Mycetoma and other subcutaneous mycoses

- Important
- Doctor Notes
- Extra, TN

Editing File

Objectives:

- ★ Acquire the basic knowledge about mycetoma and the clinical features of the disease
- ★ Acquire the basic knowledge about other common subcutaneous mycosis and their clinical features.
- ★ Know the main fungi that affect subcutaneous tissues, muscles and bones.
- ★ Identify the clinical settings of such infections
- ★ Know the laboratory diagnosis, and treatment of these infections.

Subcutaneous Mycoses

- **Subcutaneous Mycoses :** Fungal infections involving the dermis , subcutaneous tissues ,muscle and may extend to bone.
- **Initiation** : trauma to skin
- **Treatment :** they are difficult to treat , surgical intervention is frequently applied
- **Occur :** healthy host , more severe disease in immunocompromised host.

- **Examples of Subcutaneous Mycoses :**
  - 1- Mycetoma (most common)
  - 2- Subcutaneous zygomycosis (second common).
  - 3- Sporotrichosis
  - 4- Chromoblastomycosis
  - 5- Phaeohyphomycosis
  - 6- Rhinosporidiosis
  - 7- Lobomycosis

Mycetoma

Mycetoma : a chronic granulomatous disease of the skin and subcutaneous tissue which sometimes involves muscle and bones.

Characterized by :

- Patient will have trauma:
  1- Swelling in the site of trauma.
  2- abscess formation
  3- multiple draining sinuses that exude characteristic grains of clumped organisms

Typically affects:

1- the lower extremities (mainly you will see it in **FOOT**)
2- also other areas of the body (e.g. hand , back , neck)

Depending on the site of trauma

- **Mycetoma** is endemic in tropical, subtropical, and temperate regions. Sudan, Senegal, Somalia, India, Pakistan, Mexico, Venezuela, there some cases in KSA but it's NOT common.
- It is more common in men than in women (ratio is 3:1).
- Common in people who work in rural areas, framers.
- The disease was first described in the Madura district of India in 1842, and called by (Madura Foot). ⟶ **Madura Foot is another name for Mycetoma.**

Trauma here could be:

- Animal bites.
- Normal trauma ⟶ like when you hits an old wooden door by your foot.

Mycetoma

Mycetoma acquired via trauma of skin

Trauma — Helps fungi to penetrate skin

↓

Painless Subcutaneous firm nodule is observed

↓

Massive swelling + skin rupture + sinus tract formation

old sinuses **close** + **new** ones **open** , draining exudates with grains (=granules)
Grains may sometimes be **seen** with the **naked eye**

Mycetoma: Etiology

★ **Eumycetoma:** ⟶ chronic granulomatous fungal disease.

- Caused by a several mould fungi ⟶ mold, or Filamentous fungi.
- The most common are: **Madurella mycetomatis**, Madurella grisea, and Pseudallescheria boydii. (The color of grains is **black** or white) ⟶ usually black, in cases with a black grains, don't forget this.

★ **Actinomycetoma:**

- Caused by aerobic filamentous bacteria, gram positive .

1-Actinomadura madurae .(most common)

2-Nocardia brasiliensis.(partially acid fast bacillus,requires a special stain), (rarely).

3-Streptomyces somaliensis.

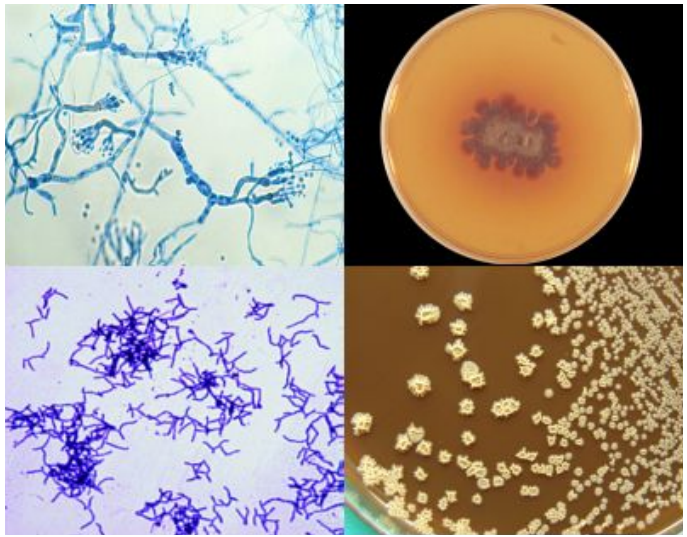
(Color of grains yellow, white, yellowish-brown, pinkish- red)

