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Case Report

Cryptococcemia in a COVID-19 Patient: A Case Report

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Abstract

Cryptococcosis is a frequent and severe opportunistic mycosis caused by encapsulated yeast of the genus Cryptococcus. It is common in immunocompromised patients, particularly those infected with the human immunodeficiency virus. We report in our work a case of cryptococcemia in a patient with covid-19 under anti-inflammatory treatment. The diagnosis was based on the presence of encapsulated yeasts with Indian ink and positive culture on Sabouraud medium without cycloheximide with identification of *Cryptococcus neoformans* as the causative agent. The patient's outcome was fatal.

Keywords: *Cryptococcus neoformans*, Cryptococcemia, covid-19, immunodepression.

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INTRODUCTION

Covid-19 is a serious viral pathology that induces profound immunosuppression and favors fungal infections, namely cryptococcosis (Segrelles-Calvo *et al*., 2020a).Cryptococcosis is a frequent and severe opportunistic mycosis caused by encapsulated yeast of the genus Cryptococcus. It is frequent in immunocompromised patients, in particular those affected by the human immunodeficiency virus (HIV). We report in our study a case of cryptococcemia in a patient with covid-19.

OBSERVATION

Patient aged 64 with history of type 2diabetes and chronic smoker, admitted to the intensive care unit for febrile dyspnea and desaturation on air. The covid-19 PCR was positive with a scannographic image suggestive of sarscov-2 viral pneumonia. The patient was treated with corticosteroids (methylprednisolone) with clinical improvement. Two days later, the evolution was complicated by a reoccurrence of fever with respiratory and hemodynamic instability. On the infection report: hyperleukocytosis and increased CRP. A bronchoalveolar lavage (BAL) and blood cultures were sampled for bacteriological and mycological study. While waiting for the results, the patient received amoxicillin and clavulanic acid as a probabilistic antibiotic without clinical improvement. The mycological study of the BAL and the blood culture was positive for *Cryptococcus neoformans*. The positivity of the fungal examination of the BAL was retained on a positive direct examination with Indian ink and positive culture on Sabouraud medium without cycloheximid. The blood culture incubated at 37°C in BACT/ALERT 3D was positive on day 1 and then inoculated on Sabouraud's medium. The identification of *Cryptococcus neoformans* species after culture was done by API 20 C AUX gallery. Capsular antigen detection on serum was also positive. The unstable hemodynamic state of the patient made impossible to perform a lumbar puncture. The evolution was rapidly fatal and the patient died the same day before the beginning of the antifungal treatment.

DISCUSSION

Cryptococcosis is an opportunistic invasive fungal infection occurring essentially during HIV infection. It is a cosmopolitan infection caused by encapsulated yeast of the genus Cryptococcus of which Cryptococcus neoformans is the main pathogenic species. It is a ubiquitous fungus, saprophytic of the environment (pigeon droppings, bat guano, soil, and tree bark). Contamination is most commonly by inhalation of spores or, exceptionally, by direct cutaneous inoculation. The transmission of the fungus is early in childhood and the primary infection is

asymptomatic and controlled by the immune system. Following immunosuppression, the yeasts will develop from the main site (lung), disseminating by hematogenous way with a particular tropism for the central nervous system. Thus, the most frequent clinical manifestation is meningoencephalitis.

Cryptococcosis is an opportunistic infection that affects immunocompromised individuals. According to a Taiwan study, HIV infection, immunosuppressive treatments and liver cirrhosis are the main factors favoring invasive fungal infections with Cryptoccosus neoformans(Lin *et al*., 2015).

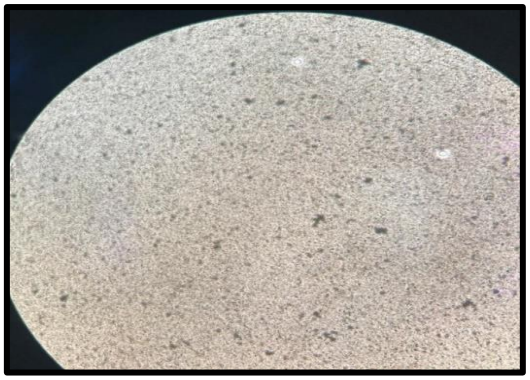
In the case of our patient with covid-19, the immunodepression is caused by the disease itself which induces an alteration of the immune defenses(Wang *et al*., 2020), the anti-inflammatory treatments prescribed which aim to control the inflammatory cascade during covid-19 (Segrelles-Calvo *et al*., 2020b) and by the underlying diseases such as diabetes in our patient, which is both a factor in the occurrence of severe forms of covid-19 disease and opportunistic infections (Eggimann *et al*., 2003).

Cryptococcosis is a serious pathology that rapidly engages the vital prognosis, hence the interest of an early diagnosis and treatment. Diagnosis of cryptococcosis is based on microscopic detection of encapsulated yeast, isolation of Cryptococcus neoformans in culture and detection of specific capsular antigens, glycuronoxylomannan, in biological fluids (serum, cerebrospinal fluid, BAL and urine) which has a sensitivity of 97% and specificity of 85% to 100% depending on the manufacturer(Boulware *et al*., 2014).

The treatment is based on a combination of liposomal amphotericin B and 5-fluorocytosine, followed by high-dose fluconazole. Despite therapeutic progress, the mortality rate of patients with cryptococcemia remains high. According to a study including Fifty-two patients diagnosed and treated for cryptococcemia, patients with cryptococcemia have a high acute mortality rate compared to patients with isolated neuromeningeal involvement(Jean *et al*., 2002).

CONCLUSIONS

Our study is the third in the literature that reports cryptococcemia in a covid-19 patient in the intensive care unit. This opportunistic infection can be vital, hence the importance of early diagnosis and treatment.



Cryptococcus neoformans: encapsulated yeast at India ink magnification ×40

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