CASE REPORT

Cryptococcus neoformans and Streptococcus *pneumoniae* co-infection in post-traumatic meningitis in a patient with unknown HIV status

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Abstract

Meningitis is a serious disease associated with considerable morbidity and mortality. Mixed meningeal infections due to bacteria and fungi are exceptionally rare. Here we report a case of meningeal co-infection with cryptococcus neoformans and streptococcus pneumoniae in a patient with unknown human immunodeficiency virus status. Because of the rarity of such cases, stringent screening of every cerebrospinal fluid specimen to exclude the presence of multiple pathogens is imperative. Assessment of patients for immunodeficiencies in case of isolation of an opportunistic organism like cryptococcus is also needed.

Keywords: Cryptococcosis, Meningeal co-infections, Cryptococcal meningitis, Post-traumatic meningitis.

Introduction

Meningitis is a serious disease associated with considerable morbidity and mortality. Mixed meningeal infections due to bacteria and fungi are exceptionally rare and not commonly seen in infectious disease practice. However, immunosuppression, intra-ventricular shunt, surgical intervention, head or spinal injury may lead to central nervous system (CNS) infections with more than one organisms.[1,2]

Here, we are reporting the case of a patient with unknown human immunodeficiency virus (HIV) status, who developed meningitis after trauma, and CSF yielded growth of two pathogens; streptococcus pneumoniae and cryptococcus neoformans.

Case Report

A 30-year-old Afghan male resident of Quetta, Pakistan, with no known comorbids suffered a road traffic accident which caused depressed, compound fracture of the skull. On radiological examination X-ray skull also revealed pneumocephalus. Nine days later, the patient visited the general physician with complaints of fever, headache, neck stiffness and clear, watery discharge from the nose. A lumbar puncture was performed and CSF was submitted to the laboratory for necessary examinations. Gram stain of the CSF revealed no

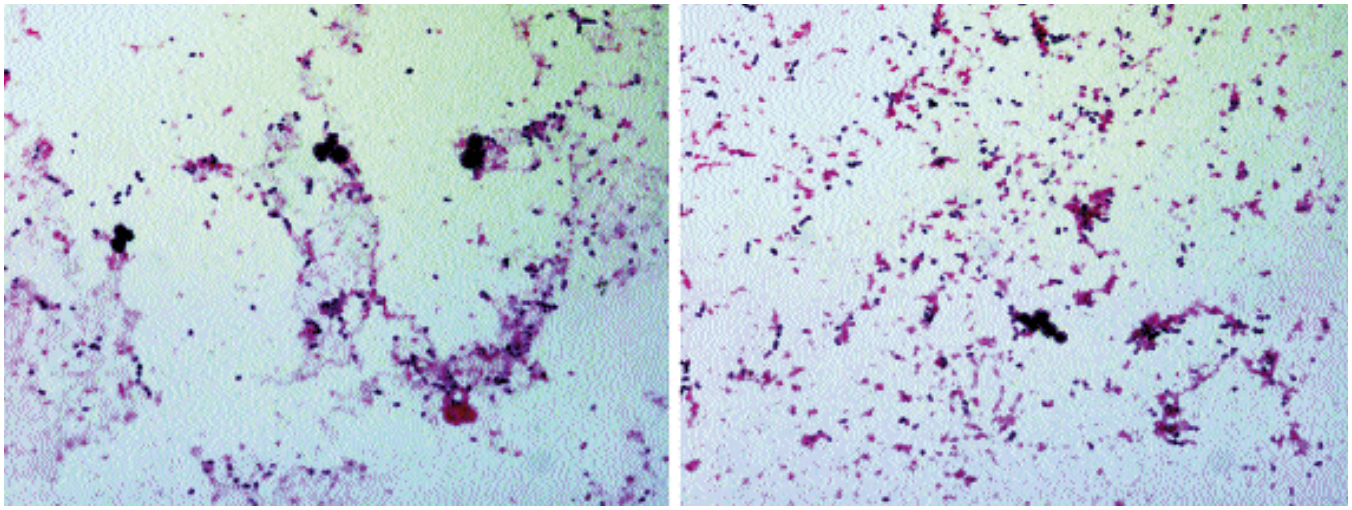

Figure: Photomicrograph of gram stain showing presence of numerous gram-positive diplococcic and rare to few yeast cells in the cerebrospinal fluid (CSF) in the absence of inflammatory cells.