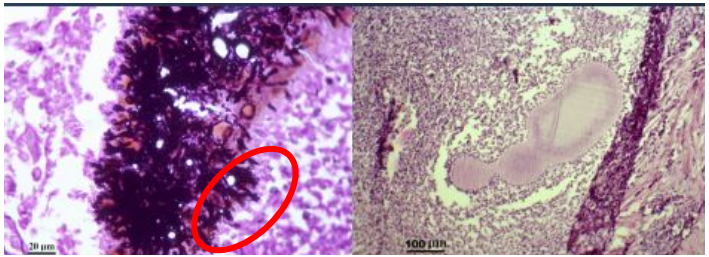
Mycetoma: Diagnosis

Biopsy is best.
Collecting pus is helpful to identify grains

Clinical samples:

- Biopsy tissue (Superficial samples of the draining sinuses are inadequate).
- Pus.
- Blood (for serology only).





flamints

Mycetoma:

Diagnosis

Culture

-Media such as Sabouraud dextrose agar (SDA) to isolate fungi
-Blood agar to isolate bacteria.

Fungi are identified based on the macroscopic and microscopic features.

For Actinomycetes biochemical and other tests are used for identification

Direct microscopic examination

Histological sections

Hematoxylin- Eosin

Smears

Stain with Giemsa , Gomori methenamine silver (Fungi)

Stain with Gram (Actinomycetes)

Grains

(Observing the size of the filaments , the color of the grain)

-White-to-yellow grains indicate: P boydii, Nocardia species, or A. madurae infection.
-Black grains indicate: Madurella species infection.

Mycetoma: Treatment

- **Eumycetoma :** Itraconazole
- **Actinomycetoma:** Trimethoprim-sulfamethoxazole \ Dapsone \ Streptomycin.(Combination of 2 drugs is used).

- Therapy is suggested for several months or years (1-2 years or more) .
- Actinomycetoma generally respond better to treatment than Eumycetoma.
- Radiologic tests (bone radiographs) if bone involvement is suspected . (important for all mycetoma patients for management and follow up).

- **Surgical Care:** In Eumycetoma, surgical treatment (debridement→ removing the dead tissue, or amputation) in patient not responding to medical treatment alone and if bone is involved.

Subcutaneous zygomycosis

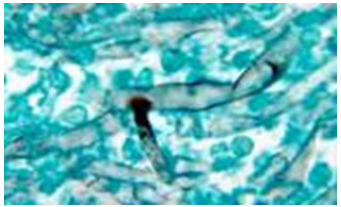
There is no sinus formation and abbesses unlike Mycetoma, the most characteristic feature here is the necrosis.
Fungi will infect blood vessels which will lead to hemorrhage which will lead to necrosis

- Chronic localized firm Subcutaneous masses
- facial area or other like hand, arm, leg, thigh.
- Firm swelling of site with intact skin-Distortion.
- Direct spread to adjacent bone and tissue.
- Acquired via **traumatic implantation of spores**,needle-stick, tattooing, contaminated surgical dressings, burn wound, also road-accident might leads to this kind of infections.

