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Increased prevalence of bloodstream infection with Klebsiella species in patients with recent COVID-19 infection

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To the Editor-in-Chief

In viral pandemics, the possibility of accompanied bacterial infections is always a serious challenge for health care providers. In the recent pandemic with COVID-19, studies showed an increase in bacterial infections in patients with COVID-19, especially those requiring intensive care unit (ICU) admission (1). Various meta-analyses have shown that the prevalence of some secondary bacterial infections, especially infection with Mycoplasma pneumoniae, Gram-negative germs like extended-spectrum beta-lactamase, and Klebsiella pneumoniae, has increased significantly (2). Recent studies have also shown that the pathogens that cause bloodstream infections have changed during the COVID-19 pandemic for a variety of reasons, including the widespread use of antibiotics, the effects of COVID-19 on the immune system, and so on. Increased prevalence of bloodstream infections with Gram-negative bacteria that are resistant to third generation of cephalosporins and carbapenems in patients with COVID-19 has been reported in several studies. Studies have also shown increased isolation of pathogens such as members of the Enterobacteriaceae family, including Klebsiella and Escherichia specimens, from blood cultures of patients hospitalized due to COVID-19 (3-5).

Klebsiella pneumoniae is a nosocomial pathogen and studies have warned about the outbreak of a resistant strain of this germ during the COVID-19 pandemic. Most of these studies have indicated that carbapenem-resistant Klebsiella was prevalent as a secondary infection among patients hospitalized due to COVID-19 (6-9). In addition to secondary infection, we have observed that the prevalence of bloodstream infection has also increased in patients who have previously been infected by COVID-19 and have recovered. Based on our observations at Shahid Beheshti Hospital in Qom, Iran, there has been an increase in the number of positive blood cultures for Klebsiella specimens compared to similar times before the pandemic. In the last 6 months, we had 6 positive blood cultures for Klebsiella pneumoniae, which is a significant increase compared to the time before the pandemic; and has increased by 40 percent, compared to a similar time before the pandemic. These 6 patients, had been infected with COVID-19, which was confirmed by Reverse transcription polymerase chain reaction (RT-PCR) test, about 1 to 2 months before their blood culture was found to be positive for Klebsiella pneumoniae, and they had recovered within one to two weeks. These 6 patients were between 60 to 80 years old, and 4 had type 2 diabetes and hypertension, while the other two did not have any specific underlying disease. All of them had anemia (mean hemoglobin level = 8.5 mg/dl) and lymphopenia (mean lymphocyte count = 780/µl) in their course of hospitalization. In addition to blood culture, Klebsiella species were isolated from one patient's pulmonary secretion culture and from another patient's urine culture. Klebsiella species isolated from blood culture were sensitive to meropenem, and these patients were treated with meropenem during their hospitalization. Five of these six patients were discharged with improvement in general condition, but one patient expired.

Based on our observations, it is possible that COVID-19 infection may predispose individuals to septicemia with Klebsiella species. Further studies with appropriate controls are needed in this area.

Declarations

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Authors' contribution

All the authors met the standards of authorship based on the recommendations of the International Committee of Medical Journal Editors.

Conflict of interest

The authors have no conflicts of interest to declare.

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