Characterization and colistin susceptibility of carbapenem resistant isolates of *Pseudomonas aeruginosa* and *Acinetobacter baumannii* in a tertiary care hospital

ABSTRACT

BACKGROUND

Non-fermenting bacilli such as *Pseudomonas aeruginosa* and *Acinetobacter baumannii* are the most common pathogens in nosocomial infections especially lower respiratory tract infections and sepsis. Management is difficult as these isolates often show intrinsic and acquired resistance to multiple classes of antibiotics. Multidrug resistance is more common since most of the resistance mechanisms are plasmid mediated.

The introduction of carbapenem was a great advance in the treatment of severe infections caused by multi-drug resistant bacteria. The emergence of Carbapenem resitant *Pseudomonas aeruginosa* and *Acinetobacter baumannii* has led to the reconsideration of colistin, a polymyxin-E antibiotic that causes nephrotoxicity. In this background, this study aims to determine the prevalence of carbapenem resistance in *P.aeruginosa* and *A.baumannii* and to characterize the resistance mechanisms and their colistin susceptibility.

AIMS AND OBJECTIVES

To determine the prevalence of Carbapenem resistance in *Pseudomonas aeruginosa* and *Acinetobacter baumannii* isolates, to characterize the resistance mechanisms and to evaluate the invitro activity of Colistin against the isolates in a tertiary care hospital.

MATERIALS AND METHODS

150 clinically significant, non-repetitive isolates of *P.aeruginosa* and *A.baumannii* from various samples were collected during April 2016 – March 2017. Antimicrobial susceptibility pattern was determined by Kirby-Bauer disc diffusion method and reported according to CLSI guidelines 2016. Carbapenem resistant isolates were tested for carbapenemase, metallo betalactamase and AmpC betalactamase. Colistin susceptibility was tested by E-test for carbapenem resistant isolates. Molecular characterization was done for metallobetalactamase producers in *P.aeruginosa* and carbapenemase producers in *A.baumannii.*

RESULTS

29.3% of *P.aeruginosa* and 50.7% *A.baumannii* were multidrug resistant (MDR); of this 12% of *P.aeruginosa* and 13.3% of *A.baumannii* were carbapenem resistant. Carbapenem resistance was predominantly observed in respiratory specimens from intensive care units. Efflux pump over expression followed by metalloβ-lactamase was the predominant mechanism for carbapenem resistance in *P.aeruginosa* while in

A.baumannii, carbapenemase (oxacillinase type) was the predominant mechanism. Carbapenem resistant isolates were also resistant to many other antibiotics but 100% susceptible to colistin.

CONCLUSION

Active surveillance of carbapenem resistance and implementation of strict infection control practices are necessary to prevent the transmission of resistance in the community. MIC tesing of colistin is mandatory before administration to prevent the emergence of colistin resistance.

KEY WORDS

Carbapenem resistance, *P.aeruginosa*, *A.baumannii*, Metallobetalactamase, Colistin susceptibility