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Case Report

Bacteremia due to Opportunistic Infection in Times of Pandemic

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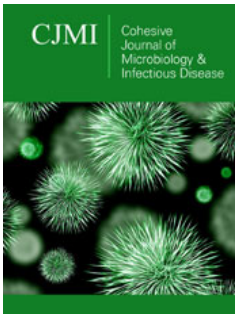

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Abstract

Nosocomial infections are considered a public health issue. They display higher rates of drug – resistant organisms. Immunosuppression is a risk factor to acquire a nosocomial infection. Various publications have tried to demonstrate that COVID-19 disease induces a profound state of suppression in patients, exposing them to nosocomial and opportunistic infections. We present a case of a 57-year-old male patient with a severe case of COVID-19 pneumonia and *Elizabethkingia miricola* bacteremia.

Keywords: Bacteremia; Immunosupresion; Nosocomial Infection; COVID-19

Introduction

The arrival of COVID-19 disease in December 2019 has brought with it more questions than answers. Regarding to the pathophysiology, several mechanisms have been proposed, and have been useful for guiding therapies [1]. The first, and best known, is the hyperinflammatory state that occurs due to excessive release of pro-inflammatory cytokines that lead to lung injury and procoagulant state [2,3]. The second hypothesis is the "immunological collapse" [2], which consists of failure in the host's immune system to contain viral replication. The result is an intense state of immunosuppression. A prospective observational study has published that although there is a significant release of pro-inflammatory cytokines, COVID-19 induces a profound suppression in T cells and in the production of interferon. The consequence is immunosuppression and the risk of opportunistic infections [2]. We present a case of a 57-year-old male patient with a severe case of COVID-19 pneumonia.

Case Report

A 57-year-old male patient consulted in our hospital for 7 days of respiratory symptoms associated with persistent fever. He had history of hypertension, diabetes mellitus 2, and smoking. Physical examination revealed respiratory distress and supplemental oxygen requirements. Laboratory finding included C-reactive protein (CRP) 112mg/L, procalcitonin 1.1ng/mL, leukocytes 7000U/L, lactate 30 mg/dL and tested positive for SARS CoV-2. Images were compatible with multifocal pneumonia due to COVID-19. Corticosteroids with dexamethasone and antibiotic therapy with ceftriaxone were started. Blood cultures and urine culture on admission were negative, as well as urinary antigen for *S. pneumoniae*. He evolved torpidly during the first days of hospitalization, requiring invasive mechanical ventilation and prone cycles. In addition, in context of coagulopathy due to COVID-19, he suffered pulmonary thromboembolism, requiring anticoagulation. The patient remained feverish and with increasing inflammatory parameters: leukocytes 15000U/L and CRP 85mg/L. CT scan, blood and endotraqueal cultures showed two simultaneous nosocomial infections, ventilator associated pneumonia and catheter-related bloodstream infection (CRBSI) due to a multi-resistant and extended spectrum beta-lactamases (ESBL) strain of Klebsiella pneumoniae Therefore, antibiotic therapy was changed to imipenem and nebulized amikacin was added. After 7 days, he presented a new clinical deterioration with hemodynamic instability and increase in inflammatory markers, without new pulmonary infiltrates. Blood and urine

cultures were obtained, identifying *Elizabethkingia miricola* in all blood cultures (peripheric and central catheter), meeting criteria for a new CRBSI, susceptible only to quinolones, so treatment with levofloxacin was started. After the infectious intercurrences, the patient progressed satisfactorily, was extubated 12 days after admission, and discharged from the intensive care unit (ICU).

Discussion

Nosocomial infections are considered a public health issue. They account for 7% in developed and 10% in developing countries [4]. In the European ICU's the prevalence is close to 20%, where a third of them are preventable. Each infection is associated with increased patient mortality, morbidity and length of ICU stay [5]. During COVID-19 highest incidence of severe cases, ICU´s were overcrowded and healthcare teams were susceptible to physical and emotional stress, both risks factors with a direct negative impact in occurrence of nosocomial infection events. Within the risk factors, we can classify them in two groups: The first one corresponds to healthcare factors such as length of hospital stay, invasive procedures or immunosuppressive treatments; and the second, to patient factors: age, comorbidities or acute illness and trauma [6]. Nosocomial infections display higher rates of drug-resistant organisms. Resistance occurs due to selective pressures from regular antibiotic use, causing evolution of existing bacteria. The most common mode of transmission is via healthcare workers and invasive procedures [6]. In the case of immunosuppressed patients, they are at high risk of opportunistic infections, some of them due to reactivation of latent infection and several due to nosocomial colonization after prolonged antimicrobial use. This has been reported by long-standing evidence [7]. In our patient there are two important considerations, firstly, a state of immunosuppression caused by COVID-19 disease and dexamethasone treatment and, secondly, antimicrobial selective pressure after broad spectrum drugs were used to treat previous nosocomial pneumonia and CRBSI, due to an opportunistic bacterium related to nosocomial environmental reservoir. Microorganisms in the genus *Elizabethkingia* are Gram-negative, aerobic, pale yellow-pigmented, nonmotile, glucose-non-fermenting, non-spore-forming, oxidase-positive, weakly indole-positive, and nitrate-negative bacilli. These bacterias are distributed in natural environments such as water, soils, fish, frogs, and insects, as well as in the tap water of hospitals. It is considered an emergent and nosocomial infection and its identification is also of clinical relevance given that they are usually susceptible to minocycline but resistant to most β-lactams, β-lactam/β-lactam inhibitors, carbapenems, and aminoglycosides [8]. *Elizabethkingia miricola* reports are sporadic. Cases of pneumonia, bacteremia, urinary tract infections, and periodontitis have been published in several years since 2003 [9]. In sum, COVID-19 disease produces a state of immunosuppression that can make the patient susceptible to getting opportunistic infections. This is essential for us, to be in alert for new nosocomial microorganisms and to strength both, infection control practices and antimicrobial control policies during COVID 19 pandemics..

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