Laboratory Diagnosis:

1. Specimen: Biopsy tissue
2. Direct microscopy:

   stained sections or smears:
   broad non-septate hyphae
3. Culture: Culture on SDA



Etiology:

- Mould fungi of the Zygomycetes, (Entomophthorales and Mucorales)

1. Entomophthorales:Conidiobolus coronatus, Basidiobolus ranarum,
2. Mucorales: Rhizopus, Mucor

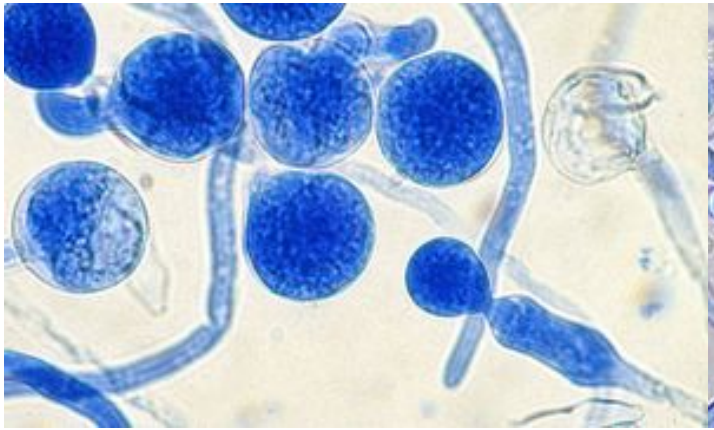
Treatment: Azols won't kill the fungi

★ Oral Potassium iodide (KI)
★ Amphotericin B ⟶ Best drug

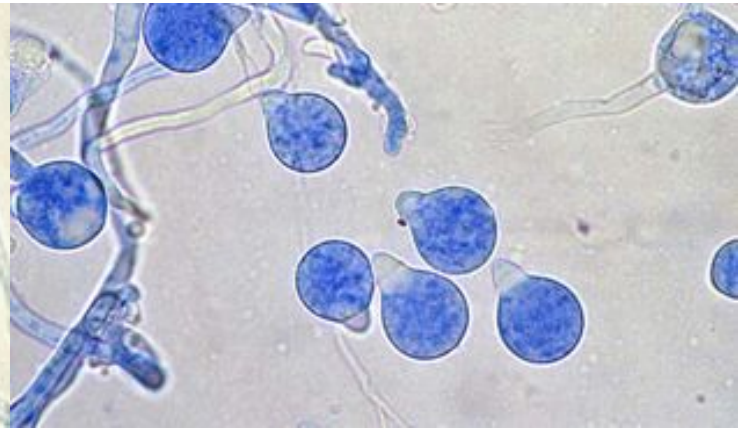
Cont.

Entomophthorales, Zygomycete

Basidiobolus species and *Conidiobolus* species



Basidiobolus ranarum



***Conidiobolus* species**

Subcutaneous zygomycosis

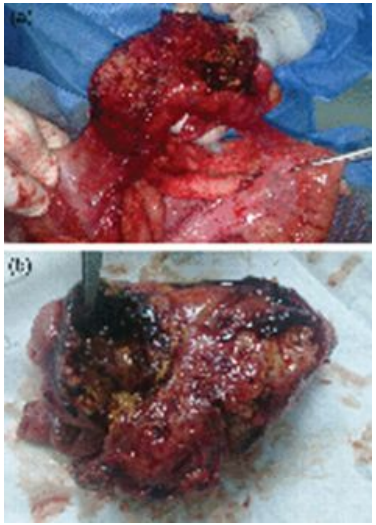
- Could be from ingestion.
- When misdiagnosed with Crohn's disease steroids will be prescribed which will worsen the patient's condition be his immunity will be suppressed and the fungi will grow more.

Gastrointestinal

Basidiobolomycosis

- The most common presenting symptoms are abdominal pain and swelling, accompanied by constipation, fever, weight loss, and abdominal mass.

- Misdiagnosis is common:
  - Abdominal malignancy and crohn's disease are the most common presumptive diagnosis.



Sporotrichosis

Lymphangitic: which spread along the line of lymphatic drainage

Dissimina: it means spread to other area by hematoginitics

- Subcutaneous , deep cutaneous or systemic fungal infection
- Inoculation into the skin

Can present as	1. plaque (subcutaneous nodules) 2. Lymphanginitic 3. Dissiminated
Etiology:	***Sporothrix schenckii.*** **Dimorphic fungus**
Laboratory Diagnosis:	1. Specimen: Biopsy tissue, pus 2. Direct Microscopy: smear will show **Finger-like yeast cells** or **Cigar shaped** 3. Culture: On SDA at room temperature and at 37°C
Treatment	**Itraconazole, KI**

