Subcutaneous Mycoses

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Clinical Classification of mycoses

- Superficial Mycoses
- Cutaneous Mycoses
- Subcutaneous Mycoses
- Systemic Mycoses
- Opportunistic Mycoses

Subcutaneous Mycoses

- Fungal infections involving the dermis, subcutaneous tissues, muscle and may extend to bone.
- 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 in immunocompromised host.

Subcutaneous Mycoses

- Mycetoma
- Subcutaneous zygomycosis
- Sporotrichosis
- Chromoblastomycosis
- Pheohyphomycosis
- Rhinosporidiosis
- Lobomycosis

Mycetoma

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

- It is characterized by Swelling , abscess formation, and multiple draining sinuses that exude characteristic grains of clumped organisms .

- It typically affects the lower extremities, but also other areas of the body e.g. hand, back and neck.

- The disease was first described in the Madura district of India in 1842, (Madura foot).

- Its is Classified as :
  - Eumycetoma: those caused by fungi
  - Actinomycetoma: those caused by aerobic filamentous bacteria (Actinomycetes)

Clinical findings are similar for both.
Eumycetoma are usually more localized than actinomycetoma

Mycetoma

Mycetoma is acquired via trauma of the skin

Start as a painless subcutaneous swelling (history of trauma)

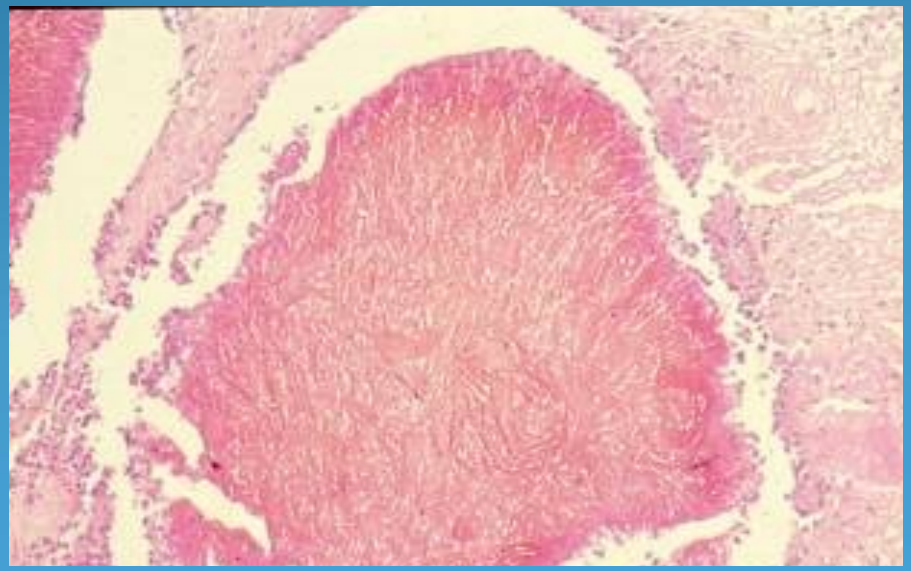
years later, painless subcutaneous firm nodule is observed

massive swelling with skin rupture, and sinus tract formation

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

Mycetoma (foot)

Note the swelling , abscess formation



(Mycetoma grain (granule)

Microscopic examination of biopsy tissue

Mycetoma

Mycetoma is endemic in tropical, subtropical, and temperate regions. Sudan, Senegal, Somalia, India, Pakistan, Mexico, Venezuela

Is more common in men than in women (ratio is 3:1).

Commonly in people who work in rural areas, framers

Mycetoma

Etiology

Eumycetomas

Caused by a several mould fungi
The most common are
Madurella mycetomatis, Madurella grisea, and *Pseudallescheria boydii*

The color of grains is black or white

Actinomycetomas

Caused by aerobic filamentous bacteria , gram positive

Actinomadura madurae
Streptomyces somaliensis
Nocardia brasiliensis

Color of grains yellow, white, yellowish-brown, pinkish – red.

