

Coccidioidal Meningitis: Case Report

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Abstract

Coccidioidomycosis is caused by the dimorphic fungi of the genus *Coccidioides* (*C. immitis* and *C. posadasii*), which are endemic in desert regions of the southwestern United States, and Central and South America. Meningitis is the most lethal complication of coccidioidomycosis and thus is crucial to recognize. A 64 years old diabetic patient suffering from meningitis was studied. Cerebrospinal fluid (CSF) sample was collected by lumbar puncture technique under aseptic conditions from female patients who admitted to Baghdad City hospital, conventional methods included cell count and differentiation, biochemical analysis, staining and culturing of CSF sample was applied. CSF smear with lactophenol cotton blue, revealed a typical picture of *Coccidioidis* spp. This is the first case reported in Iraq. In conclusion, fungal meningitis should be included as one of the most causes in chronic meningitis in Iraq.

List of abbreviations: DM= diabetes mellitus, CSF = cerebrospinal fluid, CT scan = computerized tomography scan, WBC = white blood cells, PMN = poly morphonuclear cells, TB = tuberculosis, SPP. = species, IV = intravenous.

Introductions

Coccidioidomycosis is a disease result from the infections with dimorphic fungi called *coccidioides* which have ability to disseminated from cutaneous to other organs and the clinical entity was recognized by Wernicke and Posadas in Argentina in 1882⁽¹⁾ soon after Rixford and Gilcrist was reported this disease in California⁽²⁾. Coccidioidalmeningitis first recognized by Ophuls in 1905⁽³⁾ Evans⁽⁴⁾ provided further description in 1909. Ryfkogel discovered the first patient complained from coccidioidal meningitis with hydrocephalus⁽⁵⁾ Veterans Affairs Armed Forces initiate studies from 1955-1958 that includes the definitive description of coccidioidal meningitis from the pretherapy era⁽⁶⁾.

This disease is mainly found in the Western Hemisphere, mainly in northwestern Mexico and southwestern United States. The incidence of

the disease in the endemic area not known exactly but it relatively stable in the middle decades of the 20th century the reasons for that explained by population growth and migration and by increased the number of immunocompromised hosts, the absolute and relative frequency of primary disease and consequent dissemination have multiplied⁽⁷⁾.

The persons with Coccidioidal infections are mainly asymptomatic. Primary infections are almost universally to pulmonary and they manifest Influenza-like, pneumonic, and pleural presentations are the most common. If one takes into account the large number of asymptomatic infections, the rate of dissemination is low. In high-risk, symptomatic patients, the dissemination rate can be >15%⁽⁸⁾. *Coccidioidesimmitis* the first species was identified from the genus *Coccidioides*but in recent years Taylor *et al.* recognized a second species, *Coccidioidesposadasii*, which is a more common in Texas, Central and in South America, will the *C. immitis* is more common in California.

Both species are found in Arizona. The clinical manifestations between two species have no distinctions⁽⁹⁾.

The clinical presentation of coccidioidal meningitis is similar to the other form of meningitis, which included headache. Alteration in mental acuity, with or without fever, vomiting, nausea, and focal neurological deficits may be additional findings. Physical examination will reveal some degree of meningismus in ~50% of the cases. Gait abnormalities and focal neurologic deficits may be seen in a minority of cases⁽⁷⁾.

Hydrocephalus is a late complication of coccidioidal meningitis. Initially, the hydrocephalus may dominate the clinical findings. In persons at risk for coccidioidal infection, hydrocephalus should always be considered a search for the underlying cause, including an evaluation for coccidioidomycosis⁽⁹⁾ the lumbar puncture for CSF samples requested for the diagnosis and management of coccidioidal meningitis. The CSF parameters are almost always those typical of other chronic meningitides⁽⁷⁾.

