Emergence of SPM-producing *Pseudomonas aeruginosa* in different hospitals in Northern Brazil: an analysis in the context of the COVID-19 pandemic.

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Introduction: Risk factors such as prolonged hospitalization, use of invasive devices and indiscriminate use of antimicrobials, common in the context of the pandemic, may be favoring the spread of carbapenemases producing microorganisms, especially *P. aeruginosa*, which is one of the most common associated opportunistic pathogens to nosocomial respiratory infections. Among the main mechanisms, metallo-β-lactamases (MβLs) are particularly important due to their ease of intra and interspecies dissemination. This work report the circulation of SPM-producing *P. aeruginosa* in different hospitals in Northern Brazil. **Materials and method:** The isolates are part of the culture collection of the Bacteriology and Mycology Section of Instituto Evandro Chagas, received from the State Central Laboratory for epidemiological surveillance of bacterial isolates resistant to carbapenems from different hospitals in the State of Pará, Northern Brazil. The analysis was carried out in two periods: the years 2018 to 2019 that preceded the pandemic and the years 2020 to 2021 referring to the pandemic period were evaluated. The detection of genes encoding carbapenemases was performed by PCR, where the presence of genes *bla*$_{KPC}$, *bla*$_{NDM}$, *bla*$_{OXA-48-LIKE}$, *bla*$_{IMP}$, *bla*$_{VIM}$ and *bla*$_{SPM-1}$ were investigated. **Discussion of results:** A total of 238 isolates of *P. aeruginosa* were evaluated, 41 (17.2%) were SPM-producing. In the years 2018 to 2019, 110 isolates were evaluated, of which 13 (11%) were SPM-producing and, in the current period of the pandemic, in the years 2020 to 2021, 128 isolates were evaluated. In this last period, an increase in the detection of MβL was observed, among them 28 (22%) isolates were SPM-producing. A two-fold increase in the circulation of the *bla*$_{SPM-1}$ gene was observed in the pandemic period, in seven different hospitals, making it necessary to investigate its contribution to patient morbidity and mortality. **Conclusion:** We report the circulation of SPM-producing *P. aeruginosa* in different hospitals in the State of Pará. This occurrence it was infrequent in the Northern region however the COVID-19 pandemic has been modifying this scenario, providing an increase in the number of nosocomial infections and the spread of multiresistant isolates with important genetic mechanisms such as

MβLs. We emphasize the importance of maintaining the monitoring of these mechanisms of resistance, especially in view of the uncertain scenario that the pandemic will leave behind.

Keywords: P. aeruginosa, metallo-betalactamase, COVID-19 pandemic

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