Actinomycosis (anaerobic Actinomycetes)

Mycetoma

Diagnosis:

Clinical samples:

Biopsy tissue (Superficial samples of the draining sinuses are inadequate)

Pus

Blood (for serology only)

7. Direct microscopic examination

Microscopic examination of tissue or exudate from the draining sinuses

- Histological sections: Hematoxylin-Eosin,
- Smears: Stain with Giemsa , Gomori methenamine silver , or periodic acid-Schiff stain (Fungi)
- Stain by: Gram, ZN (Actinomycetes)

Grains (Observe the size of the filaments , the color of the grain)

e.g.

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

Diagnosis

3.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

Serology:

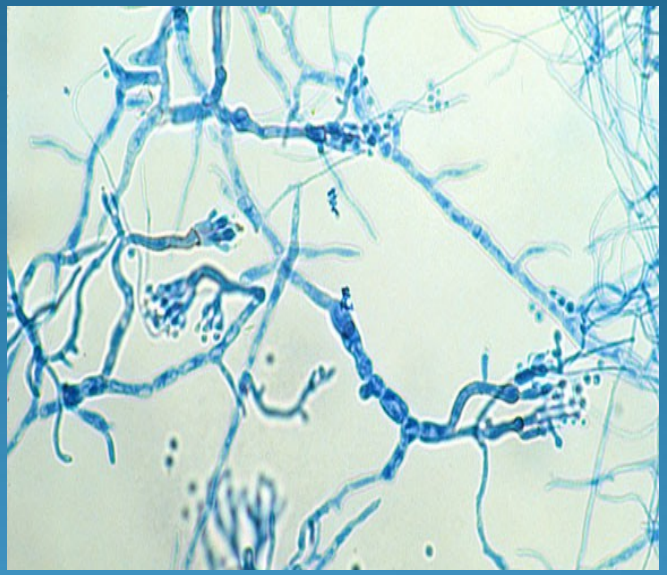
Detect the antibodies using culture filtrate or cytoplasmic antigens of mycetoma agents
Antibodies can be determined by immunodiffusion, , enzyme-linked immunosorbent assay

Helpful in some cases for diagnosis and follow-up

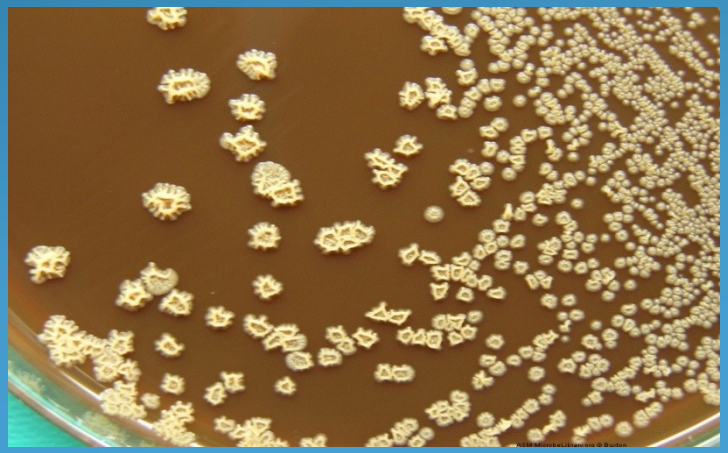
- Radiologic tests (bone radiographs) if bone involvement is suspected (Multiple lytic lesions or cavities, Osteoporosis)

