**Zygomycosis Outbreak Associated with Hospital Linens**

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**ABSTRACT**

Zygomycosis is an invasive fungal infection caused by mucormycetes (formerly zygomycetes), a ubiquitous group of molds including Rhizopus species. Infections can occur, usually in people with an underlying medical condition, after a surgical or burn site, or in a severely immunocompromised host. Conventional treatment for zygomycosis is challenging, and mortality remains high. We investigated an outbreak of zygomycosis at Hospital A, a 300-bed rural hospital located in the United States, that occurred from January 2009 through June 2009.

**Objectives:**
- To investigate an outbreak of zygomycosis at Hospital A among patients hospitalized to identify the environmental source of the outbreak and to prevent further infections.
- To review Hospital A’s linen supply chain and practices to identify potential sources of environmental contamination.

**Methods:**
- Retrospective case-finding: based on review of Hospital A pathology, microbiology, and billing records.
- Hospital linens were cultured using multinested PCR targeting multiple genera of zygomycetes.
- Indoor air was sampled using 0.3-micron filter cassettes (n=4).
- Patient specimens were collected from blood, tissue, and clinical cultures.
- Environmental fungal cultures were collected using 0.3-micron filter cassettes.
- DNA was extracted from positive cultures with the QIAamp DNA Mini kit and purified using QIAquick spin columns.
- PCR products were sequenced using an ABI 3730 automated sequencer.

**Results:**
- All five case-patients died within 13 days of illness onset.
- All five had established risk factors for zygomycosis, including acidosis (4) and bone marrow transplantation (1). Cases included cutaneous infections in patients ranging in age on admission from 0 days to 13 years. Hospital length of stay at first diagnosis for the series was 106 days.
- Cases were hospitalized with more than one infection site: rhinocerebral (4), rhino-orbital-ethmoidal (1), rhino-ocular-oral (1), rhino-ocular (1), gastrointestinal (1), rhino-sinus (2), nasal (1), rhino-oral (1), upper back and posterior neck (1), and rhino-maxillary (1).

**Conclusions:**
- The history of two outbreaks that occurred in January 2009 and June 2009 was reviewed to identify a common source. The investigation of the outbreak was conducted to identify the environmental source of the outbreak and to prevent further infections.

**Further Discussion:**
- Hospital A’s linen supply chain was examined to identify potential sources of environmental contamination.
- Linens from Hospital A’s linen supply company were cultured and tested for the presence of zygomycetes.
- The results of the initial investigation and culture testing were reviewed to identify potential sources of contamination.

**Keywords:**
- Zygomycosis
- Hospital linens
- Mucormycetes
- Rhizopus oryzae
- Indoor air
- DNA extraction
- PCR
- Sequencing

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**METHODS**

**Background:**
Mucormycosis (formerly known as zygomycosis) is a ubiquitous group of mold belonging to the Rhizopus genus. The incidence of zygomycosis is low, but the mortality rate is high, ranging from 50% to 90%.

**Objective:**
To investigate an outbreak of zygomycosis caused by Rhizopus oryzae at Hospital A, a rural hospital located in the United States, that occurred from January 2009 through June 2009.

**Methods:**
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**CONCLUSIONS**

- Rhizopus oryzae was isolated from four of the five case-patients in his Positive, and the other sample sufficient for testing, was generally related to Rhizopus oryzae isolated from a deceased then.
- The hospital cannot trace back how the fungus became contaminated with Rhizopus oryzae in the common area or to the linen supply chain.
- The fungus is not resident in the common area or to the linen supply chain.
- The U.S. Centers for Disease Control and Prevention recommend the following interventions:
  - Change the method of linen supply company.
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