compared with **erysipelas , cellulites ,** erysipeloid usually lacks constitutional symptoms and lymphangitis , the lesions are more purplish , and local joint involvement is more common , diagnosis is by culture of aspirated material or biopsy specimen .

Treatment- penicillin is the drug of choice , given parenterally in sever infections , ciprofloxacin or erythromycin are alternatives , tetracycline is often satisfactory , but the sensitivity of the organism is variable .

Gas gangrene:

Definition and aetiology- it is a clinical syndrome caused by the infection of wounds with various species of **Clostridium** , alone or in combination with anaerobic **Streptococci** , and often with aerobic organisms such as **Proteus** . The Clostridia spp. are **C. perfringens (formerly c. welechii) , C. oedematicus , C. septicum , C.**

histolyticum and other species . Clostridia are **anaerobic Gram-positive** , spore-forming , bacilli , widely distributed in the soil and in the GIT of the human and other mammals , C. perfringens can be isolated from the skin of the thighs , groins and buttocks of many healthy persons .

Clinical features- the incubation period varies from 12hours to 5-6days , **deep and dirty wounds** in the muscular regions of the body are most susceptible , how ever abdominal and intrauterine infections also occur . The affected area becomes painful and swollen , and there is increasing serous discharge from the wound . **constitutional symptoms , but often with out fever . The oedema** around the wound continues to spread and is associated first with **brownish staining** and mottling , then bullae , and later with formation of **black slough , crepitation** from gas in the tissue is classical but inconstant .

Diagnosis- by clinical criterias of infected wound , and bacteriological confirmation of Gram-positive bacteria rods .

Treatment- the immediate surgical debridement of all damaged tissue is essential , **penicillin** in high dose (10-20 million units) is usual treatment , alternatives include **chloramphenicol , metronidazole and imipenem .**

Pseudomonas infections ;

Definition and aetiology- are infections caused by Pseudomonas aeruginosa (P. pyocyanea) , which is **aerobic , Gram-negative , rod ,** which occurs only as a transient member of the skin flora , mainly in the anogenital region , axillae , and external ear , it occurs in soil and water and is presented in the intestine of small percentage of adults and a high proportion of infants . It readily colonizes burns , ulcers or other moist skin lesions and frequently contaminates the equipments . The use of **antibiotics , debilitating diseases , immune compromised and high-humidity environments** enhances pseudomonal infections .

Typical strains produces two pigments , the **blue-green pyocyanin (**a phenazine derivatives) and a **greenish-yellow pyoverdin .**

Clinical features:-

***Periumbilical infection in infancy-** is the commonest local infection , with a foul – smelling , bluish-green discharge and spreading erythema , in some cases usually under conditions of high humidity , widely scattered pustules may break down to form necrotic ulcers .

***Perionychial pustules –** may be accompanied by green discoloration of the nails .

***Lips and cheeks infection** may be followed by progressive gangrene , also with subungual green discoloration .

***Tropical immersion foot –** is infection of the toe webs by pseudomonas , results from inhibition of the Gram-positive flora or dermatophytes , by maceration or antibiotics , which is characterized by **sharply demarcated maceration ,** some times tinged with green , and showing **green fluorescence** under Wood's light .

***Pseudomonal infections of superficial wounds and burns –** which is results in discoloration of the slough with extensive surrounding oedema , fever , septicemia and shock may supervene .

***Gram-negative folliculitis ,** seen in swimming pool users , in patients with acne treated by tetracycline , are pseudomonal infection , presented as macular , papular , or pustular lesions , some are urticarial suggesting insect bite . In most of the cases , the rash settles spontaneously with in 7-10days , in the absence of re exposure .

***Pseudomonas septicemia –** most commonly occurs in the severely compromised host , usually there are no **skin lesions** , but in minority , a non-specific erythema ,

which can be tender or painful , purpura , or a cellulites like picture , **bullae** may form , particularly in moist areas , such as axillae , perineum and the buttocks , which may rapidly rupture to give necrotic ulcers --- ecthyma gangrenosum .
***Malignant otitis externa-** is pseudomonal infection of the external ear , in elderly diabetics , and neutropenic patients .
Prognosis of systemic infection – is always grave , even with early treatment , local infections in infants , or patient with debilitating illness should be regarded as potentially dangerous .
Diagnosis – by clinical , and bacteriological confirmation by cultures .
Treatment- superficial lesions responded best if drying out is possible , 1%acetic acid compresses , k---permanganate soaks and silver sulphadiazine cream may be of value , topical antibiotics e.g. polymyxin . In infected burns and septicemia , systemic antibiotics , ciprofloxacin , gentamicin , piperacillin , azlocillin , tobramycin and amikacin , as well as ceftazidime may be used in appropriate combinations .

