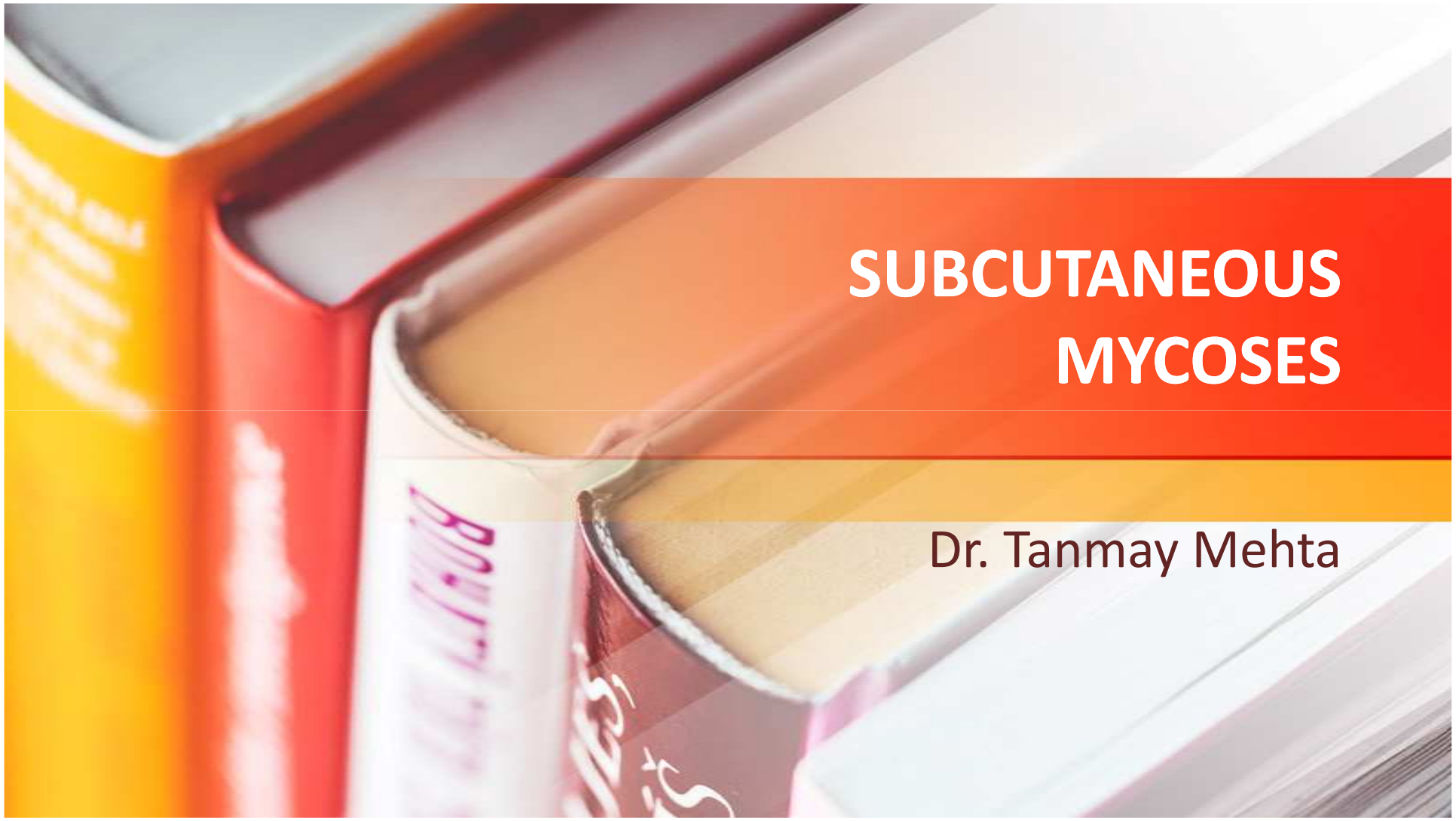


SUBCUTANEOUS MYCOSES

Dr. Tanmay Mehta

SUBCUTANEOUS MYCOSES

- The agents of subcutaneous mycoses usually inhabit the soil
- They enter the skin by traumatic inoculation with contaminated material
- Tend to produce granulomatous lesions in the subcutaneous tissue

MYCETOMA

- Chronic, slowly progressive granulomatous infection of the skin and subcutaneous tissues
- **Triad:** Swelling, discharging sinuses and presence of granules in the discharge
- Also known as **Maduramycosis** or **Madura foot**, as it was first described in Madurai, South India, by John Gill (1842)

