COVID-19 PATIENTS IN THE INTENSIVE CARE UNIT AND INVASIVE FUNGAL INFECTIONS : ABOUT 5 CASES

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Introduction

SARS-CoV-2 disease is a new respiratory infectious pathology responsible for a global pandemic. Covid-19 is a serious pathology; it is associated with a deep immunodepression which favors invasive fungal infections especially in patients in intensive care unit (1). We report a series of 5 COVID-19 patients with fungal co-infection.

Observation

We conducted a retrospective, observational study including all COVID-19 patients (positive respiratory CRP to SARS-CoV-2 or compatible thoracic CT-scan results) hospitalized in intensive care unit for acute respiratory distress syndrome (ARDS) between March 15, 2020 and January 1, 2021. Patients who presented a clinical worsening during their hospitalization were sampled with mycological study (bronchoalveolar lavage (BAL), serum and fungal blood culture).
On the BAL samples, we performed:
-direct examination in the fresh state
-direct examination after special staining: Indian ink stain, MGG and Zeihl Nelson
-a culture on Sabouraud and Sabouraud medium with added chloramphenicol
-complemented by a search for mannan and galactomannan antigen in serum or BAL by ELISA method.
Blood culture samples were incubated at 37°C in BACT/ALERT 3D. The identification of fungi after positivity was done by API 20C AUX gallery.

Results

MYCOLOGICAL DIAGNOSIS					
Sample site	Blood culture/ BAL	BAL	BAL	BAL	Blood culture
Direct examination	Direct examination with indian ink +	Direct examination with indian ink +	Positive : Presence of septatemycelial filaments at acute angle	Positive : Presence of septatemycelial filaments at acute angle	Positive
Culture	*Cryptococcus neoformans*	*Cryptococcus neoformans*	*Aspergillusfumigatus*	*Aspergillusnidulans*	*Candida albicans*
Ag research on BAL /serum	-	-	*Galactomannan*	-	*Mannane*
Evolution	Deaths	Deaths	Deaths	Deaths	Good clinical course

Discussion

Many authors have reported a high frequency of invasive fungal infections in severe forms of COVID-19 in the ICU setting including invasive pulmonary aspergillosis (IPA) (2). This high prevalence can be explained by the impaired immune defenses during SARS-CoV-2 infection (3). Also the anti-inflammatory treatments used in COVID-19 disease and which aim to control the inflammatory cascade are an additional risk factor for invasive fungal infections (1). In addition to these factors, comorbidities and underlying diseases such as diabetes and hemodialysis are factors in the occurrence of severe forms of COVID-19 disease and deep mycoses (3).
Unlike the majority of studies published in the literature, we found a relatively low frequency of IPA (1.27%), which can be explained by the fact that samples were only taken from patients presenting a clinical worsening.
In the case of COVID-19, the wide use of antibiotics, corticosteroids and central venous catheters, as well as the damage caused by SARS CoV-2 in patients with ARDS, seem to favor the occurrence of candidemias. According to a review of the literature, several cases of invasive candidiasis have been published: Spain (N=3), Italy (N=3), Oman (N=5), India (N=15) with C. albicans as the most common species followed by C. auris, C. glabrata and C. tropicalis (4).
Disseminated Cryptococcus infections are common in immunocompromised patients and rarely in the immunocompetent. In our study 2 cases of Cryptococcus infection were diagnosed, one of which was disseminated (3).
The evolution was unfavorable for 4 of our patients, i.e. a mortality rate of 80% despite the introduction of antifungal treatments. In the literature, invasive candidiasis and IPA in COVID-19 patients are associated with a high morbidity and mortality rate (1), hence the importance of early diagnosis and management.

Conclusion

Our study is the second in the literature to report a case of disseminated cryptococcosis in a COVID-19 patient in an intensive care unit. This opportunistic infection with the other invasive fungal infections are responsible for a very important mortality rate. These results must be confirmed by a larger prospective study.

References
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