Case report

A 64 years old diabetic woman with a history of allergic bronchitis at the last three years, she underwent corticosteroid injection during this period of time. Symptoms of meningitis such as fever, nausea, vomiting, and decreasing in mental acuity. She had a history of headaches in several weeks. On admission, her vital signs were as follow: Temperature was 37°C, PR was 80/min., respiratory rate was 15/min., and blood pressure was 110/70 mmHg. In physical examination, she had neck stiffness as well as positive Kernig's signs (positive when the thigh is bent at the hip and knee at 90 degree angles, and subsequent extension in the knee is painful (leading to resistance) and Brudzinski's signs (A positive Brudzinski's sign occurs when flexion of the neck causes involuntary flexion of the knee and hip). Physical examination of chest, heart, abdomen and extremities were normal. She was confused and disoriented to time, place and

persons. Cranial nerves examination and deep tendon reflexes were normal and plantar responses was normal. Brain CT scan was normal. CSF parameter reveals lymphocytosis, WBCs were 500, lymphocyte was 90%, PMN was 10%, Glucose was 30 mg/dl, concomitant blood sugar was 155 mg/dl, and a protein was 244 mg/dl. The patient underwent anti-TB treatment due to CSF analysis pattern that improve tuberculosis meningitis, and due to the endemicity of this disease in Iraq. The patient did not respond to anti- TB treatment. Lumbar puncture was repeated for direct examination, CSF smear with lactophenol cotton blue, revealed typical picture of *Coccidioides spp.* (Fig. 1).

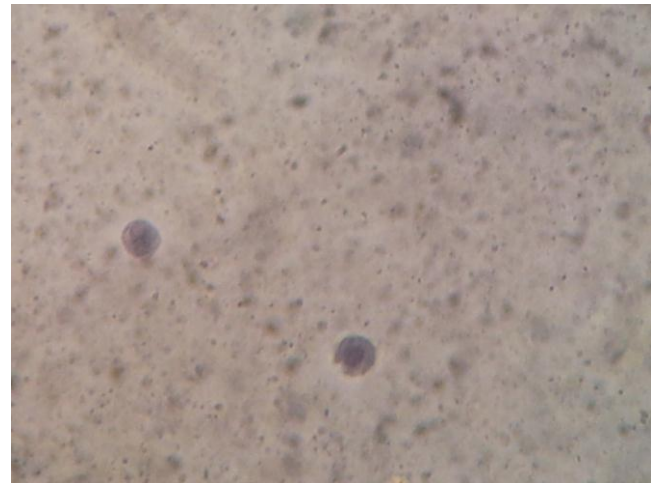


Fig. 1. *Coccidioides spp.* direct smear from CSF, stained with lactophenol cotton blue. Magnification power (400X).

After diagnosis, the patient underwent anti-fungal therapy with IV Amphotericin B 50 mg/day for two weeks. The patient was cured and discharged from the hospital.

Discussion

Coccidioides species one of the most common fungal agents of chronic meningitis in regions endemic with Coccidioidal. Occasionally, even short-term travel to endemic regions results in the acquisition of meningeal disease, so awareness of this complication of coccidioidomycosis is important even in non-endemic areas.

The prognosis depends on the early recognition and treatment of the disease, so it is important to be familiar with the varied clinical manifestations, risk factors associated with meningeal involvement, diagnostic challenges, and therapeutic modalities⁽¹⁰⁾.

The most predisposing factors lead to develop coccidioidal meningitis is immunosuppressive drugs. History of exposure to *C. immitis*, a wide age range, and, in about one third, underlying conditions are noteworthy. Dissemination to the meninges usually occurs within the first few months although diagnosis is frequently delayed. Presenting symptoms and signs of coccidioidal meningitis are varied but signs of chronic meningitis or suggestion of hydrocephalus are prominent. Evidence of acute infection is unusual even with widespread disease. Diagnosis is usually made by demonstration of coccidioidal CF antibodies in the CSF although they are not found in all patients⁽¹¹⁾.

The first identified *Coccidioides* species was *Coccidioides immitis*. Recently, Taylor *et al.*⁽¹²⁾ identified a second species, *Coccidioides posadasii*. Meningitis is the most sequel form of dissemination and is found in nearly one-half of individuals with disseminated disease. Prior to the advent of anti-fungal treatment, death within a few months was nearly universal.

There are rare reports of survival for 2 years⁽¹³⁾. Most cases of dissemination, including cases of meningitis, occur within weeks to months after primary infection. Rare instances of meningitis presenting years after the original diagnosis of primary or other disseminated disease have been reported⁽¹⁴⁾. In this study CSF picture and the typical yeasty form of *Coccidioidis spp.* improved the infection with this causative agent.

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