

Microbiology Team

430

1st Lecture

Subcutaneous Mycoses

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## Definitions:

**Mycoses**= Fungal infections

**Opportunistic Mycoses**= patients with immune deficiencies who would otherwise not be infected. They are usually normal flora.

**Subcutaneous Mycoses**: Fungal infections involving the dermis, subcutaneous tissues, muscle and may extend to bone.

**Serology**: The characteristics of a disease or an organism shown by study of blood serums. Or the science that deal with blood sera.

**Firm**= قاس وصلب

**Grains** = granules

**Tropical**= المناطق الاستوائية

**Subtropical**= المناطق الشبه استوائية

**Temperate**= المناطق المعتدلة

**Rural**= الريف

**Mold** =filamentous fungi.

**ZN**: Ziehl-Neelsen (stain)

**KOH test**: a procedure in which potassium hydroxide is used to dissolve skin and reveal fungal cells under the microscope.

**Plaques**= a localized abnormal patch on a body part

**Muriform**= Resembling courses of bricks or stones in sequence and regular arrangement.

**Swamps**= المستنقعات

**Cryosurgical**= surgery in which diseased or abnormal tissue (as a tumor or wart) is destroyed or removed by freezing (as by the use of liquid nitrogen).

## Clinical calcification of fungal mycoses:

1. Superficial Mycoses
2. Cutaneous Mycoses
3. Subcutaneous Mycoses
4. Systemic Mycoses
5. Opportunistic Mycoses

## Subcutaneous Mycoses

### Characteristics:

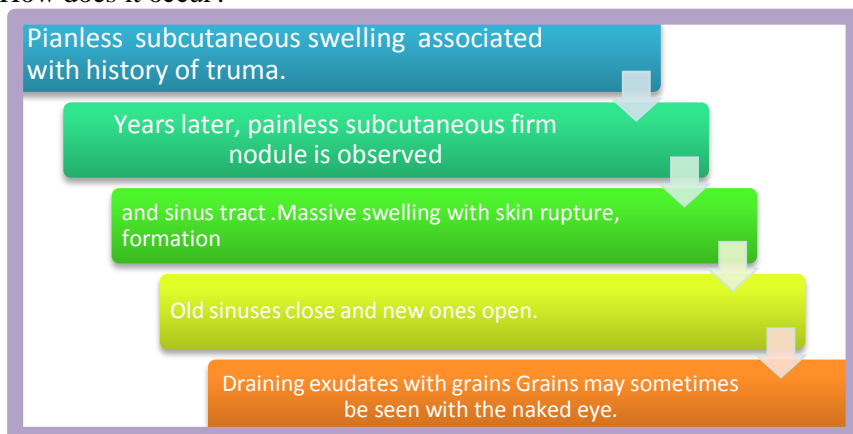
- They are initiated by trauma to the skin.
- Are difficult to treat and surgical intervention is frequently employed.
- Diseases in healthy host, however, more severe disease immunocompromised.

### Types of Subcutaneous Mycoses:

1. Mycetoma.
2. Subcutaneous zygomycosis.
3. Phoeypomycosis.
4. Rhinosporidiosis.
5. Chromoblastomycosis.
6. Sporotichosis.
7. Lobomycosis.

## Mycetomas

- Mycetomas are chronic granulomatous disease of the skin and subcutaneous tissue, which sometimes involves muscle, and bones. Caused by both aerobic filamentous bacteria (actinomycetomas) and fungi (eumycetomas)
- Characterized by tumefaction of the affected area, abscess formation, multiple draining sinuses, which exude characteristic grains of clumped organisms.
- Affects the lower extremities.
- Acquired via trauma of the skin.
- Mycetoma is endemic in tropical, subtropical, and temperate regions. Sudan, Senegal, Somalia, India, Pakistan, Mexico and Venezuela
- Is more common in men than in women (ratio is 3:1). (because as we said before that it requires a history of trauma and men are more likely to have a trauma because they work out more.).
- Commonly in people who work in rural areas, farmers
- How does it occur?

