**Cryptococcus and Cryptococcosis**

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**Cryptococcosis**

- Two etiological agents:
  - Cryptococcus neoformans
  - Cryptococcus gatti
- Phylum Basidimycota
  - Originally believed to belong to Phylum Ascomycota and Genus Saccharmyces
  - Transferred to Genus Cryptococcus based on its inability to ferment carbon and lack of ascospore formation

**Cryptococcus Gattii**

- Geographic distribution:
  - Found mainly in tropical regions; exception: Vancouver
  - Such as the Pacific Northwest & in eucalyptus trees
- Life Cycle:
  - Encapsulated yeasts; grow & develop in 24-48 hours
  - Grow at 37 degrees celsius;
  - Undergoes sexual reproduction to form basidiospores.

**Cryptococcus Neoformans**

- Geographic distribution:
  - Most common form
  - Found worldwide
  - In bird droppings; mainly pigeons
  - Nonmotile
- Life Cycle:
  - Like the Gattii form they also undergo sexual reproduction to create basidiospores.
  - Yeast cell varies from 2.5 to 10 nanometers

**Cryptococcosis**

- May be Cryptococcal Pneumonia, Cryptococcal Menengitis, or a Cryptococcoma if cancerous
  - Dependent upon the location of lesion, type of lesion, or method by which the disease is obtained
  - Immunocompromised patients are more likely to have these diseases; however, immunocompetent patients can be infected in rare cases.

**Cryptococcus Gattii**

- Epidemiology:
  - Spores can cause infections in persons with normal immune systems
  - Not known to be spread person to person
- Pathogenesis:
  - Both severe neurological and pulmonary infections occur
  - Incubation period may be 2 to 11 months
Cryptococcus Neoformans

**Epidemiology:**
- Highly infectious; causes considerable morbidity and mortality in humans
- Remains dormant in lungs until immune system weakens
- Transmitted via organ transplant when infected donors used.

**Pathogenesis:**
- Can lead to chronic meningitis
- Can get infection by inhalation of airborne fungi spread
- Has an antiphagocyte and immunosuppressive effect

Cryptococcosis

**Diagnosis**
- direct microscopic examination of clinical specimens in India ink and Nigrosin stain
- thick, wide, circular, refractile, gelatinous capsule which appear hollow

Cryptococcosis

**Clinical Manifestations**
- Cerebromeningial cryptococcosis
  - headache, neck stiffness, fever, and altered consciousness
- Pulmonary cryptococcosis
  - bronchopulmonary disease
  - cough, chest pain, pneumonia, night sweats, and weight loss
- Visceral cryptococcosis
  - affects the liver and spleen
- Osseous cryptococcosis
  - osseous lesions
- Cutaneous cryptococcosis
  - cutaneous lesions

Cryptococcosis

**Treatment**
- Depends on the involvement of organ and host immune status
- Drug therapy is found to be the most effective chemotherapeutic curing agent
- Ketoconazole is found effective for known for non-meningeal cryptococcosis
- Cryptococcal meningitis has been managed with intracranialzole
- Prostate may serve as a protective site for C. neoformans therefore urine samples obtained after prostatic massage may direct the physicians to prolong drug therapy

Cryptococcosis

**Prevention and Control**
- Cryptococcosis is difficult to eradicate because of lack of data on the prevalence of infection in specific areas, sporadic nature of the disease, and occurrence in immunosuppression status
- At greater risk in which workers are exposed to large amounts of dust containing soil contaminated with avian excreta
- Immunocompromised persons should avoid visiting avian habitats and dusty environments
Case Report 1

- 42-year-old male
- Presents with headache and fever for three weeks
- HIV positive
- Cerebrospinal fluid positive for cryptococcal antigen
- CSF contained encapsulated yeast-like forms which were positive for Cryptococcus neoformans
- 2.6 x 2.0 cm lesion on lower lobe of right lung

Case Report 1 (cont.)

- Patient died the day after admission into hospital
- Autopsy performed on brain and lungs
- Lungs revealed congestion, edema, and cavitary lesion on the right lung
- Evidence of cryptococcal meningitis
- Case was significant because it demonstrates that a patient can present with both cryptococcal pneumonia and cryptococcal meningitis
- This case also demonstrates that these diseases are fatal if not treated in time.

Case Report 2

- 32-year-old male
- Presents with fever, dyspnea, chest pain and cough for 3 months
- Symptoms accompanied by neck rigidity
- History of anorexia and significant weight loss
- Hematological investigation, renal function test, urine examination, and liver function tests were all within normal limits
- Immunocompetent patient

Case Report 2 (cont.)

- Chest x-ray revealed a mass lesion in upper right lobe
- Lobe had a solid hypoechoic area with minimal air specks and evidence of thickening of adjacent pleura
- Mass lesion appeared to be a malignant cryptococcoma
- Ultrasound Fine Needle Aspiration (FNA) of lung mass performed
- Aspirates revealed sheets of reactive bronchial cells and aggregates of cryptococcal organisms
- Case is significant because it demonstrates that cryptococcal disease in HIV negative hosts are possible

References