Types of Mycetoma and Causative Agents

- **Eumycetoma** – caused by fungi
- **Actinomycetoma** – Caused by bacteria
- **Botryomycosis -** mycetoma like condition caused by some bacteria such as *Staphylococcus aureus.*

Organisms causing Mycetoma

Eumycetoma	Actinomycetoma
Black granules- *Madurella mycetomatis* *Madurella grisea* *Exophiala jeanselmei* *Curvularia* species **White granules-** *Pseudallescheria boydii* *Aspergillus nidulans* *Acremonium* species *Fusarium* species	**White to yellow granules-** *Nocardia* species- Most common agent *Streptomyces somaliensis* *Actinomadura madurae* **Pink to red granules-** *Actinomadura pelletieri*

Pathogenesis

- Accidental trauma (thorn prick or splinter injury)

→ Organisms enter the skin or subcutaneous tissue from contaminated soil

→ micro abscesses by polymorphs

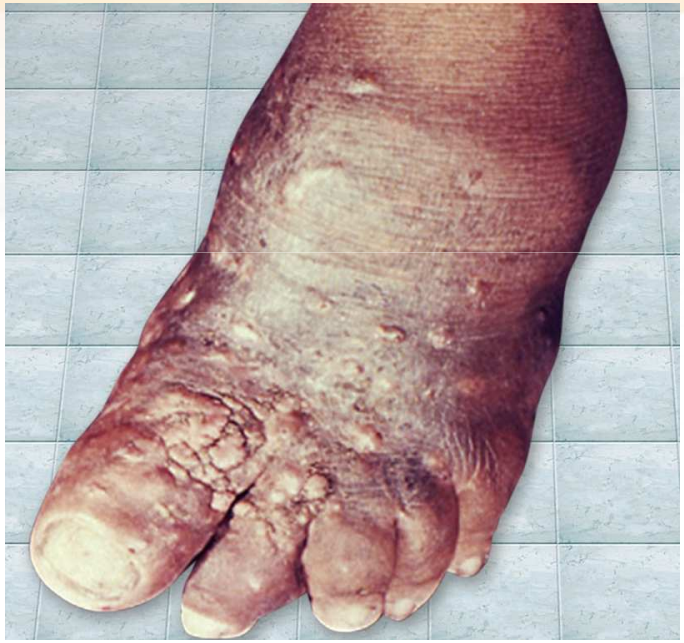
→ chronic granulomatous tissue in skin and subcutaneous tissues

Clinical Manifestations

- **Clinical triad**

1. Tumor like swelling (tumefaction)
2. Discharging sinuses
3. Discharge oozing from sinuses containing granules

- Commonest site – Feet
- Osteolytic or osteosclerotic bony lesions
- Usually painless



Eumycotoma v/s Actinomycotoma

Features	Eumycotoma	Actinomycotoma
Tumor	Single, well defined margins	Multiple tumour masses with ill defined margins
Sinuses	Appear late, few in number	Appear early, numerous with raised inflamed opening
Discharge	Serous	Purulent
Grains	Black/white	White/ red
Bone	Osteosclerotic lesions	Osteolytic lesions
Grains contain	fungal hyphae (>2um)	Filamentous bacteria (< 2um)

Epidemiology

- Endemic in Africa, India, the Central and South America
- Globally Actinomycetoma is more common (60%) than eumycetoma (40%)
- Eumycetoma is more common in Africa
- In India, Rajasthan reports the maximum cases of mycetoma per year followed by Tamil Nadu and West Bengal
- Actinomycetoma predominates in India (65%), except in Rajasthan where eumycetoma is more common

Laboratory Diagnosis

- **Specimen Collection**
- Grains collected on sterile gauze by pressing the sinuses from periphery or by using a loop
- **Direct Examination**
- Granules washed in sterile saline; crushed between the slides and examined
- **Macroscopic appearance of granules** - color, size, shape, texture

Laboratory Diagnosis

- **Suspected Eumycetoma :**

- KOH mount - hyphae of 2–6 µm width along with chlamydospores at margin

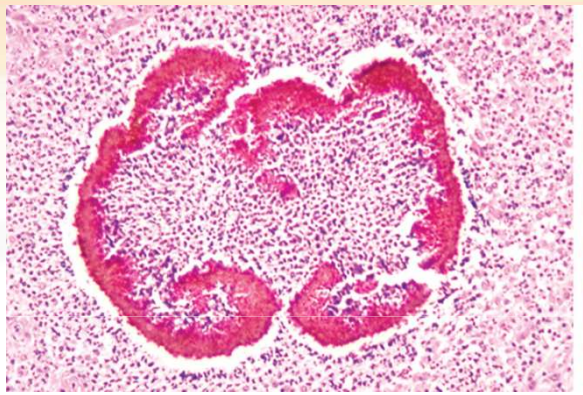
- **Suspected Actinomycetoma**:

