Blastomycosis
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Taxonomy
- Kingdom: Fungi
- Phylum: Ascomycota
- Genus: Blastomyces
- Common names include Chicago Disease, Gilchrist's Disease and North American Blastomycosis

History
- First described in 1894 by T. Caspar Gilchrist
- Categorized into two types in 1939 by Martin and Smith
  - Cutaneous
  - Systemic
- 1951 landmark study by Schwarz and Baum
  - Lesions most often originate from primary pulmonary infection
  - Spread through blood and lymph to skin

Etiology
- Caused by Blastomyces dermatitidis
- Thermal dimorphic fungus
  - Mycelium (mold form) found in environment (25°C)
  - Yeast form inside the lungs (37°C)
- Usually occurs in
  - Immunocompetent hosts
  - Immunocompromised patients

Epidemiology
- Endemic areas of disease:
  - Mississippi river valley
  - Ohio river valley
  - Missouri river valley
  - Africa
- Streams and rivers with rotting wood and moist soil
- Very rare 1-2 out of 100,000 contract it

Blastomyces Dermatitidis
www.doctorfungus.org/.../init_images/p28Mike.jpg
Epidemiology (cont.)
- Men are more susceptible than women
- Dogs are susceptible as well
- Acquired due to inhalation of conidia of \textit{B. dermatitidis}
- 30 to 45 days after inhalation acute pulmonary disease usually occurs
- 50% of primary infections show no symptoms

Pathogenicity
- Conidia required for pathogenicity of the organism
- Conidia germinates in vivo, producing yeast cells
- Unchecked proliferation of yeast can be fatal if untreated or undiagnosed.

Disease spectrum:
- Acute / Chronic pulmonary infection
- Skin diseases (lesions)
- Bone infection
- Joint infection
- Subcutaneous nodules

Pathogenicity
- Causative agent of Blastomycosis
- One of the true systemic mycoses
- Two clinical forms: cutaneous and systemic
- Generally acquired via inhalation and presents as a pulmonary infection. May later disseminate to other organs and systems.

Conidia of \textit{B. dermatitidis}
Yeast form in lungs

bot.it.botany.wisc.edu/fungi/jan2001.html
**Diagnosis**
- Traditionally, gold standard has been a combination of clinical signs and histopathological isolation of the organism.
- At 37°C: Budding yeast cells, 8-12 µm in diameter. Globule in appearance.

**Stains used:**
- H&E used for host reaction, fungus may be difficult to visualize.
- GMS and PAS are used to visualize.
- GMS/H&E combinations are used to detect both the fungal cells and the host reaction.
- May resemble Chrysosporium, Emmonsia, or Scedosporium in its mould phase. Dimorphism is diagnostic in comparison.

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**Management**
- **Amphotericin B** is fungicidal with MFC of .5 µg/ml. Principle method of treatment.
- **Itraconazole** inhibitory with MIC of .125 µg/ml and fungicidal at 4 µg/ml.
- **Voriconazole** inhibitory at .25 µg/ml and fungicidal with MFC of .125 µg/ml. Relatively new drug.
- **Mvista EIA** can be used to monitor progress.

**Prevention**
- As of 2004, there were no standardized methods of prevention.
- A vaccine created from a genetically altered form of B. dermatitidis is in development.
- High risk factors include clinical history of pneumonia, immunocompromise, and increased outdoor activity.
- Awareness of the disease goes a long way toward prevention.

**Infections Due to Blastomyces Dermatitidis**
Appears as a chronic granulomatous and suppurative disease.

Blastomycosis can be either primary or secondary:

- Primary is extremely uncommon
- Secondary is most common but is sometimes mistaken for primary
- Skin is most common site of dissemination from pulmonary infection.
- Other dissemination sites include
  - Bone
  - Genitourinary Tract
  - Central Nervous System

Case Report 1


- In June of 1994, a 26-year-old female teacher from rural South Carolina was referred to the medical center.
- 6-month history of eruption consisting of vegetative plaques
- Stains and cultures, done 3 months prior, for fungi and acid-fast bacilli had been reported as negative.
- Diagnosis of pyoderma gangrenosum made.
- Despite treatment via systemic prednisone the disease progressed.

Case Report 1 (cont.)

Evaluation of symptoms

- First lesion had appeared on palm after getting a splinter.
- Spontaneous discharge of gelatinous material could be seen from many of the plaques.
- Decreased breath sounds in right lung led to chest radiograph:
  - Showed a right hilar mass and diffuse parenchymal changes.

Case Report 1 (cont.)

GMS stain showed rare budding yeast forms.
Skin and sputum cultures grew blastomyces dermatitidis.

Case Report 1 (cont.)

Treatment

- Itraconazole at 200 mg daily
- Disease improved over next 12 month period.
- Skin lesions healed leaving residual scarring.
Case Report 2

- Ricciardi et al., Diseases of the Colon and Rectum. (2007) 50: 118-121
- 77-year-old male with a 20 year history of perianal fistulas and abscess.
- Lived most of life in north central Minnesota.
- Avid outdoorsmen who spent a good amount of time in the Mississippi river valley.

Case Report 2 (cont.)

- Patient had been diagnosed with a malignant colonic polyp in 1985.
- After surgery he developed anal lesions.
- Over next several years patient underwent procedures to control drainage and lesions but with out resolution.
- Biopsy of lesion in 1999 revealed no significant pathology.
- Chest film in August 2001 showed left upper lobe infiltrate.
- Chest problems were resolved by August of 2002
- Patient received a diversion of fecal stream shortly thereafter.
- This provided no resolution to patient's symptoms.

Case Report 2 (cont.)

- In April of 2003 the patient was referred to the Division of Colon and Rectal Surgery at the Veterans Administration Hospital.
- Examination revealed a large anal verge lesion.
- Patient received examination and biopsy under anesthesia:
  - April 2003 resulted in little significant pathology
  - November 2003 resulted in the discovery of numerous single budding yeasts.
- Biopsy results were consistent with blastomycosis dermititidis.
- Review of previous biopsies showed yeast in April 2003 specimen.

Case Report 2 (cont.)

- Treatment
  - Patient received 200 mg oral dose of itraconazole daily.
  - Treatment has resulted in complete resolution of draining fistulas and sinuses, with a minimal amount of induration.

References

### Questions

1. Blastomyces dermatitidis are common to all of these areas except?
   - A. Ohio river valley
   - B. Africa
   - C. Mississippi river valley
   - D. Asia

2. Which phylum does blastomycosis belong to?
   - A. Basidiomycota
   - B. Ascomycota
   - C. Zygomyctota
   - D. Oomycota

3. What is a common treatment for blastomycosis?
   - A. Prednisone
   - B. Penicillin
   - C. Itraconazole
   - D. Inflammazole

4. Which stain(s) are used to visualize the fungal cells of blastomycosis?
   - A. H&E
   - B. GMS
   - C. PAS
   - D. Both B & C

5. What is the most common site of dissemination?
   - A. Skin
   - B. Heart
   - C. PNS
   - D. Liver