



Subcutaneous Mycoses

Advanced medical mycology
Prof.Dr. Inaam Alrubayae

SUBCUTANEOUS MYCOSES

Introduction:

Chronic, granulomatous infections of the subcutaneous tissues, usually on an extremity (hands, feet); can extend through the lymphatics or form sinus tracts. Caused by a variety of fungi and bacteria-like fungi that live in the soil.

Subcutaneous Mycoses

- § They must be introduced into the body beneath the cutaneous layer.
- § Examples of these diseases include chromoblastomycosis, maduromycosis, and sporotrichosis.

Subcutaneous Mycoses

- § Most infections involve barefooted agricultural workers.
- § Once in the subcutaneous tissue, the disease develops slowly—often over a period of years. During this time the fungi produce a nodule that eventually ulcerates and the organisms spread along lymphatic channels producing more subcutaneous nodules. At times such nodules drain to the skin surface.

Subcutaneous Mycoses

- § The administration of oral 5-fluorocytosine, iodides, amphotericin B, and surgical excision are the usual treatments.
- § Diagnosis is accomplished by culture of the infected tissue.

SUBCUTANEOUS MYCOSES

Types

- Mycetoma
- Phaeohyphomycosis
- Chromoblastomycosis
- Sporotrichosis
- Lobomycosis
- Rhinosporidiosis

MYCETOMA

(=Maduromycosis=Madura foot)

- Chronic, slowly progressive granulomatous infection of skin & subcutaneous tissues with the involvement of underlying fasciae & bones commonly affecting the extremities.
- Reported by Gill from Madurai, S.India.
- Maduramycosis or Madura foot.
- Tropical & subtropical countries of Asia , Africa, Central & S.America.

MYCETOMA

(=Maduromycosis=Madura foot)

- Fungi associated with fungal mycetoma are opportunistic.
- mycotic mycetoma - usually more common in men (3:1 to 5:1) than in women
- usually results from trauma or puncture wounds to feet, legs, arms and hands (usually on the feet)

MYCETOMA

(=Maduromycosis=Madura foot)

- Posttraumatic chronic inf. of subcutaneous tissue
- Common in tropical climates
- **Causative agents**
 - Saprophytic fungi (Eumycetoma)
 - Actinomyces* (Actinomycetoma)

MYCETOMA

Causative agents

- *Madurella mycetomatis*
- *Pseudallescheria boydii*
- *Acremonium*
- *Exophiala jeanselmei*
- *Leptosphaeria*
- *Aspergillus*

Classification of Mycetoma

- Based on the **causative agent**
 - Fungi – Eumycetoma
 - Bacteria (actinomycetes) - Actinomycetoma
- Based on the **colour of grains**
 - Bacterial agents – white to yellow grains except *Actinomadura pelletieri* (red or pink)
 - Fungal agents – black as well as white grains.

Colour of grains in Mycetoma of various etiology

White to yellow	Brown to black	Red
Nocardia asteroides	Madurella mycetomi	Actinomadura madurai
Nocardia brasiliensis	Madurella grisea	
Actinomadura madurai	Phialophora jeanselmei	
Streptomyces somaliensis		
Pseudallescheria boydii		

MYCETOMA

Clinical findings

Site(s): Feet, lower extremities, hands

Findings: Abscess formation, draining
sinuses containing granules Deformities

Dissemination: Muscles and bones

Mycetoma



MYCETOMA

Diagnosis

- Clinical findings are nonspecific
- Identification of the infecting fungus is difficult
- Characteristics of the granule, colony morphology, and physiological tests are used for identification

Diagnosis

- **Laboratory diagnosis**
 - Proper h/o patient
 - Gross examination of lesion by a microbiologist