- **Gram staining** - filamentous gram positive bacilli (0.5–1 µm wide)

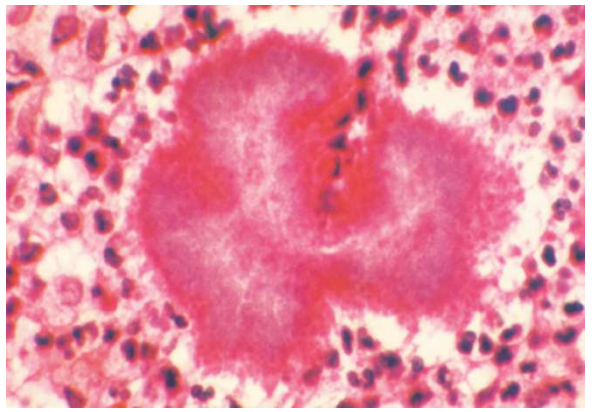
- **Modified acid fast stain** – *Nocardia* is weekly acid fast

Histopathological staining of the granules

- **Eumycetoma:** granulomatous reaction with palisade arrangement of hyphae in the cement substance (A)
- **Actinomycetoma:** granulomatous reaction with filamentous bacteria at the margin (B)



A



B

Culture

- **Granules** - best specimen for culture
- Both fungal (SDA) and bacteriological media (Lowenstein Jensen medium, Blood agar) inoculated
- **Eumycetoma agents** - growth rate, colony morphology, production of conidia and their sugar assimilation patterns
- **Agents of actinomycetoma** - growth rate, colony morphology, urease test, acid fastness and decomposition of media containing casein, tyrosine, xanthine, etc

Treatment

- Surgical removal of the lesion followed by:
- Antifungal agents for eumycetoma (itraconazole or amphotericin B for 8–24 months)
- Antibiotics for actinomycetoma such as Welsh regimen (amikacin plus cotrimoxazole)

SPOROTRICHOSIS

- Also known a Rose Gardner's disease
- Subcutaneous noduloulcerative lesions
- Caused by *Sporothrix schenckii,* thermally dimorphic fungus
- **Pathogenesis**
- Minor trauma by thorn prick or splinter injury → Spores of *S.schenckii* introduced into skin → Fungal Enzymes help in local invasion → spread along the lymphatics

Clinical Manifestations

- Chronic subcutaneous pyogranulomatous disease
- Incubation period - about 3 weeks
- **Lymphocutaneous type**: most common type (80%)

- Painless noduloulcerative lesions (sporotrichoid pattern) along the lymphatics

- Enlarged Lymph nodes, indurated and have cord like feeling on palpation

Other clinical types

- **Osteoarticular type**: seen among alcoholics
- **Pulmonary type**: following spore inhalation, seen in people with COPD
- **Disseminated sporotrichosis**: in immunocompromised patients (AIDS)
- **Fixed cutaneous type**: Single nodule is found, that is less progressive and does not spread by lymphatics

Sporotrichoid lymphocutaneous infection

- Syndrome characterized by the development of superficial cutaneous lesions that progress along dermal and subcutaneous lymphatics
- **Common causes**: *Sporothrix schenckii, Nocardia brasiliensis, Mycobacterium marinum or Leishmania brasiliensis*
- **Rare causes:** *Coccidioidomycosis, cryptococcosis, blastomycosis, histoplasmosis, anthrax, Burkholderia pseudomallei, lepromatous leprosy, lupus vulgaris, Francisella tularensis and cowpox virus*

Epidemiology

- Tropical countries with high humidity
- **World:** Central South America, South Africa and India
- **India:** Sub Himalayan hilly areas of northeast states ranging from Himachal Pradesh to Assam

- Other endemic foci - northern Karnataka and southern Maharashtra

- **Source:** Decaying vegetations (wood, bark, leaves), and soil
- **Risk factors** - people walking bare foot, certain occupations such as farmers and gardeners