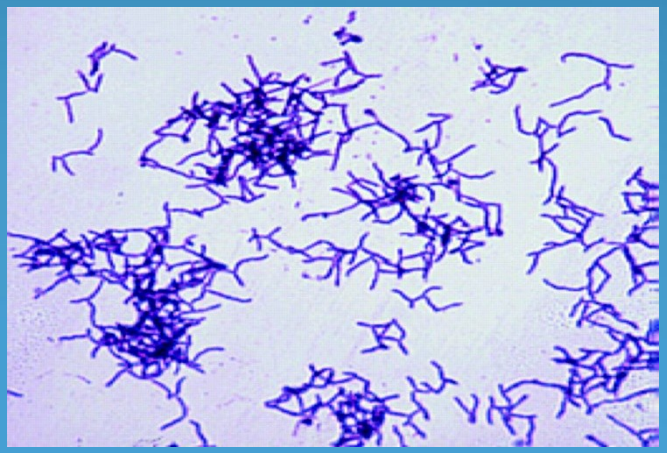
Culture

Microscopic examination



Madurella mycetomatis
LPCB preparation





Actinomycetes
Gram stain

Treatment

Eumycetoma

Ketoconazole
Itraconazole

Also Voriconazole and Amphotericin B

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

Surgical Care

In eumycetoma, surgical treatment (debridement or amputation) in patient not responding to medical treatment alone and if bone is involved.

Subcutaneous zygomycosis

- 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

Etiology:

Mould fungi of the zygomycetes (Entomophthorales)

Conidiobolus coronatus, Basidiobolus ranarun, and few mucorales.

Subcutaneous zygomycosis

Laboratory Diagnosis:

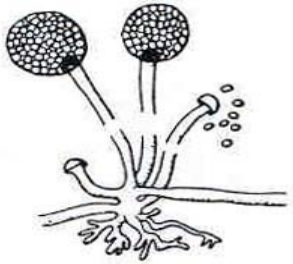
Specimen: Biopsy tissue

Direct microscopy:
stained sections or smears: broad non-septate hyphae
Culture on SDA

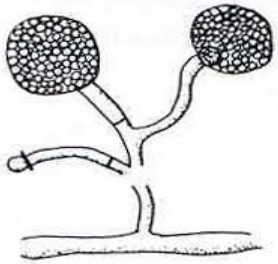
Treatment:

Oral Potassium iodide (KI)
Posaconazole
KI + Ampho B

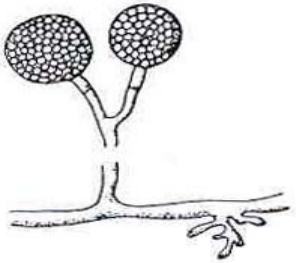
Rhizopus



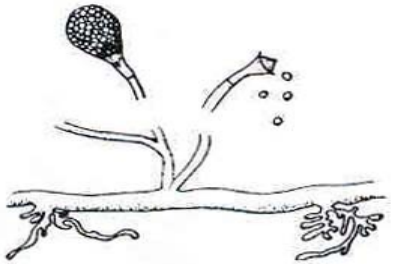
Mucor



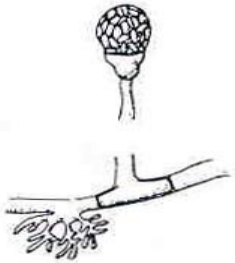
Rhizomucor



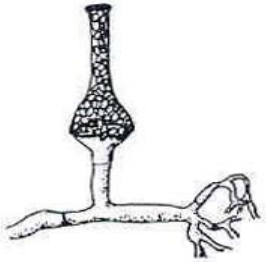
Abisidia



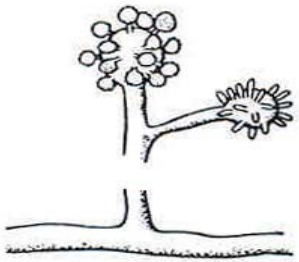
Apophysomyces



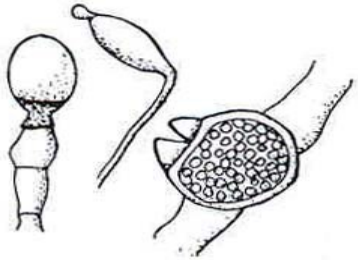
Saksenaea



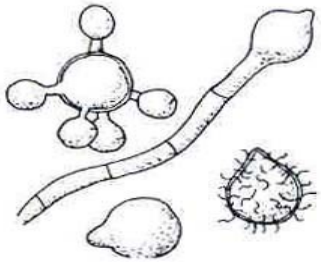
Cunninghamella



Basidiobolus



Conidiobolus



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.

