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Retrospective Study on Bacteremia in COVID-19 Patients in the Delta and Omicron Era

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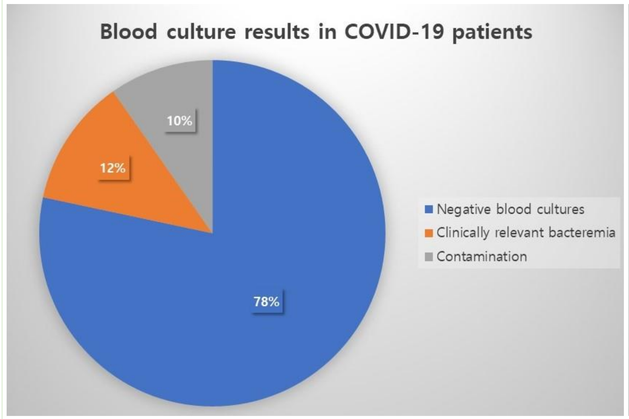
Background

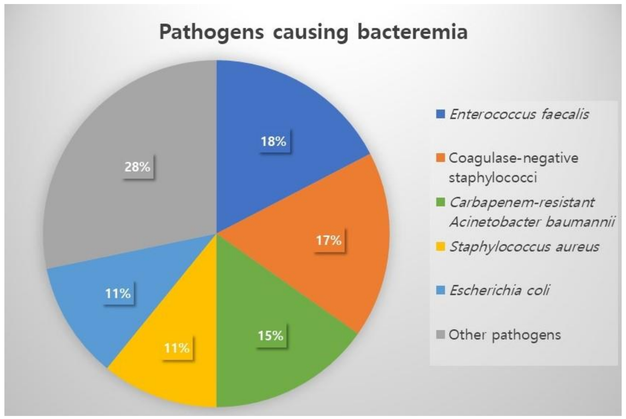
- The coronavirus disease 2019 (COVID-19) pandemic has affected hundreds of millions of people across the globe since its emergence in December 2019.
- The outbreak caused by this constantly evolving virus reached peak levels in South Korea as the Delta variant, dominant from late August until the end of 2021, was rapidly overtaken by the Omicron variant at the start of 2022.
- A few studies on bacteremia in COVID-19 patients conducted near the start of the pandemic mostly showed that the occurrence of bacteremia in COVID-19 patients was relatively low compared to previous years, and also compared to other viral diseases such as influenza.
- We aimed to determine the rate of bacteremia in COVID-19 patients in the delta and omicron era.

Methods

- In South Korea, patients diagnosed with COVID-19 who require inpatient treatment are referred to certain government-designated hospitals. A retrospective study was performed at one of these referral hospitals.
- Patients over 18 years of age who were diagnosed and admitted for COVID-19 between September 2021 and March 2022 were included in the study. Patients were excluded if there were no blood cultures results after the diagnosis of COVID-19.
- Blood culture results were recorded, along with the demographic characteristics and clinical outcomes of the patients.
- Contamination was considered when a single blood culture was positive for coagulase-negative staphylococci (CoNS), *Corynebacterium* species, or *Bacillus* species.
- Clinically relevant bacteremia was defined as bacteremia due to clinically significant pathogens between 7 days before COVID-19 diagnosis to 14 days after diagnosis.

Results





- A total of 388 patients who were diagnosed with COVID-19 were admitted between September 2021 and March 2022. Twenty-eight patients who had no blood culture results were excluded.
- Among the 360 patients included in the final analysis, 78 (21.7%) patients had positive blood cultures at least once during their admission period. According to our case definition, a total of 46 cases from 43 (11.9%) patients were considered to be clinically relevant bacteremia.
- *Enterococcus faecalis* (17.4%) and CoNS (17.4%) were the most common pathogens identified, followed by *Acinetobacter baumannii* (15.2%), *Staphylococcus aureus* (10.7%) and *Escherichia coli* (10.7%).
- The mean age of the patients with clinically relevant bacteremia was 69.7 ± 13.8 years, and 25 (58.1%) of them were male. The median number of days from COVID-19 diagnosis to identification of bacteremia was 2 days.
- There was no significant difference in the rate of bacteremia between the Delta (September-December 2021) and Omicron variant eras (January-March 2022) (12.2% vs. 11.7%, $P = .88$).
- In the subgroup analysis of patients who received more than 2 days of intensive care, there was no statistical difference in the rate of bacteremia (14.5% [9/62] in the Delta variant era vs. 16.9% [14/83] in the Omicron variant era; $P = .70$).
- Mortality was significantly higher in patients with clinically relevant bacteremia, compared to those without (48.8% vs. 19.2%, $P < .001$).

Conclusions

- Many of the moderate-to-severe COVID-19 patients admitted to our hospital had concomitant bacteremia, especially in the intensive care unit. There was no statistically significant difference in the rate of bacteremia between the Delta and Omicron variant eras.
- Although using antibiotics as empiric treatment for all COVID-19 patients is not recommended, clinicians should suspect bacterial co-infection when a COVID-19 patient is clinically aggravated, and initiate appropriate treatment.
- Since this study was based on a single tertiary hospital in South Korea, the results may be hard to generalize in different hospital settings or other countries. Further studies including a larger population with a wider spectrum of patients are warranted to guide future treatment.

References

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