Coccidioidomycosis

Disease Description:

- Also known as San Joaquin Valley Fever/ Valley Fever
- Caused by the dimorphic fungus *Coccidioides immitis*
- Endemic only in Western Hemisphere
- Once in lungs, arthroconidia transform into spherical cells called “spherules”
- Acute respiratory infection occurs 7 – 21 days after exposure
- May result in a chronic pulmonary condition, or disseminate to meninges, bones, joints and cutaneous/ subcutaneous tissue

Description of the Causative Organism:

- *Coccidioides immitis* - dimorphic fungus that grows filamentously in soil and produces arthroconidia, which transform in vivo into spherules
- Spherules 30-60 µm in diameter with a thick wall (up to 2 µm)
- Endospores 2-5 µm in diameter characteristic of *Coccidioides immitis*

Ecology/Epidemiology and Pathogenesis:

- Found in alkaline soil, aerosolized by dusty conditions (e.g., wind storms)
- Chronic skin disease leading to verrucose ulcers or subcutaneous abscesses

Histopathology/Diagnosis:

- Direct microscopy, culture (grown on Sabouraud’s dextrose and Brain heart), skin scrapings, serological testing, urine tests, etc.
- Granulomatous inflammation, serological testing shows elevated levels of IgM
- Key positive diagnosis: tissues show thick-walled spherules with endospores

Clinical Manifestations:

- Results in acute respiratory infection 7-21 days after exposure
- Can also result in chronic pulmonary condition or disseminate to meningitis, bones, joints and cutaneous and subcutaneous tissues
- Can virtually affect any organ
Treatment:
- Amphotericin B used as initial therapy
- Oral Azoles: Ketoconazole, Fluconazole, Itraconazole
- Surgical management may be used for pulmonary and extra pulmonary lesions.

**Sporotrichosis**

**Disease Description:**
- Once the mold spores move into the skin, the disease takes days to months to develop.
- The fungus can be found in sphagnum moss, hay, other plant materials, and soil.
- The fungus enters the skin through small cuts or punctures from thorns, barbs, pine needles, or wires. It does not spread from person to person.

**Description of the Causative Organism:**
- *Sporothrix schenckii* - thermally dimorphic fungus found in peat moss, woods and decomposing plants
- Septate, hyaline hyphae at 25°C, at 37°C it produces oval to cigar shaped yeasts
- Young colonies are white and old colonies turn black due to production of dark conidia

**Ecology/Epidemiology and Pathogenesis:**
- Worldwide, however, more commonly found in tropical and subtropical America
- Acquired through direct inoculation in skin and rarely via inhalation of conidia
- With advent of HIV epidemic, frequency of presentation has increased

**Histopathology/Diagnosis:**
- In the skin, pattern of inflammation is similar to that seen in blastomycosis and coccidioidomycosis
- Fungus is yeast-like, subglucose to ovoid in shape, with the yeast not encapsulated
- Demonstration of organism in tissue may be difficult because the fungi are not numerous
- Often times, Splendore-Hoeppli material is noted
Clinical Manifestations:
- Cutaneous, osteoarticular, pulmonary, meningitis, and disseminated are all varieties of the disease
- Lymphocutaneous is the hallmark of the disease

Treatment:
- Usually requires prolonged therapy
- Oral azoles such as itraconazole
- SSKI effective treatment, Amphotericin B reserved for extreme cases

Paracoccidioidomycosis

Disease Description:
- Endemic disease produced by *Paracoccidioides brasiliensis*
- Endemic to Latin America
- Four clinical presentations: 1) regressive sub-clinical infection; 2) progressive disease can be chronic (adult type); 3) acute/sub-acute (juvenile type); 4) residual form

Description of the Causative Organism:
- Grows in mold form at 25°C and in yeast form at 37°C
- At 25°C, it produces hyaline, septate hyphae, aleuriconidia; hyphae do not sporulate
- At 37°C, multiple buds form around mother yeast cell, attach by a narrow neck, producing short yeast chains

Ecology/Epidemiology and Pathogenesis:
- Natural habitats are soil and wood
- Found in areas of gradual deforestation
- Found in animals especially bats, armadillos, monkeys, and horses
- Mainly found in males

Histopathology/Diagnosis:
- Areas of granulomatous inflammation with a focal area of central caseation mixed with pus-making abscesses; oval to round yeast with a thick refractive wall
- Many giant cells within granulomata which contain organisms
- Budding yeast cell 12-14 µm in diameter and resemble a “captains wheel”
中央单细胞被许多芽生孢子菌包围，这些菌通过狭窄的颈相连。

直接检查痰液、活检材料或从引流的淋巴结中收集的结痂/脓液含有酵母型。

10% KOH 显示真菌为多个芽生，与球形的年轻细胞和成熟细胞靠近中心。

真菌-酵母型在体外的转换是必要的，以确认培养物是 Paracoccidioides brasiliensis。

临床表现

- 口腔、咽部、喉部粘膜上的病变
- 皮肤病变于面部和躯干，呈结节和溃疡状
- 淋巴结发育异常（肿大），主要在颈部淋巴结和年幼儿童
- 副作用包括：肺纤维化，肾上腺破坏，声带损伤和阻塞淋巴管

治疗：

- 吡啶并酰胺（磺胺甲氧嘧啶，磺胺甲氧嘧啶）：给这些药物3-5年以避免复发，这发生在20-25%的患者。
- 阿莫匹林 B：保留此药物用于对其他治疗有抵抗力的严重病例，并与磺胺类或唑类药物联用。
- 唑类药物（伊曲康唑，酮康唑）：这些药物更有效（85-90%治愈率）比其他抗真菌药物和与其他抗真菌药物相比较少复发（<10%）。这些药物治疗期较短，副作用少，口服可用。 (伊曲康唑是首选)

Penicilliosis

疾病描述:

- 1959年首次描述为竹鼠的自发感染
- 1959年首次记录的人类感染
- 现已发现的疫区包括东南亚和中国南部，与该地区HIV/AIDS的流行相吻合
- 在Penicillium中，P. marneffei是唯一重要的致病菌

描述致病菌：

- 双相的
Mold form: produced at 25°C, microscopically exhibits hyaline, septate, branched hyphae with oval, smooth conidia

Yeast form: produced at 37°C, microscopically exhibits unicellular, pleomorphic cells with one or two possible septae

Ecology/Epidemiology and Pathogenesis:
- Natural reservoir found in the soil, first isolated in Chinese bamboo rats (a mountainous species with extensive burrowing habits)
- Isolation suggests means of infection by inhalation and suggests a relationship with occupational and environmental risk factors

Histopathology/Diagnosis:
- Presence of extracellular yeasts (long and irregular) is a common trait
- Unlike infections due to *H. capsulatum var. capsulatum*, *P. marneffei* infections are denoted by yeasts that reproduce via binary fission
- Diagnosis by Wright’s stain of a skin biopsy or smear

Clinical Manifestations:
- Most frequently occurring in immunocompromised HIV/AIDS patients, but can develop in normal hosts
- Typical symptoms of disseminated infections include fever, skin lesions, cough and diarrhea
- Wide variety of symptoms in acute infections, trends not easily observed

Treatment:
- Combination therapy of amphotericin B intravenously and itraconazole orally
- Common relapses in immunocompromised patients, suppressive therapy most likely needed
- Usually fatal if no therapy is applied