STAPHYLOCOCCUS AUREUS RECOVERED FROM BLOODSTREAM INFECTIONS DURING THE COVID-19 PANDEMIC: ANTIMICROBIAL RESISTANCE AND MOLECULAR EPIDEMIOLOGY

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ABSTRACT:
The exacerbated use of antimicrobials during the COVID-19 pandemic may impact the resistance rates of *Staphylococcus aureus*, one of the main agents of bloodstream infections (BSI). We aimed to evaluate the antimicrobial resistance and molecular epidemiology of 68 *S. aureus* isolates recovered from BSI from patients admitted from March 2020 to March 2021, at a University Hospital in Rio de Janeiro, of which, 17 isolates were recovered from patients with COVID-19. Antimicrobial resistance was determined by disk-diffusion and broth microdilution. *SCCmec*, PFGE and MLST defined the lineages. The methicillin resistant *S. aureus* (MRSA) isolation rate was 48.5% (33/68), with 6.1% (2/33) of these characterized as susceptible dose dependent (SDD) to ceftaroline. All isolates were susceptible to linezolid, trimethoprim-sulfamethoxazole, and vancomycin, and no heteroresistant to vancomycin *S. aureus* (hVISA) isolate was identified. Overall, 10.3% (7/68) of *S. aureus* isolates were non-susceptible to daptomycin, 1.5% was resistant to rifampicin, 13.2% to gentamicin, 25% to ciprofloxacin, 55.9% to erythromycin and 38.2% to clindamycin. The occurrence of MRSA BSI was associated with patients diagnosed with COVID-19, also presenting higher resistance rates for clindamycin and erythromycin (p-value < 0.05). Azithromycin was frequently used among these patients and, therefore, its use could be associated with erythromycin resistance among *S. aureus* isolates. Among the 33 MRSA isolates, we observed the prevalence of USA800/ST5/SCC*mec*IV (39.4%) and USA100/ST105/SCC*mec*II (27.3%) lineages, irrespective of COVID-19 diagnosis. Noteworthy, 10 (30.3%) *S. aureus* isolates were associated with community lineages, such as USA1100/ST30/SCC*mec*IV (9.1%) and USA300/ST8/SCC*mec*IV (21.2%), one of them being related to the Latin American variant (USA300/ST8/SCC*mec*IV-LV). The *pvl* gene, which encodes for the Panton-Valentine leukocidin, was detected in 13 (19.1%) isolates, being most of them characterized as MRSA (76.9%) and associated with the USA300 and USA1100 clones. We conclude that the prior use of azithromycin among COVID-19 patients impacted the rate of clindamycin and erythromycin resistance. In addition, the prevalence of USA800 clone and the emergence of the community USA300 lineage indicate a replacement of previously well stablished clones circulating in the hospital during the pandemic period. Surveillance and control measures for BSI caused by *S. aureus* are constantly necessary.

Keywords: *Staphylococcus aureus;* Bloodstream infection; COVID-19; MRSA; antimicrobial resistance

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