Coccidioidomycosis
Natalie Nimer, MD, Tammy Camp, MD
Texas Tech University Health Sciences Center, Lubbock, TX

Coccidioides is a genus of dimorphic fungi made up of 2 separate species: Coccidioides immitis and Coccidioides posadasii. The 2 species, endemic to arid regions of Mexico, Central and South America, and the southwestern United States, lead to clinically indistinguishable infections. The incidence of disease from these species has increased markedly since 1998, particularly in Arizona and California. Most infections occur through inhalation, whereas person-to-person transmission is rare. Coccidioides has been reported to be the cause of 15% to 29% of community-acquired pneumonia in endemic regions. Clustering of coccidioidomycosis can occur around dust-generating events, such as storms, recreational activity, or occupational exposures that cause aerosolization of soil. For a patient with clinical criteria consistent with coccidioidomycosis, a thorough travel history should be obtained because even short visits to an endemic region can provide sufficient exposure to cause infection. Patients who are immunocompromised, people of Filipino or African American descent, women in their third trimester of pregnancy, and children younger than 1 year are at greater risk.

Although 60% of people infected with coccidioidomycosis remain asymptomatic or have mild symptoms, those who develop symptoms usually do so within 7 to 21 days of exposure. Symptoms resemble influenza-like illness or community-acquired pneumonia, typically including malaise, fever, cough, myalgias, headaches, and chest pain. Constitutional symptoms of fatigue and weight loss can last for weeks to months after infection. Pulmonary coccidioidomycosis, the most common manifestation of the infection, can occur with complications necessitating close follow-up until the infection resolves. These complications include pleural effusions, pulmonary cavities, pneumothorax, and miliary disease. Miliary disease is frequently associated with development of acute respiratory distress syndrome. Disseminated infections occur in less than 0.5% of patients and usually involve the skin, bones, joints, and central nervous system.

Diagnosis is made through serologic testing, histopathologic analysis, and cultures. The erythrocyte sedimentation rate may be elevated, and eosinophilia should increase suspicion. IgM can be detected in the first week in approximately 50% of cases and by the third week in 90% of cases. IgG response can be detected as well. Titers in serum and cerebrospinal fluid can be used to determine severity of disease and progression of infection and treatment efficacy. These methods are not always reliable in immunocompromised patients. Histopathologic analysis can also be used to detect spherules in body fluid or tissue samples. Spherules are large and easily visualized under light microscopy; their presence is diagnostic of coccidioidomycosis. The fungus can be cultured; however, this is potentially hazardous, and laboratory personnel should be notified if the organism is suspected. In addition, a real-time polymerase chain reaction assay has been developed to directly detect the fungus in tissue samples and is undergoing
validation. This assay could potentially provide a more rapid and safer method of direct diagnosis in patients.

Most cases of coccidioidomycosis resolve without treatment, and there is controversy regarding which populations to treat. Generally, the recommendation is to treat severe and disseminated cases and immunocompromised patients with antifungal agents. Examples of severe disease would include patients with symptoms for more than 8 weeks, weight loss greater than 10%, night sweats for longer than 3 weeks, significant pulmonary infiltrates, persistent hilar lymphadenopathy, or complement fixation of greater than 1:16. Initial therapy with fluconazole or itraconazole is recommended for at least 3 to 6 months, depending on severity of illness. Use of itraconazole requires measurement of serum concentration to ensure adequate absorption. Amphotericin B, used for treatment in the past, is now reserved for severe illness refractory to other therapy. A recent retrospective review, although small, found that combination voriconazole and caspofungin therapy may be effective for refractory coccidioidomycosis. Some cases may require surgical debridement, depending on size, progression, and location. All symptomatic patients should be followed up every 1 to 3 months for at least 2 years after diagnosis to monitor for complications from the disease. Patients with central nervous system involvement, osteomyelitis, human immunodeficiency virus infection, or organ transplant recipients should receive lifelong suppressive treatment with fluconazole. Because the treatment of this infection must be individualized according to each patient’s severity of disease and risk factors, practitioners may benefit from consultation with a clinician experienced in treating coccidioidomycosis.

COMMENT: A world renowned geneticist at my institution, Barton Childs, MD, would often ask when reflecting on a patient’s diagnosis, “Why this child, why now?” These words kept coming to mind as I read this In Brief. Coccidioidomycosis is a fascinating infection with a wide range of symptom variability from being asymptomatic to respiratory failure and dissemination to extrapulmonary infections. This variability is due to multiple factors, such as the individual’s immune state, infection burden, and even ethnicity. Although respiratory symptoms are the most prominent presentation, cutaneous presentations range from a nonspecific erythematous rash to erythema multiforme or erythema nodosum. As a generalist, I have not often had this on my differential diagnosis, but knowing that one-third of patients present with community-acquired pneumonia will change my precision of history taking to include more specifically travel history to high-risk areas, especially for patients who present with eosinophilia. The first case of coccidioidomycosis was described by a medical student in 1892 and reinforces the important contributions that medical professionals can make across the educational continuum. Future medical professionals will need to build on research to develop vaccines and improve outcomes of patients who have severe disease from coccidioidomycosis.

– Janet Serwint, MD
Consulting Editor,
In Brief
Coccidioidomycosis
Natalie Nimer and Tammy Camp
Pediatrics in Review 2015;36;181
DOI: 10.1542/pir.36-4-181

Updated Information & Services
including high resolution figures, can be found at:
http://pedsinreview.aappublications.org/content/36/4/181

References
This article cites 5 articles, 3 of which you can access for free at:
http://pedsinreview.aappublications.org/content/36/4/181#BIBL

Subspecialty Collections
This article, along with others on similar topics, appears in the following collection(s):
Infectious Diseases
http://pedsinreview.aappublications.org/cgi/collection/infectious_diseases_sub

Permissions & Licensing
Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
http://pedsinreview.aappublications.org/site/misc/Permissions.xhtml

Reprints
Information about ordering reprints can be found online:
http://pedsinreview.aappublications.org/site/misc/reprints.xhtml
Coccidioidomycosis
Natalie Nimer and Tammy Camp

*Pediatrics in Review* 2015;36;181
DOI: 10.1542/pir.36-4-181

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://pedsinreview.aappublications.org/content/36/4/181