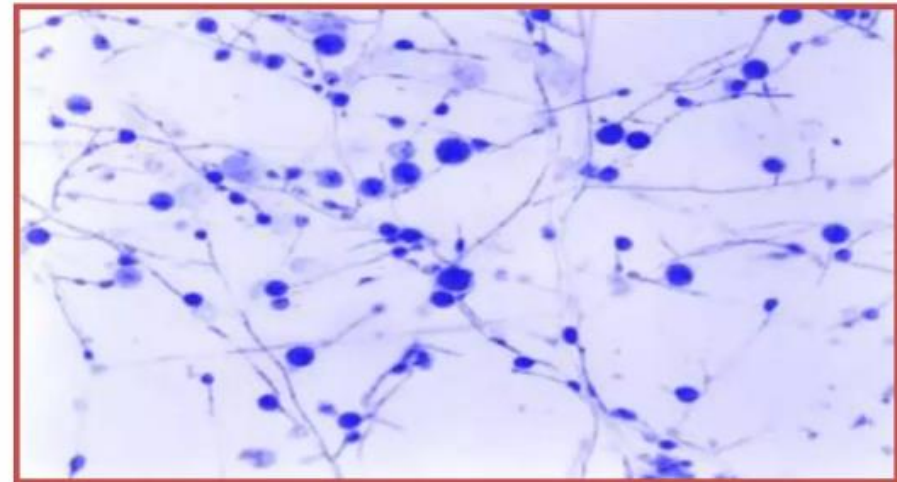
Specimen – grains or granules

- pus / exudates or biopsy

Lesions cleaned with antiseptics & the grains collected by pressing the sinus from the periphery.

Gross examination of grains – size, shape, texture, colour

Madurella mycetomatis causes the majority of the cases with the black grains. It is imperfect dematiaceous mold with brown colonies and diffused honey-colored pigment.



Direct Examination

- **KOH mount** – grains

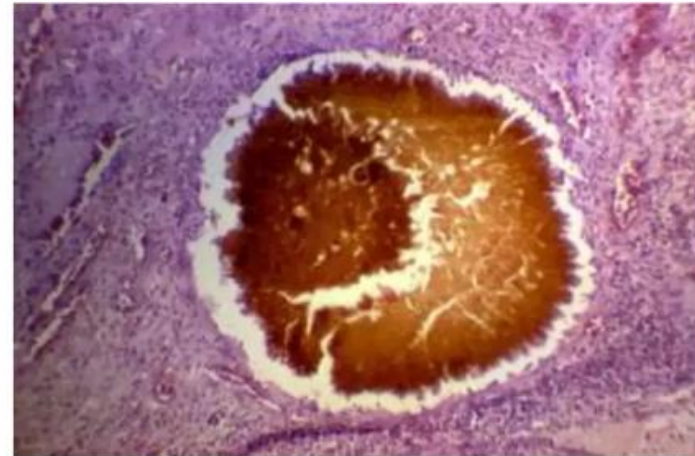
Eumycetoma : 2-6 μ , wide interwoven hyphae with large, swollen cells (chlamydospores) at the margin of the lesion.

Actinomycetoma : filaments with a diameter of 0.5 - 1 μ , coccoid to bacillary forms.

If hyphae seen on KOH mount, use special stains.

Direct Examination

- **Gram stain** – gram +ve branching filamentous bacteria embedded in the grain material.
- **Modified Acid fast staining** with 1% sulphuric acid – pink colored filamentous bacteria i.e. Nocardia Sps whereas other actinomycetes are non-acid fast.



Culture

- Different sets of media – both possibilities of fungi & bacteria .
 - When Actinomycetoma is suspected on direct examination - wash grains several times with NS & then inoculate on SDA without antibiotics.
 - When Eumycetoma is suspected – wash grains several times in NS with antibiotics(Pn) & inoculate it on SDA with antibiotics.
- incubated at 25° & 37°C

SPOROTRICHOSIS

- § **Sporotrichosis** is the subcutaneous mycosis caused by the dimorphic fungus *Sporothrix schenckii*.
- § The disease occurs throughout the world and is the most common subcutaneous mycotic disease in the US.
- § The fungus can be found in the soil, on living plants, such as shrubs and roses, or in plant debris, such as moss and pine.

SPOROTRICHOSIS

- § Infection occurs by a puncture wound from a thorn or splinter contaminated with the fungus.
- § The disease is an occupational hazard to florists, gardeners, and forestry workers.

