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Recurrent outbreak of *Serratia marcescens* infections in a Tunisian ICU

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Background: the aim of this study was the epidemiological investigation of three consecutive outbreaks of *S. marcescens* infections in an ICU of a university hospital in Sfax Tunisia over a 13-months period.

Material/methods: The outbreaks have occurred from February 2014 to March 2014 (outbreak 1) involving 3 patients, from August 2014 to November 2014 (outbreak 2) involving 12 patients and during February 2015 (outbreak 3) involving 4 patients. The outbreak investigation included case identification, review of medical records, environmental cultures, Spe-1 pulsed-field gel electrophoresis (PFGE) and PCR-sequencing.

Results: A total of 50 clinical (39 blood cultures, 10 catheters and 1 urine from 19 patients) and 1 environmental *S. marcescens* isolates were recovered. All isolates belonged to 4 PFGE types. In outbreak 1, all clinical *S. marcescens* isolates were genetically indistinguishable belonging to PFGE type I. In outbreak 2 and 3, the PFGE type II prevailed and was recovered also from the sink drain. Curiously, during the last outbreak two wild type isolates acquired an OXA-48 carbapenemase as these resistant isolates had the same pulsotype of the wild type.

S. marcescens acquisition was identified after an average length of stay of 15 days. Case fatality rate of the 19 *S. marcescens* bloodstream infections was 38%. Finally, enhanced hygiene measures, especially hand hygiene, controlled the outbreak.

Conclusions: The PFGE type II epidemic strain of *S. marcescens* spread rapidly and threatened to become endemic and multi-drug-resistant in this ICU. Transient carriage on the hands of healthcare

personnel was the likely mode of transmission. Moreover, this study confirms the rapid transfer and acquisition of *bla*_{OXA-48} in an OXA-48 carbapenemase endemic setting.