Pythiosis

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Pythiosis

- More than 200 species of Pythium are known
- Caused by most common etiologic agent: Pythium Insidiosum

**Taxonomy:**

- **Kingdom:** Stramenopila
- **Phylum:** Oomycota
- **Class:** Oomycetes
- **Order:** Phythiales
- **Genus:** Pythium
- **Species:** *Pythium insidiosum*
Alternate Names

- swamp cancer
- Florida horse leeches
- summer sores
- burusattee (means rain in India)
- espundia
- granular dermatitis
Geographical Distribution

- First reported case in horses, zebras, and donkeys in Australia, India, Indonesia, and USA (more specifically Florida)
- Found in tropical and subtropical regions, but cases in Japan and USA prove that it can be found in cooler environments
- Mostly found in Australia, Pacific Islands, Asia, North, Central, and South America, and the Caribbean islands.
- In the United States it is generally found around the Gulf of Mexico, Alabama, Florida, Louisiana, Mississippi, and Texas. Some cases were reported in cooler places like Georgia, Illinois, Missouri, Oklahoma, South Carolina, Tennessee, New Jersey, New York, and Wisconsin
- In Central America there were reported cases in Guatemala, Nicaragua, Costa Rica, and Panama
- In South America cases were manifested in Argentina, Colombia, Venezuela, and Brazil
Life Cycle

- Similar to life cycle of Oomycetes
- Needs wet environments to carry out life cycle
- Produce motile, flagellated zoospores
- Oomycete hyphae develop sporangia
- Have ability to form resistant spores when conditions don’t favor zoospore formation
Epidemiology

- Known as the swamp cancer because it is generally found in unmoving water such as swamps
- It is possible to get the disease in areas with no water via oospores in soil and grass
- Generally occurs during the summer after heavy amounts of rain, thus it is mostly found in tropical or subtropical areas
- Commonly found in horses, zebras, donkeys, and dogs. Also reported to be found in humans, cats, zebras, birds, bears, cattle and camels
Pathogenesis

- *P. insidiosum* causes infection through open wounds in the skin or gastrointestinal tract.
- Penetrating hyphae express exoantigens to purposely causes an inflammatory response and the release of eosinophils and mast cells.
- This strategy allows *P. insidiosum* to conceal important antigens from the immune system.
- This also causes a Splendore-Hoeplli phenomenon. (The reaction is very intense in equine causing hard masses called “kunkers”)

Histopathology

- Yeast like cells in chains of five or more cells
- Sparsely septated hyphae
- Motile zoospores (asexual stage in damp conditions)
- Colonies are colorless to white.
- Hyphae with 90 degree lateral branches.
- Silver stain and Periodic Acid-Schiff (PAS) are suggested for the proper identification of hyphae.
Clinical Manifestations

- Keratitis (Painful photophobia and ulcer formation in corneal infections.)
- The formation of small itchy papules and large painful lesions on the skin and subcutaneous layers.
- Kunkers in horses.
- Thrombosis of large arteries.
- Arterial infections lead to endothelial necrosis, swelling, muscular dystrophy, skin discoloration and eventually gangrene.
Treatment

- Antifungal drugs are used with limited success and contradictory results. *(P. insidiosum has no ergosterol in its cytoplasmic membrane)*
- Amputation and surgery.
- Surgery has a 40% recurrence rate.
- Immunotherapy using extracted proteins from *P. insidiosum* has a 55% cure rate in humans and more than 70% in horses.
Case Report 1

10 yr old boy with no previous history of trauma

He had fever, severe pain, and a swollen right knee

Presented with gangrenous ulcers on his right knee that did not respond to therapy for 6 weeks

High above knee amputation was done to remove affected tissue and prevent spreading

After testing by immunoblot and chromatography tests, Phytophthora Insidiosaum antibody was detected

Antifungals were administered and the patient was discharged after 2 months of hospitalization

There was no recurrence of the disease and the patient has been symptom free for 2 years.

It was said that because the pediatricians were unfamiliar with this disease its diagnosis and treatments were delayed
Case Report 2

- A 49-year-old policeman was admitted for the treatment of a skin lesion on his leg, initially diagnosed as cutaneous zygomycosis.
- A biopsy of the lesion showed inflammation associated with several nonseptated hyphae, a finding that led to the diagnosis of zygomycosis.
- Patient stated that a small pustule developed on his left leg 3 months earlier, 1 week after he fished in a lake with standing water.
- Amphotericin B was given but lesion only showed slight improvement after treatment.
- Other antifungals were tried but no improvement.
- Skin grafts were taken and finally after microscopic examination, slide cultures showed broad, branched, and sparsely septated hyphae, without fruiting bodies, which were identified as colonies of *P. insidiosum*.
Case Report 2 con’t

- After extensive surgical debridement to remove the lesion, a cure was achieved.
- The infection was more likely acquired during water-associated leisure activities; the most common source of the infection among patients with pythiosis.

The figure shows the wide extension of the lesion in a frontal (A) and in depth (B) medial views.
References


References


- Mendoza, Dr. Leonel. *Pythium insidiosum*. 25 July 2011
  <http://bld.msu.edu/mendoza.html>.