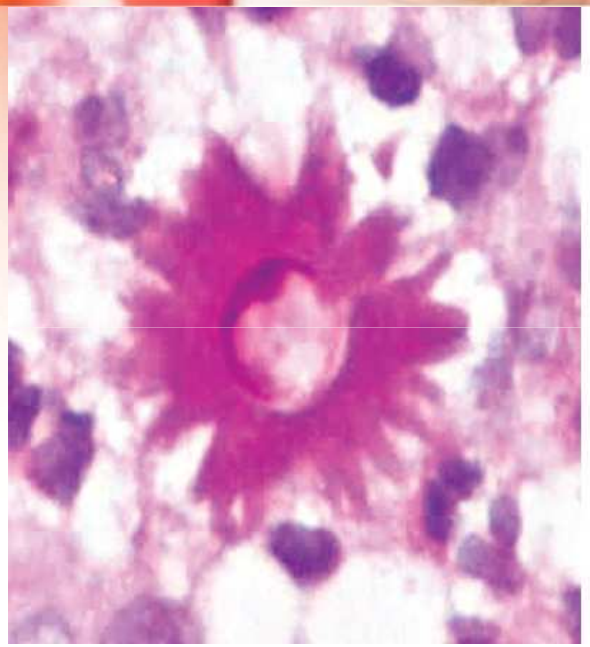
Laboratory Diagnosis

- **Specimens** - pus, aspirate from nodules, curettage or swabbing from ulcers
- **Direct microscopy:** KOH mount or calcofluor staining → elongated yeast cells of 3–5 µm in diameter
- **Histopathological staining** of tissue sections - cigar-shaped asteroid bodies
- **Asteroid body** - central basophilic yeast cell surrounded by radiating extensions of eosinophilic mass, composed of antigen-antibody complexes (**Splendore-Hoeppli phenomenon)**

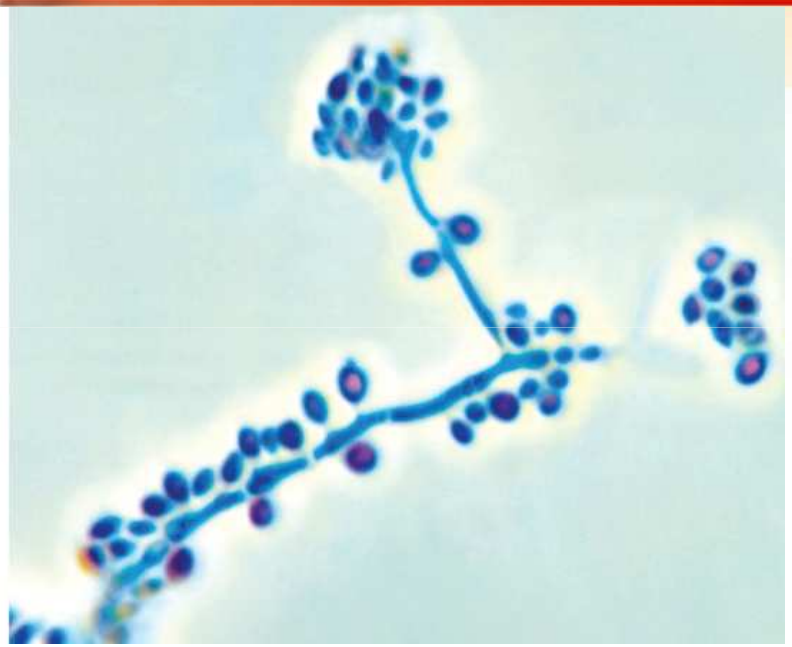
Laboratory Diagnosis

- **Culture: It is the most definitive tool for diagnosis.**
- Specimens are inoculated onto SDA and blood agar
- in duplicate and incubated at 25*°C and 37°C simultaneously,*
- because *S. schenckii is a dimorphic fungus*
- . **At 25°C: It produces mycelial form, consisting of**
- slender delicate hyphae with conidia arranged in
- **flower-like pattern (Fig. 52.11B)**
- . **At 37°C: It produces yeast form, characterized by**
- moist creamy white colonies which turn brown black
- in 10–14 days.

