Coccidioides immitis mycelial form is detected in CSF cytology specimen

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ABSTRACT

Background: Coccidioides immitis, the common causative organism in coccidioidomycosis, can be detected by direct microscopy, culture, serology, and molecular techniques. In cases of coccidioidal meningitis, the diagnosis is usually made via detection of anti-coccidioidal antibodies in the cerebrospinal fluid (CSF). Literature review reveals very limited reports of Coccidioides organisms detected in CSF.

Case History: We present the case of a 58-year-old male with a history of hydrocephalus status post ventriculoperitoneal shunt placement complicated by multiple malfunctions and revisions as well as coccidioidal meningitis seven years ago. The patient reported one week of forgetfulness and headaches. Lumbar puncture was performed, and CSF was collected for microbiology and cytology. Diff-Quik, Giemsa, and Papanicolaou stains were performed.

Results: Diff-Quik, Giemsa, and Papanicolaou stains all showed abundant mycelial or hyphal form organisms. The morphology was consistent with Coccidioides immitis organisms. No spherule form was identified.

Discussion: The mycelial or hyphal form of Coccidioides is rarely seen in human tissue, though a few cases have been described, including suggestion of an association with CNS plastic devices. CSF cytology and culture rarely reveal Coccidioides species. It is important to be able to recognize Coccidioides both in spherule form and mycelial or hyphal form and to consider it in the differential diagnosis of meningitis, as it is a rare entity to detect in CSF, as in this cytology case.

BACKGROUND

Coccidioides immitis, the common causative organism in coccidioidomycosis, can be detected by direct microscopy, culture, serology, and molecular techniques. In cases of coccidioidal meningitis, the diagnosis is usually made via detection of anti-coccidioidal antibodies in the cerebrospinal fluid (CSF). Literature review reveals very limited reports of Coccidioides organisms detected in CSF.

CASE HISTORY

We present the case of a 58-year-old Hispanic male with a ten-year history of non-communicating hydrocephalus status post ventriculoperitoneal shunt placement complicated by multiple malfunctions and revisions as well as culture-proven coccidioidal meningitis seven years ago. On current presentation, the patient reported one week of worsening forgetfulness and mild headaches. The patient had been prescribed lifelong fluconazole for secondary prophylaxis but appears to have been lost to follow-up and off of the medication for the past year. Lumbar puncture was performed, and CSF was collected for microbiology and cytology. Diff-Quik, Giemsa, and Papanicolaou stains were performed.

RESULTS

Diff-Quik, Giemsa, and Papanicolaou stains display abundant mycelial or hyphal form organisms in CSF. The morphology is consistent with Coccidioides immitis organisms. No spherule form was identified. CSF culture and serology confirmed a diagnosis of coccidioidal meningitis.

1. Diff-Quik stain shows well-preserved mycelial form of Coccidioides

Figure 1. The cytospins of CSF with Diff-Quik stain displays that hyphae can mature fully to form arthroconidia producing pleomorphic cells (A-C, X600). Triangular-1, barrel-shaped-2, rectangular-3, ovoid-4, spherical-5, degenerating fungal cells-6. Arrows indicate the structures described.

2. Giemsa stain shows mycelial form of Coccidioides with macrophages and one RBC present as internal controls of measurement

Figure 2. The cytospins of CSF with Giemsa stain show hyphae with arthroconidia production forming pleomorphic cells (A-C, X600). Racket-shaped-1, barrel-shaped-2, rectangular-3, ovoid-4, spherical-5. Macrophages-6 and one RBC-7 are present as internal controls of measurement (A). Arrows indicate the structures described.

3. Papanicolaou stain shows mycelial form of Coccidioides in one large cluster

Figure 3. The cytospin of CSF with Papanicolaou stain shows a large cluster of mycelial form Coccidioides. On lower power (A, X100), the hyphae may suggest mold infection. Higher power view (B-C, X600) demonstrates predominately barrel-shaped arthroconidia.

REFERENCES