Phaeohyphomycosis

- Is a group of fungal infections caused by **dematiaceous** (darkly pigmented) fungi widely distributed in the environment.
- **Subcutaneous** or **brain Abscess,**
- Presents as **nodules or erythematous plaques with no systemic involvement**

Affected site:	Thigh, legs, feet, arms
Etiology	Dematiaceous mold fungi. common:*Cladosporium,Exophiala,Wangiella, Cladophialophora*, *Bipolaris*
Diagnosis	Specimens: Pus, biopsy tissue Direct Microscopy: KOH & smears will **show brown septate fungal hyphae** Culture: On SDA
Treatment	• The treatment of choice is **Surgical** excision of the lesion • Antifungal (Itraconazole, Posaconazole)

Bone and joint infections

Eg:Osteomyelitis, Joint infections

They are **uncommon**

Not as isolated clinical problem

Result from:	1. Hematogenous dissemination 2. Presence of foreign body 3. Direct inoculation of organism (trauma, surgery , etc) 4. Spared through direct extension of infection to the bone e.g. Rhinocerebral zygomycosis, Aspergillosis, mycetoma
Etiology:	***Candida*** *species* ***Aspergillus*** *species* and mould fungi *Blastomyces dermatitidis* *Coccidioides immitis* *Histoplasma capsulatum* *Paracoccidioides brasiliensis*

quiz

Q1. What is the first tissue that becomes affected by mycetoma ?

A. Soft tissue
B. Subcutaneous
C. Bones
D. Skin

Q2.mycetoma can be cultured in ?

A. Sabouraud dextrose agar (SDA)
B. Blood agar
C. Horse blood agar
D. Thayer-Martin agar

Q3. which one of the following cause brain abscess?

A. Phaeohyphomycosis
B. Sporotrichosis
C. Subcutaneous zygomycosis
D. Mycetoma

Q4. Amphotericin B is a treatment of ?

A. Sporotrichosis
B. Subcutaneous zygomycosis
C. Mycetoma
D. Phaeohyphomycosis

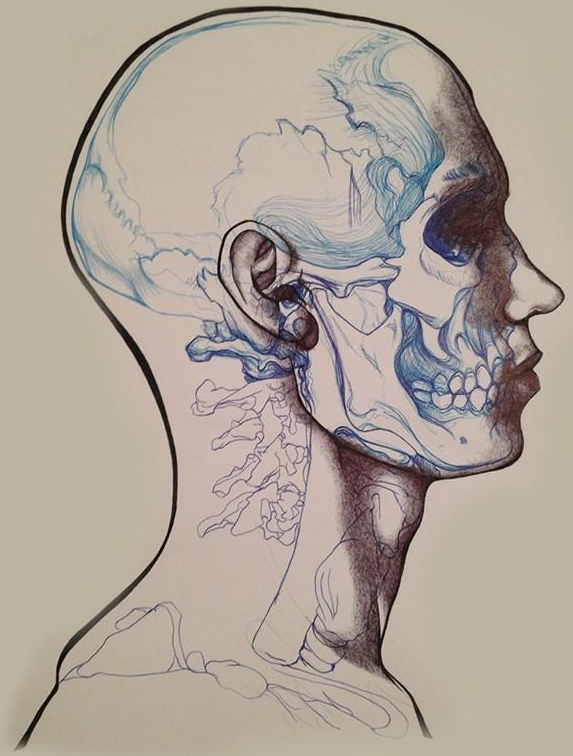
SAQ: Subcutaneous zygomycosis
Is acquired via?

Answers:
1-D,2-A,3-A,4-B

SAQ A:traumatic implantation of spores,needle-stick, tattooing, contaminated surgical dressings, burn wound

"Humanity shares a common ancestry with all living things on Earth. We often share especially close intimacies with the microbial world. In fact, only a small percentage of the cells in the human body are human at all. Yet, the common biology and biochemistry that unites us also makes us susceptible to contracting and transmitting infectious disease."

— Brenda Wilmoth Lerner,
Infectious Diseases: In Context



Thank You

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