Lyme disease (Lyme is town in USA):
Definition- it is a disease spectrum consists of characteristic eruption called **erythema chronicum migrans** (ECM) , at the site of inoculation , and dissemination of the infection may cause disease of the nervous system , heart , and joints , in addition to other dermatosis .
Aetiology- it is caused by **spirochete** called **Borrelia burgdorferi ,** which is transmitted to humans by **tick bites (Ixodes tick)** , it is Gram-negative anaerobic bacteria . The disease was first recognized in 1977 in USA , infection may occur at any time of year , **young nymphal ticks** feed in early summer , when there is a marked peak in incidence of human Lyme disease .
Clinical features- about 50% of patients with Lyme disease recall a tick bite , a bout 90% develop ECM at the site of inoculation . The eruption appears 1-36(average 9) days after the tick bite , and is due to local spread of the spirochete , usually in a ring formation enlarging at a rate of several Cm /week . In some cases the erythema is intense , in others rarely detectable , it may be entirely flat or show elevation at the center , the periphery or both , slight scaling is occasionally seen , older lesions may become **dusky blue** , moderate burning or itching occurs in 1/3 of cases , **with out treatment** the lesions fades , usually with in a few weeks (vary between 1day to 14months . **Regional lymphadenopathy and mild constitutional symptoms** may occur , **dissemination** of infection may occur within days or weeks of inoculation , with **systemic involvement ,** 57%had arthritis , 18% neural involvement (specially meningitis) , 10%had heart diseases (myocarditis , pericarditis , conduction defects) , myositis , conjunctivitis , hepatitis , generalized lymphadenepathy and splenomegaly , may occur .
Other Cutaneous manifestations – **10%** of patients had secondary lesions of ECM , molar erythema in febrile cases , diffuse maculopapular rash , localized urticaria , generalized urticaria , urticarial vasculitis and septal panniculitis .
Solitary lymphocytoma , develop near the site of the original ECM and occasionally coexisting with it , with strong positive serology test .
Acrodermatitis chronica atrophicans – is a late Cutaneous manifestation of lyme disease , it develops with in one or more years after the original infection , typical sites are **hands , feet , knees , and elbows** , the lesion begins as an erythematous plaque , which slowly enlarges and gradually becomes violaceous and atrophic , spirochetes have occasionally been cultured , but strongly positive serological test in all cases .

Diagnosis- ECM should be differentiated from other insect or spider bite , cellulites , drug eruption and EM , by clinical criteria and confirmation by serology (often negative in the first few weeks after inoculation) which include : ELISA , IDIF , W**estern blot and PCR .**

Treatment- in patients with solitary skin lesion of ECM i.e. no bacterial dissemination , **amoxicillin 500-1000mg 3times/day , or doxycycline 100mg 2-3times/day** is recommended for **3weeks , cefuroxime and erythromycin** are alternatives , early treatment is advised . **Mild systemic disease may be treated as above .**

More sever systemic cases required i.v. treatment , **ceftriaxone 2g daily i.v. for 2weeks** seems best , but there is still a 15% failure rate , **Benzyl penicillin 24million unites /day for 2-3weeks is also useful** and **chloramphenicol** is alternative .

Prophylactic treatment following tick bites in endemic areas may be considered .

<u>Kawasaki disease:</u> SYN. MUCOCUTANEOS LYMPH-NODE SYNDROME

Definition- is a disease usually seen in children , often affecting those under 2years of age , it presents with fever and a generalized exanthema with lymphadenitis , of unknown aetiology , although resent evidence would support a role for bacterial super antigens as possible trigger factors .

Aetiology- it's name is from **Kawasaki in Japan** , in which the disease was first described in 1967, males are more commonly affected , and the condition is also seen more often in siblings , than in the general population , suggesting the possibility of transmission , but epidemics have not been recorded .

Clinical features- disease of children , often below 2years , rarely seen in adults , the onset is **acute with a high fever (last 5-7days) , injected mucosa and conjunctivae , mouth and lips are dry and fissured , tongue** appears red with prominent papillae (strawberry tongue) and injected throat . After 3-4days , there is a wide spread exanthema on the limbs and trunk , it become localized over the distal extremities , hands and feet, the affected areas becomes oedematous , followed by scaling of the previously affected areas , in other cases the rash is morbilliform or EM like .