SPOROTRICHOSIS

- § After an incubation period of 1 to 12 weeks, a small red papule arises and begins to ulcerate.
- § New lesions appear along lymph channels and can remain localized or spread throughout the body, producing **extracutaneous sporotrichosis**.

SPOROTRICHOSIS

Causative agent

§ *Sporothrix schenckii*

§ Natural habitat: soil

37°C: Round/cigar-shaped yeast cells

25°C: Septate hyphae, rosette-like clusters of conidia at the tips of the conidiophores



Sporotrichosis

A 60-year-old woman developed multiple subcutaneous nodules and abscesses on her right hand and forearm 7 days after finger thorn prick

SPOROTRICHOSIS

Pathogenesis & Clinical Findings

- § Skin: Follows minor trauma
Nodule → ulcer → necrosis
Skin/subcutaneous tissue → lymphatic channels → lymph nodes
- § Systemic dissemination: Bones, joints, meninges
- § Primary pulmonary: Chronic alcoholics

SPOROTRICHOSIS

Diagnosis

Samples: Aspiration fluid, pus, biopsy

I. Micr. Direct microscopic examination (KOH), histopathological examination (methenamine silver stain)

Yeast cells, asteroid body

II. Culture

III. Serology Yeast agglutination test

IV. Sporotrichin skin test

SPOROTRICHOSIS

Treatment

§ Spontaneous healing is possible.

Cutaneous inf.: Potassium iodide
(Topical/oral)

Disseminated inf.: Amphotericin B

CHROMOBLASTOMYCOSIS

- § One type of subcutaneous mycosis is **chromoblastomycosis**.
- § The nodules are pigmented a dark brown. This disease is caused by the black molds *Phialophora verrucosa* or *Fonsecaea pedrosoi*.
- § These fungi exist worldwide, especially in tropical and subtropical regions.

CHROMOBLASTOMYCOSIS

- § Posttraumatic chronic inf. of subcutaneous tissue
- § Papules → verrucous cauliflower-like lesions on lower extremities
- § Systemic invasion is very rare
- § Most infections involve the legs and feet.



Classical Chromoblastomycosis:
Fonsecaea pedrosoi

CHROMOBLASTOMYCOSIS

Causative agents

1. *Fonsecaea*
2. *Phialophora*
3. *Cladosporium*

§ Pigmented (dematiaceous) fungi in soil

§ Arrangement and shape of the spores vary from one genus to other

CHROMOBLASTOMYCOSIS

Diagnosis

§ Direct microscopic examination (KOH)

Sclerotic body

§ Culture

Sabouraud dextrose agar, 4-6 weeks,
37°C

CHROMOBLASTOMYCOSIS TREATMENT

§ Surgical excision

§ Antifungal therapy (susceptibility varies depending on the genus)

Amphotericin B

Flucytosine

Ketoconazole

§ Heat

RHINOSPORIDIOSIS

General & Clinical features

- § Chronic infection.
- § In divers
- § Polypoid masses at nasal mucosa, conjunctiva, genitalia and rectum
- § Seropurulent discharge from nasal lesions

RHINOSPORIDIOSIS

Causative agent

Rhinosporidium seeberi

- § Natural reservoir: fish, aquatic insects
- § Spherules filled with endospores (in tissue)
- § Has not been cultured in vitro on artificial media

RHINOSPORIDIOSIS

Treatment

§ Surgery

§ Ethylstilbamidine
(Local injection)

LOBOMYCOSIS

Pathogenesis & Clinical features

- § Chronic, subcutaneous, progressive inf.
- § Traumatic inoculation of the fungus
- § Natural infection in dolphins
- § Hard, painless nodules on extremities, face and ear
- § Verrucous / ulcerative lesions
- § Lesions mimic those of chromoblastomycosis, mycetoma and carcinoma

LOBOMYCOSIS

Causative agent

Loboa loboi

- Multiple budding yeast cells forming short chains

§ Asteroid body

§ Has not been cultured in vitro on artificial media

LOBOMYCOSIS

Treatment

§ Surgery

§ Clofazimine

§ Amphotericin B

§ Sulphonamides



Thank You