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)

Chromoblastomycosis

- 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

Etiology:

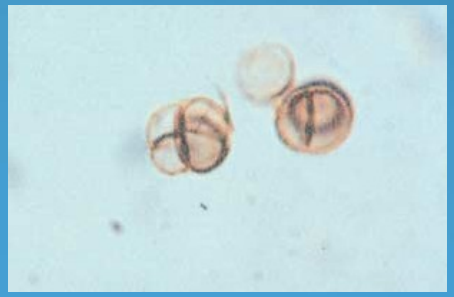
Dematiaceous mold fungi,

Laboratory Diagnosis

Specimen : Biopsy tissue

Direct Microscopy: KOH & smears: presence of Muriform cells (sclerotic bodies) brown cells with septa,

Culture: On SDA



Treatment

The treatment of choice is Surgical excision of the lesion

Antifungal (Itraconazole, Posaconazole)

Sporotrichosis

Subcutaneous , deep cutaneous or systemic fungal infection

Inoculaion into the skin
Can present as
- plaque (subcutaneous nodules)
- Lymphanginitic
- Dissiminated

Etiology: *Sporothrix schenckii.*
Dimorphic fungus

➢ **Laboratory Diagnosis:**

Specimen: Biopsy tissue, ulcerative material
Direct Microscopy: smear will show Finger-like yeast cells
Cigar shaped
Culture: On SDA at room temperature and at 37°C

Treatment
Itraconazole, KI

Rhinosporidiosis

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 (exposure to water)

Etiology:

Rhinosporidium seeberi

Obligatory parasitic fungus, can not be cultured in artificial media

Rhinosporidiosis

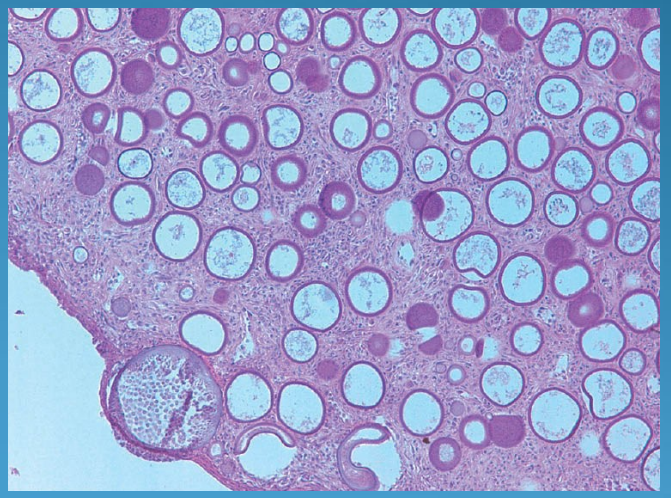
- **Diagnosis:**

  Specimen: Biopsy tissue

  Direct microscopy:

  Stained sections, smears or KOH, will show spherules with endospores

  No culture



- Treatment:

  Surgery, Cryosurgical excision of lesion.

  Recurrences are common (lesions can be cauterized after excision).

Lobomycosis

- Chronic cutaneous – subcutaneous mycosis Characterized by numours nodular lesions, keloids
- Fungi introduced into the skin by penetrating injury

Etiology:

Lacazia loboi

Laboratory Diagnosis:

Biopsy tissue

Diagnosis depend on direct Microscopy, does not grow in culture

Traetment:

cryosurgery or surgical excision of lesion

Bone and joint infections

- They are uncommon
- Result from hematogenous dissemination
- Presence of foreign body
- Direct inoculation of organism (trauma, surgery , etc)

Etiology:

Candida species

Blastomyces dermatiditis
Coccidioides immitis
Histoplasma capsulatum
Paracoccidiodes brasiliensis

Thank you