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inflammatory cells with numerous gram-positive diplococci and rare to few round yeast cells. India ink staining was positive for encapsulated yeast cells. Due to financial constraints cryptococcal antigen test could not be performed. Culture revealed growth of β-haemolytic colonies identified as S. pneumoniae based on colony morphology, gram stain and sensitivity to optochin. S. pneumoniae was found susceptible to chloramphenicol, erythromycin, tetracycline, ofloxacin, vancomycin and resistant to penicillin with minimum inhibitory concentrations (MIC) of 0.25 µg/ml. Along with S. pneumoniae, few creamy white colonies were grown on sheep blood and chocolate agar. These colonies were isolated and inoculated on Sabouraud's Dextrose (SDA) agar and Corn Meal Tween (CMT) agar. At 48 hours, it was identified as cryptococcus neoformans based on urea positivity, rounded budding yeast cells on CMT agar. Commercially available biochemical system API 20 AUX further verified the identification of C. neoformans (API #2107133-98%). This isolate was found to be susceptible to amphotericin (MIC <0.12 µg/ml), fluconazole (MIC 0.25 µg/ml) and voriconazole (<0.015 µg/ml).[3,4]

The primary physician was contacted. It was found that empirical treatment with ceftriaxone and metronidazole had already been initiated. Addition of amphotercin B to the treatment regimen was advised along with discontinuation of metronidazole. However, due to financial constraints, the patient could not take antifungal therapy and due to the same reason his immune status could not be evaluated. He had responded to the initial therapy and had left for his home country. Further progress of the patient could not be assessed as he was lost to follow-up.

Discussion

Isolation of a fungus along with other pathogens in the CSF is a rare finding and only a few cases have been reported so far. Literature search showed meningeal co-infections with C. neoformans include toxoplasma, Mycobacterium tuberculosis, Taenia solium and Plasmodium falciparum.[5-8] However, we found only two case reports of meningitis with co-infection of C. neoformans and S. pneumoniae. The first case with such findings was reported in 1997 in a patient with acquired immune deficiency syndrome (AIDS).[9] The second case was reported in 2005, yet again in a HIV-infected patient. This patient was admitted in the intensive care unit (ICU) for bacterial meningitis due to S. pneumonia, but a co-infection with C. neoformans was diagnosed later.[10] One common factor in all these cases was immunosuppression, with majority of subjects having AIDS.[11]

We hypothesised that our patient might have had some underlying immunodeficiency which led to cryptococcal meningitis. This was probably an incidental finding when he presented with post-traumatic acute bacterial meningitis due to S. pneumoniae. Unfortunately, this patient's immune status was never assessed. This case points towards an important clue that in population where financial issues pose hindrance in risk assessment of immunodeficiencies, finding of opportunistic infections can guide physicians to evaluate patients on these lines.

Additional evidence that raised suspicion of immunodeficiency in our case was the absence of inflammatory cells on gram stain. Similar finding was also reported in a case report.[9] It is known that in advanced HIV infections, along with impaired cell mediated immunity, humoral immune response is also compromised.[12]

Conclusion

Careful screening of all CSF samples, especially in the absence of adequate clinical information provided to the laboratory, is essential. Presence of a bacterial aetiology does not exclude the possibility of the presence of another pathogenic organism. It is important to exclude the presence of multiple pathogens, especially in resource-limited settings. The assessment of patients must be done for immunodeficiencies in case of isolation of an opportunistic organism like cryptococcus.

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