Sporothrix schenckii



Yeast form
(asteroid body)



Mold form showing thin septate hyphae with flower-like sporulation

Sporotrichosis

- **Serology:** Latex agglutination test detects serum antibodies in patients with extracutaneous form of the disease
- **Skin test:** delayed type of hypersensitivity reaction against sporotrichin antigen
- **Treatment Sporotrichosis**
- Itraconazole - drug of choice for all forms of sporotrichosis; except for disseminated form where amphotericin B is recommended
- Duration: 2–4 weeks after the lesions resolve

CHROMOBLASTOMYCOSIS

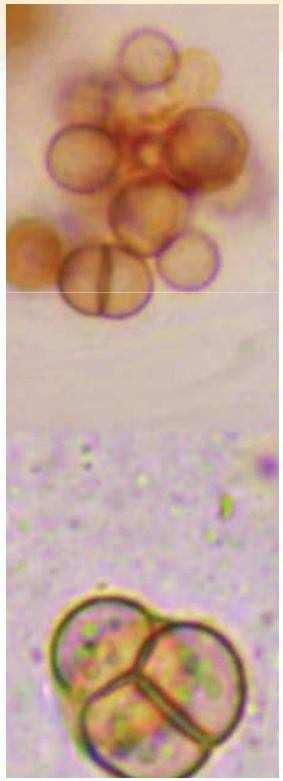
- Slow growing chronic subcutaneous lesions caused by group of dematiaceous or phaeoid fungi (i.e. darkly pigmented fungi) that produce a characteristic morphology called **sclerotic body**
- **Agents of chromoblastomycosis:**

- *Fonsecaea pedrosoi and F. compacta*
- *Phialophora verrucosa*
- *Cladosporium carrionii*
- *Rhinocladiella aquaspersa.*

CHROMOBLASTOMYCOSIS

- **Lesions** - slow growing and polymorphic - verrucose (most common type), crusted, ulcerative and nodular or tumor-like
- **Sclerotic bodies:** brown thick walled round cells (5–12 µm size) with multiple internal transverse septa

- also called **Medlar bodies** or **muriform cells or "copper** pennies."



CHROMOBLASTOMYCOSIS

- Tropical or subtropical climates, often in rural areas
- Treatment:

- Surgical removal (cryosurgery or laser therapy) of the lesion followed by antifungals (itraconazole)

PHAEOHYPHOMYCOSIS

- Chronic subcutaneous lesions, caused by dematiaceous or phaeoid fungi other than that are described in chromoblastomycosis (i.e. they do not produce sclerotic bodies)
- They exist in mycelial form
- **Caused by:**

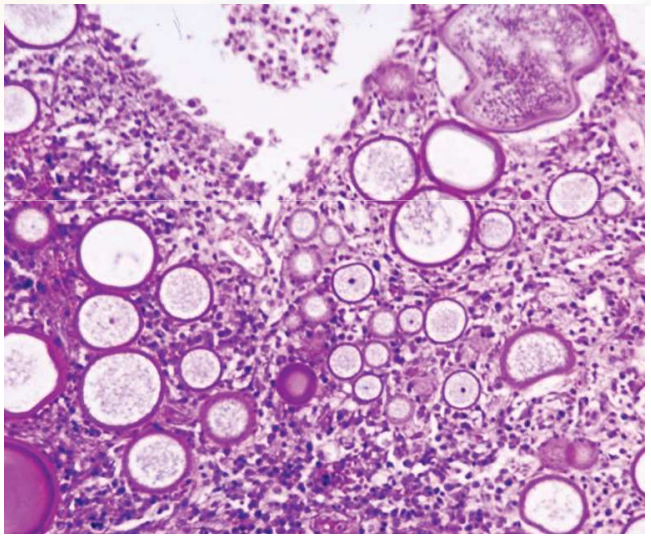
- *Alternaria species*
- *Bipolaris species*
- *Curvularia species*
- *Exophiala jeanselmei*
- *Cladophialophora bantiana (it is neurotropic, produces* brain abscess)

RHINOSPORIDIOSIS

- Chronic granulomatous disease, characterized by **large friable polyps in the nose** conjunctiva and occasionally in ears, larynx, bronchus and genitalia
- **Agent:** *Rhinosporidium seeberi,* an aquatic protistan parasite
- **Source**: Stagnant water
- **Distribution**: tropical countries, especially in Sri Lanka and India (Tamil Nadu, Kerala, Odisha and Andhra Pradesh)

RHINOSPORIDIOSIS

- **Diagnosis** - histopathology of the polyps → **spherules (large sporangia up to 350 µm** size, that contain numerous endospores, each 6–9 µm in size)
- Stained better with mucicarmine stain
- *R.seeberi* has not been cultivated yet



RHINOSPORIDIOSIS

- **Treatment:**
- Radical surgery with cauterization is the mainstay of treatment
- Dapsone
- Recurrence is common