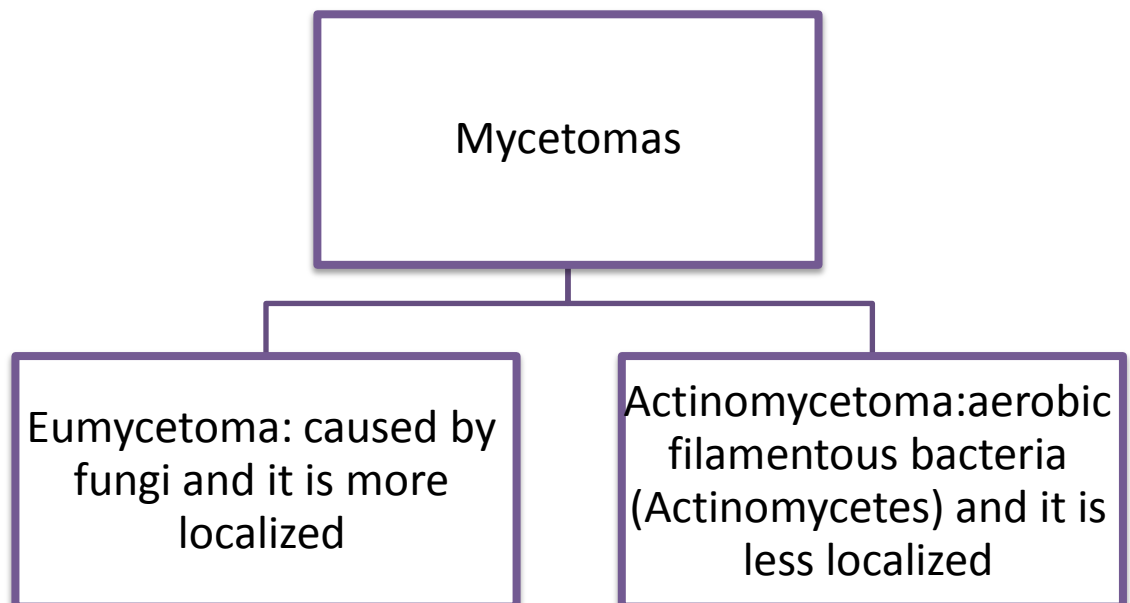


## Revision:



### We see:

- Infection in the lower extremities.
- Swelling
- Firm subcutaneous nodules.
- Abscesses formation.
- Skin rupture and sinus tracts with grains.
- There is a history of trauma.  
So it is mycetoma.



	<b>Eumycetomas</b>	<b>Actinomycetomas</b>
<b>Etiology</b>	Mold fungi	Aerobic filamentous bacteria, gram positive. It is different from Actinomycosis which is caused by anaerobic Actinomycetes.
<b>Most common are</b>	Madurella mycetomatis, Madurella grisea, and Pseudallescheria boydii	Actinomadura madurae Streptomyces somaliensis Nocardia brasiliensis
<b>The color of the grains</b>	White or black	Yellow, yellowish –brown, pinkish-red or white.
<p style="text-align: center;"><b><u>Diagnosis</u></b></p> <p style="text-align: center;">Clinical findings are similar for both</p>		
<p><b>Laboratory diagnosis (Specimen)</b></p> <ul style="list-style-type: none"> <li>• Biopsy tissue(if we take superficial sample of the draining sinuses is not going to be helpful)</li> <li>• Pus</li> <li>• Blood (for serology only)</li> </ul>		
<p><b>Direct microscopic examination: it is a direct microscopic examination of tissue or exudate from the draining sinuses.</b></p> <p><b>How we do it?</b></p> <p><b>We should do the staining procedure according to the following:</b></p> <p><b>If it is histological section =we stain it by Hematoxylin-Eosin.</b></p> <p><b>If it is smear= we stain it by</b></p> <ul style="list-style-type: none"> <li>• Giemsa , Gomori methenamine silver ,or periodic acid-Schiff stain (if the result become positive with these staining so it will be Eumycetomas ).</li> <li>• Garm stain and ZN(if these 2 staining become positive it will be Actinomycetes)</li> </ul> <p><b>Grains (appears in the histological section) =we will observe the size of the filaments and the color of the grain) .</b></p>		
<b><u>Culture</u></b>	Sabouraud dextrose agar (SDA)	Blood agar
<p><b><u>Serology:</u> it is helpful for follow- up.</b></p> <p>Detect the antibodies using culture filtrate or cytoplasmic antigens of mycetoma agents</p> <p>Antibodies can be determined by immunodiffusion, , enzyme-linked immunosorbent Assay(ELISA)</p>		
Radiologic tests (bone radiographs) if bone involvement is suspected (Multiple lytic lesions or cavities, Osteoporosis)	Less likely to do it	More likely to do it

<b><u>Treatment:</u></b> Therapy is suggested for several months or years (1-2 years or more)	Less response to the treatment. Ketoconazole, Itraconazole, Voriconazole and Amphotericin B	More response to the treatment. Trimethoprim-sulfamethoxazole Dapsone and Streptomycin Combination of 2 drugs is used
<b><u>Surgical Care:</u></b> In <b>Eumycetomas</b> patients we use if there is no response to the treatment or there is a bone involvement.		

