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Coccidioidomycosis (Valley Fever) Awareness

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Coccidioidomycosis (Valley Fever) Awareness

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Introduction

Topic

- Coccidioidomycosis pathophysiology, risk factors, clinical presentation, diagnosis, treatment, complications, nursing implications, vaccine information and Covid-19 similarities.
- Coccidioidomycosis is a respiratory fungal disease that occurs in humans by inhaling aerosol spores created by *Coccidioides posadasii* or *Coccidioides immitis* (Hung et al., 2019).
- Coccidioidomycosis is a common source of developing community acquired pneumonia (Hung et al., 2019).
- 150,000 new cases in the United States occur each year (Castro-Lopez & Hung, 2017).

Reason for Choosing Topic

The purpose of this poster is to educate and bring awareness to the coccidioidomycosis infection.

History

- Coccidioidomycosis was first discovered in 1892 by Alejandro Posadas (Deresinski & Mirels, 2019).
- William Ophüls discovered that coccidioidomycosis was a fungal infection, previously thought to be a protozoan (Deresinski & Mirels, 2019).
- In 1957, the first effective treatment for coccidioidomycosis was reported (Deresinski & Mirels, 2019).
- Currently, the search for a vaccine is underway (Deresinski & Mirels, 2019).

Pathophysiological Processes

Risk Factors

- Immunosuppression (Benedict et al., 2019).
- Black race (Benedict et al., 2019).
- Filipino ethnicity (Benedict et al., 2019).
- Occupation:
 - Construction work
 - Agricultural work (Heaney et al., 2021).
- Incarcerated Populations: Facilities located in areas with high environmental dust concentrations (Heaney et al., 2021).
- Overcrowded areas (Heaney et al., 2021).
- Geographics:
 - Southwestern U.S.
 - Parts of Mexico
 - Parts of South America
 - Parts of Central America (Benedict et al., 2019).

High Risk Areas

- Phoenix, Arizona (Benedict et al., 2019).
- Tucson, Arizona (Benedict et al., 2019).
- San Joaquin Valley, California (Benedict et al., 2019).

Signs & Symptoms

- Fatigue (Benedict et al., 2019).
- Shortness of breath (Benedict et al., 2019).
- Fever (Benedict et al., 2019).
- Cough (Benedict et al., 2019).
- Headache (Benedict et al., 2019).

Underlying Pathophysiology

- Coccidioidomycosis occurs when fungal cells (mycelia) that evolve into arthroconidia (asexual fungi spores) are inhaled (Akram & Koirala, 2021).
- Once inhaled, the arthroconidia remodel, grow, and release endospores (Akram & Koirala, 2021).
- These endospores are engulfed by macrophages, causing a host response (acute inflammation) (Akram & Koirala, 2021).

Significance of Pathophysiology

- Spread by disturbance of soil and dust (Heaney et al., 2021).
- Symptoms are similar to symptoms of bacterial and viral respiratory infections (Chi et al., 2019).
- 60% of those infected with coccidioidomycosis do not show symptoms (Benedict et al., 2019).

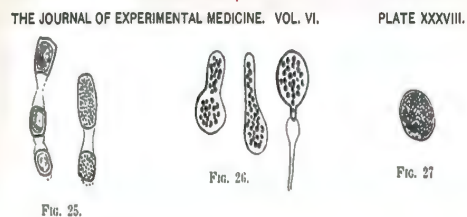


Figure 1: Morphology of *Coccidioides* (Deresinski & Mirels, 2019).

Implications for Nursing Care

- Delays in accurate diagnosis are common and can put patients in danger of infection progression (Donovan et al., 2019).
- Delays in accurate and prompt diagnosis can increase health care costs (Donovan et al., 2019).
- It is vital for nurses to be aware of this infection to help guide physicians in accurate diagnosis of the disease.

Coccidioidomycosis & Covid-19

- Coccidioidomycosis and Covid-19 have many similarities.
- Common risk factors with Covid-19: diabetes, old age, immunosuppression, ethnic or racial minority, and smoking (Heaney, et al., 2021).
- Common preventative measures with Covid-19: wear a face mask, limit crowding, social distance (Heaney et al., 2021).
- Common symptoms with Covid-19: fatigue, cough, difficulty breathing (Heaney et al., 2021).

Vaccine

- The search continues for an effective vaccine for coccidioidomycosis. Understanding of immunity (innate and adaptive) against coccidioidomycosis has been assessed through whole-cell vaccine trials in rodents (Castro-Lopez & Hung, 2017).
- Induction of T 1 helper cells' and T 17 helper cells' coactive immunity against *Coccidioides* is necessary to protect humans against respiratory coccidioidomycosis (Castro-Lopez & Hung, 2017).

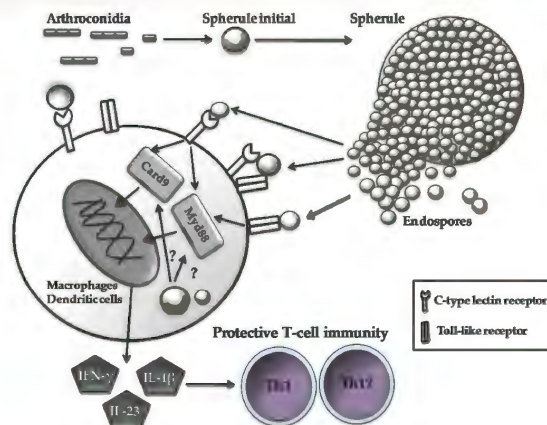


Figure 2: Illustration of the effectiveness of T1 helper cells and T 17 helper cells to protect the body against coccidioidomycosis (Castro-Lopez & Hung, 2017).

Disease Process

Diagnosis

- There is no established testing for diagnosis (Ampel, 2020).
- Screening occurs with enzyme immunoassay (Chi et al., 2019).

Treatment

- Early antifungal treatment is key to treatment (Chi et al., 2019).
- Antibiotics are not effective in treatment (Chi et al., 2019).
- Antibiotics are the most common first line treatment due to the similar presentation of coccidioidomycosis to common bacterial and viral respiratory infections (Chi et al., 2019).
- This misuse of antibiotics can lead to unnecessary antibiotic treatment and potential antibiotic resistance (Chi et al., 2019)
- It has been shown that life-long immunity can occur after diagnosis and survival from coccidioidomycosis (Ampel, 2020).

Complications

- Diseases of:
 - Skin
 - Muscle
 - Bone
 - Central nervous system (Castro-Lopez & Hung, 2017).



Figure 3: Lungs from the autopsy of a patient that suffered from coccidioidomycosis (Aduroja et al., 2019)

Conclusion & Key Points

- Coccidioidomycosis is an area specific disease, but awareness is crucial throughout the United States (Ampel, 2020).
- Awareness of coccidioidomycosis is key to saving lives.
- Prompt and accurate diagnosis of this infection is crucial for patient survival and to help decrease health care costs.
- Infection is commonly acquired in dusty and dirt environments.
- Life-long immunity can develop with survival.
- Coccidioidomycosis and Covid-19 have many similarities.
- Vaccine development is on the rise.

Additional Resources

Centers for Disease Control and Prevention. (2020, December 29). Valley fever (Coccidioidomycosis). <https://www.cdc.gov/fungal/diseases/coccidioidomycosis/index.html>

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