Aspergillosis

Fungus Ball

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• **Aspergillosis**
  – is a disease of subcutaneous and deep mycoses caused by aspergillus fungus which usually affects the lungs.
  – is a ball or aspergilloma arranged as a tangled mass of fungus fibers, blood clots, and white blood cells.

Figure 1

Case Study

• 45-year-old man diagnosed with hyperglycemia.
• April 7, 2001 patient visited hospital for persistent cold.
• 2 days later hospital visitation indicated severe infection.
• Culture/ Laboratory Work
  – Chest X-ray
    • showed a reticular shadow
  – CT
    • revealed thickening of the walls of the large bronchus and diffuse bronchiolitis.
  – Sputum culture
    • Positive for aspergillus
  – Tuberculin skin test was positive.

Case Study

• Treatment
  – First given cefotiam HCl but high fever and black sputum continued.
  – Non-responsive to antibiotic indicated presence of fungal infection.
  – Treated with itraconazole and Meropenem trihydrate.
  – In addition 1mg of amphotericin B was taken daily and increased to 50mg daily.
Case Study

- Day 10 respiration status deteriorated
  - Chest X-ray and CT showed multiple cavities.
- Day 25
  - Respiratory failure led to the patient's death
- Autopsy
  - Weight of right lung was 1710 g ~ 3.7699 pounds
  - Weight of left lung was 1650 g ~ 3.6376 pounds
  - Healthy lungs together weigh 2.5 pounds ~ 1133.9 g

Etiological Agents

- Various Species
  - A. fumigatus
    - Most commonly isolated
  - A. flaxus
  - A. niger
  - A. clavatus
  - A. glaucus
  - A. nidulans
  - A. oryzae
  - A. terreus
  - A. ustus
  - A. versicolor

- Aspergillosis is commonly found in:
  - Airborne dust
  - Compost heaps
  - Air vents
- Effects open spaces in the body.
  - Lungs
  - Ear canal
  - Sinus

Symptoms

- Symptoms of allergic aspergillosis may include:
  - Fever
  - Malaise
– Cough
– Coughing up blood or brownish mucous plugs
– Wheezing
– Weight loss
– Lung obstruction

Additional symptoms
• Chills
• Headaches
• Shortness of breath
• Chest pain
• Increased sputum production, which may be bloody
• Bone pain
• Blood in the urine
• Decreased urine output
• Meningitis
• Sinusitis
• Endocarditis
• Vision problems

Risk Factors
• Opportunistic infections
  – Bone marrow or stem cell transplant patients are greatly affected.
  – AIDS patients have increased risk
• Allergic states or cystic fibrosis
  – 7% of people have allergic response to aspergillus mold.
• Lung cavities
  – Mold spores grow in healed cavity
  – The larger the cavity the greater chance of developing an infection.
• Hospital stay
  – Patients with weakened immune system are susceptible.
• Low white blood count
  – Are more susceptible to invasive aspergillosis

Tests
• Chest x-ray
• CT scan
• Sputum stain and culture for Aspergillus
• Tissue biopsy
• Aspergillus antigen skin test
• Aspergillus precipitin antibody
• Complete blood count

Histopathology
• No special stain is needed because grains are quite visible.
• Usually stained with the haematoxylin and eosin.
• Stain is seen in the middle of polymorphonuclear leucocytes.
• Periodic acid schiff and silver reveal the details of colonies showing the
segments on hyphae.
• GMS stain (figure 5)

Characteristics
• Grains may be circular or oval in shape composed of compact hyphae with or without spores.

Treatments
• Fungus ball
  – May cause no symptoms
  – Can be found by X-ray
  – Usually requires no treatment unless coughing up blood, then surgery is needed.
• Invasive aspergillosis
  – Treated within weeks of
    • amphotericin B– an antifungal medication given by an IV.
    • Itraconazole or voriconazole can also be used
• Endocarditis
  – Can be treated by removing the infected heart valves
  – In addition long-term amphotericin B therapy is needed.
• Aspergillosis of the ear
  – Scraping out fungus and applying antifungal drugs.
• Allergic aspergillosis
  – Can not be treated with Antifungal agents
  – Treated with orally taking prednisone

Complications
• Amphotericin B can cause kidney impairment and bad side effects.
• Invasive lung disease can cause substantial bleeding from the lung.
• Infection of sinuses can destroy facial bones.
• Most damaging is the spreading of the infection.

Epidemiology and Ecology
• Noscomial infection
• Commonly found in the 1980’s
• Effects immunocompromised patients

References


