

Genetic characterisation of Carbapenem-resistant *Providencia rettgeri*: Outbreak isolates from tertiary hospital



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Background: Emergence of resistance to multiple antimicrobial agents among the pathogenic Enterobacteriaceae is on the rise posing a significant public health threat as there are limited effective antimicrobial agents for treatment. Carbapenem-resistant *Providencia rettgeri* (*P. rettgeri*) belong to this category of resistant bacteria that were recently labeled as superbugs due to its intrinsic resistance to colistin which is one the commonly used drug for these multidrug resistant Enterobacteriaceae. The study sought to characterise the identified carbapenem-resistant *Providencia rettgeri* and determine if the isolates are clonally related.

Material/methods: A *P. rettgeri* outbreak was identified over a period of 3 months at an Academic Hospital in South Africa. The outbreak involved patients sharing a hospital unit and dialysis machine. Four carbapenem-resistant *P. rettgeri* isolates were included in the study. Multiplex polymerase chain reaction (PCR) was used to identify the resistant genes and clonality was determined using pulsed field gel electrophoresis (PFGE). Percentage of relatedness was determined by means of Dice coefficient method. Clinical and demographic characteristics of four cases with Carbapenem-Resistant *P. rettgeri* were documented.

Results: All *P. rettgeri* isolated in these cases had carbapenem resistant antibiogram with resistance to imipenem, ertapenem and meropenem. All isolates had *bla*_{NDM} and demonstrated genetic clonality.

Conclusions: Caution in the usage of common equipment such as dialysis machines, to prevent the transfer of the bacteria is recommended. Proper sterilisation and cleaning of equipment is of paramount importance in the prevention of microbial contamination and infection. A point prevalence surveillance of colonisation must be conducted on a regular basis for early detection of environmental and equipment contamination. Cohorting of patients infected and colonised by resistant organisms may limit the spread of infection to other patients in the unit. Education of healthcare personnel and emphasis on universal precaution will play a pivotal role in preventing and controlling the outbreak. The use of hand hygiene must be reiterated to healthcare personnel, as proper hygienic practices are important in the prevention of bacterial infections in a healthcare facility setup.

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