Lecture 9: Superficial, Cutaneous, and Subcutaneous Mycoses

Superficial Mycoses

◆ Include the following disease classifications:
  ✰ Superficial
  ✰ Dermatophytoses
  ✰ Cutaneous infections caused by non-dermatophytic fungi
  ✰ Cutaneous candidiasis

◆ Superficial Infections
  ✰ Defined as fungal infections of the skin and hair that invade only the most superficial layers and cause little or no inflammatory response
  ✰ Four general types
    ● Malasseziosis - *Malassezia* species
      ✦ Also known as pityriasis (tinea) versicolor
      ✦ Hypo- to hyperpigmented patches with scales
      ✦ Can also cause folliculitis
      ✦ These fungi also cause seborrheic dermatitis and dandruff
      ✦ Diagnosis - “sphaghetti and meatballs” appearance of oval to round budding yeasts as well as short, septate and sometimes branching hyphae
      ✦ Treatment - selenium sulfide or ketoconazole shampoos, systemic or topically applied azoles (ketoconazole or itraconazole), terfinafine
    ● Tinea nigra - *Exophiala weneckii*
      ✦ Asymptomatic, non-scaly brown to gray patches on palms or soles of feet
      ✦ Confirmed by KOH prep of skin sample showing pigmented hyphae
    ● Black piedra - *Piedraia hortae*
      ✦ Superficial infection of hair shafts
      ✦ Causes shafts to break
    ● White piedra - *Trichosporon species*
      ✦ Superficial infection of hair shafts
      ✦ Diagnosis - observation of hyphae and arthroconidia
◆ Dermatophytoses
  * Infections commonly referred to as “tineas”
  * Caused by three different species
    - *Trichophyton*
    - *Microsporum*
    - *Epidermophyton*
  * Epidemiology
    - Arthropophilic - acquired from other humans
    - Geophilic - acquired from soil
    - Zoophilic - acquired from animals
  * Diagnosis
    - Microscopic observation of fungal elements in skin samples/scrapings prepared in KOH
    - Culture of fungus
      - Microscopic identification
      - Growth on diagnostic media
  * Pathogenesis
    - Virulence related to secreted keratinases
    - Cell-wall mannans are immunoinhibitory
    - Human genetics may play a role in making some families more susceptible to some fungi
  * Types of tineas
    - Corporis - body
    - Cruris - inguinal, pubic, and perianal areas; also known as “jock itch”
    - Pedis/manuum - feet or toes webs; also known as “athlete’s foot”
    - Unguium - fingernails or toenails
    - Capitits - hair follicles; also known as “ringworm of the scalp”
  * Treatment of tinea types
    - Corporis - topical allylamines and azoles
    - Cruris - most topical agents, but griseofulvin for severe, unresponsive cases
    - Unguium - systemically applied doses of fluconazole, itraconazole, or terbinafine
    - Capitits - systemically applied doses of griseofulvin, fluconazole, itraconazole, or terbinafine
Non-dermatophytic infections

- Defined as non-dermatophytes (i.e., not *Epidermophyton*, *Trichophyton*, or *Microsporum* species) that invade keratinized tissue and produce infections that clinically resemble dermatophytosis
- Main etiological agents: species of *Scytalidium* and *Scopulariopsis*
- Treatment: topical and systemic drugs generally not effective

Superficial candidiasis

- Defined as an infection of the cutaneous or mucosal epithelium by *Candida* species
- Types of infections:
  - Cutaneous - onychomycosis, intertrigo, and interdigitalis blastomycetica
  - Superficial - oropharyngeal, vaginal, balantis, chronic mucocutaneous
- Treatment: in most cases, good response to topical or systemic antifungals

Eumycetoma

- Mycetoma is a chronic, subcutaneous infection that can spread to bone and lymph tissue
- Three characteristics of mycetomas
  - Tumor - progressive, relatively painless swelling of tissue
  - Draining sinuses
  - Grains (colonies) formed and released
- Etiologic agents
  - Aerobic actinomycetes (bacteria)
  - Various fungal agents (eumycetoma)
    - Black grain mycetoma
      - *Madurella mycetomatis*
      - *Madurella grisea*
      - *Scedosporium apiospermum*
      - *Leptosphaeria senegalensis*
    - White grain mycetoma
- Pathogenesis - disease develops typically as a result of a minor trauma that implants the etiological agent; subsequently, the host response limits hyphal growth and instead promotes grain production
- Treatment
  - Surgery
  - Extended antifungal use
Chromoblastomycosis

- Defined as a chronic fungal infection of the skin and subcutaneous tissue
  - Fungal agents are darkly pigmented
  - Histopathologically produce sclerotic cells in vivo
  - Lesions are nodular and verrucous
- World wide distribution, but tends to subtropical to tropical
- Infections tend to be of the lower extremities
- Means of infection almost exclusively a result of traumatic implantation
- Causative agents (selected):
  - *Fonsecea pedrosoi* and *F. compacta*
  - *Phialophora verrucosa*
  - *Cladophialophora species*
- Disease often confused with phaeohyphomycosis due to some similar/common pathogens - remember: the disease is primarily defined on in vivo pathology
  - Phaeohyphomycosis - yeast and hyphae
  - Chromoblastomycosis - sclerotic cells
- Treatment is difficult
  - Surgical intervention
    - Best for small lesions
    - Often combined with antifungals in severe cases
  - Antifungals alone have been minimally successful