Cervical lymphadenopathy , 1/4 accompanying myocarditis , 1-2%MI , arrhythmia , arthralgia , arthritis , EM , protenuria , hepatitis , aseptic meningitis .

Diagnosis- **clinical features** , leukocytosis , thrombocytosis , increase ESR .

Treatment – I.v. gamma globulin in high dose 2g/kg in a single infusion over 10hours , aspirin is also helpful .

<u>Suppurative hidradenitis ,</u> SYN. APOCRINITIS , HIDRADIENITIS SUPPURATIVA .

Definition- it is a chronic relapsing inflammatory disease originating in apocrine gland follicles , often indolent due to subcutaneous extension with induration , scarring , destruction of skin appendages and sinus formation .

Aetiology- the disease begins after puberty , when apocrine glands are fully developed , common in females than males , uncommon after the age of 40years , although chronic recurrent disease may occasionally persist into the seventh decade . The density and the size of apocrine glands are the same in patients as in normal adults , there is no clear cause that induce this disease , but many **aetiological factors** are suspected :-

a. **The presence of comedones** in the apocrine glands bearing skin (normally not present) , which close the opening of the glands specially when opened in the

upper portion of sebaceous glands , this obstructs the outflow of the apocrine and sebaceous glands , and is belived to be the initiating event in hidradenitis .

b. **The follicular occlusion triad (hidradinitis , acne conglobate and perifolliculitis capitis)** or tetrad if pilonidal sinus is included , this occlusion induces an early inflammatory changes in the occluded glands , followed by secondary bacterial infection .
c. **The evidence for hormonal effects** – pubertal development , improvement during and relapse after pregnancy , premenstrual and menstrual exacerbation , oral androgenic progestogens contraceptives , in all these states is low estrogen level and high androgen level .
d. **Various immune defects –**presumably predispose to the infective element of the disease in individual cases , e.g. marked reduction in T-lymphocytes , higher frequency of HLA-A1 and B8 .
e. **Genetic predisposition** i.e. many patients had family history of the disease .

Clinical features- the disease occurs only in skin containing apocrine glands , axillae , perineal region , perianal region , buttocks and upper thigh , also female breast , neck , posterior aspect of the ears and adjacent scalp and the back .

Comedones , often polyporous , are usually present in or beside affected skin , pruritis and vague discomfort may precede the development of one or more small , firm , subcutaneous nodules , with pain and tenderness , and for weeks or months there may be no clinically obvious suppuration except that small pustules may surmount the nodules . If **subcutaneous extension** occurs it leads to indurated plaques , or in lax , flexural skin as in the axillae and groins , to thick linear bands .

Inflammatory nodules often rupture externally , giving rise to chronic sinuses ,with intermittent or persistent discharge of fluid consisting of serous exudates , blood and pus in varying proportions , ulceration sometimes occurs and burrowing abscesses may perforate neighboring structures .

The severity and the course are variable but persistence for many years with partial remission and acute relapses is common .

Complications – formation of fistulae to urethra , bladder , rectum or peritoneum has occurred rarely , sequelae of chronic inflammation include secondary anemia , hypoproteniaemia , amyloidosis , renal disease , interstitial keratitis , and peripheral and axial arthropathy , squamous carcinoma , chronic malaise and depression .

Diagnosis – scrofuloderma should be diagnosed from axillary and inguinal disease , inguinal lesions may simulate **actinomycosis , granuloma inguinale or lymphogranuloma venereum , pilonidal sinus , sigmoidal diverticulitis and Chrohn's disease** , must be excluded in anogenital region .

Treatment- local hygiene , including Wight reduction in the obese , use of antiseptic – detergent agents for washing .

Acute episodes and relapses should be treated as bacterial infections by 2weeks course of antibiotic(erythromycin , metronidazole , clindamycin , minocycline) , long term antibiotics , usually tetracycline or erythromycin as in acne – type regimen are used in some patients .

In acute exacerbation , systemic corticosteroids may be useful e.g. prednisoline 60mg /day and low maintenance dose for long term control .

Oral contraceptive for women with high estrogen /progesterone ratio e.g. 50mg ethinyloestradiol alone or in combination with cyproterone acetate 50mg or 100mg .

Retinoid – appear useful in some cases , isotretinoin in a dose of about 1mg/kg/day for 4months , acitretin 0.5mg/kg/day for 6months . **Plastic surgery** should be considered in refractory cases .