	<b>Subcutaneous zygomycosis</b>	<b>phaeohyphomycosis</b>
<b>Description</b>	Chronic, firm localized subcutaneous mass. Acquired via implantation of spores (needle-stick, contaminated surgical dresses, tattooing and burn wound) Firm swelling of site with intact skin-distortion. Direct spread to adjacent bone and tissue.	Fungal infection caused by dermatiaceous fungi which is widely spread in the environment.
<b>Affected sites</b>	Mainly face	Thigh, leg, arm and feet.
<b>Etiology</b>	Mold fungi of Zygomycetes Kingdom: Fungi Phylum: <b>Zygomycota</b> Class: <b>Zygomycetes</b> <b>Orders:</b> Entomophthorales Species: Conidiobolus coronatus, Basidiobolus ranarum, and few mucorales.	Dermatiaceous mold fungi. Brain or subcutaneous abscesses. Present as nodules or subcutaneous plaques.
<b><u>Laboratory Diagnosis:</u></b>		
<b>Specimen</b>	Biopsy	Biopsy and pus
<b>Direct microscopy:</b>	Stained section or smear= it will appear broad non-septate hyphae	KOH test and smear = will show brown septate fungal hyphae.
<b>Culture</b>	SDA	SDA
<b>Treatment:</b>	Oral potassium iodide (KI) Posaconazole, KI and Amphotericin B	Surgical excision of the lesion (the best) Itraconazole and posaconazole.



	<b>Chromoblastomycosis</b>	<b>Sporotrichosis</b>
<b>Description</b>	Subcutaneous chronic fungal infection different dematiaceous fungi The initial lesion is single nodule, then new nodules appear ☐ The lesions become large with a cauliflower aspect and black dots, hyperkeratotic, Verrucous, Ulcerative • Local trauma into the skin	Subcutaneous, deep cutaneous or systemic fungal infection. Inoculation into the skin Can present as: plaque (subcutaneous nodules) Lymphanginitis Disseminated
<b>Etiology</b>	Dematiaceous mold fungi	Dimorphic fungus <i>Sporothrix schenckii</i> .
<b><u>Laboratory Diagnosis:</u></b>		
<b>Specimen</b>	Biopsy tissue	Biopsy tissue, ulcerative material
<b>Direct microscopy</b>	KOH & smears: presence of Muriform cells (sclerotic bodies) brown cells with septa	smear will show Finger-like yeast cells
<b>Culture</b>	SDA	SDA at room temperature and at 37°C
<b>Treatment</b>	Surgical excision of the lesion (the best) Itraconazole and posaconazole.	Itraconazole, KI

	<b>Rhinosporidiosis</b>	<b>Lobomycosis</b>
<b>Description</b>	Is chronic granulomatous, mucocutaneous fungal infection. Polyps affect mostly the mucous membranes such as Nasal mucosa, Oral mucosa (Palate, epiglottis), Conjunctiva. Through dust and water, more seen in communities near swamps, divers	Chronic cutaneous – subcutaneous mycosis Characterized by tumours nodular lesions, keloids Fungi introduced into the skin by penetrating injury.
<b>Etiology</b>	Rhinosporidium seeberi(it is obligatory parasitic fungus cannot be culture in artificial media)	Lacazia loboi
<b><u>Laboratory Diagnosis:</u></b>		
<b>Specimen</b>	Biopsy tissue	Biopsy tissue
<b>Direct microscopy</b>	Stained sections, smears or KOH, will show spherules with endospores	The diagnosis depend on it
<b>Culture</b>	No culture	Does not grow in culture
<b>Treatment</b>	Surgery, Cryosurgical excision of lesion. Recurrences are common	Cryosurgery or surgical excision of lesion



	<b>Bone and joint infection</b>
<b>Description</b>	They are uncommon Result from hematogenous dissemination Presence of foreign body Direct inoculation of organism (trauma, surgery , etc)
<b>Etiology:</b>	Candida species Blastomyces dermatiditis Coccidioides immitis Histoplasma capsulatum Paracoccidioides brasiliensis