Isolation and Characterization of NDM-1 Producing Klebsiella Pneumoniae from Three Palestinian Hospitals

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ABSTRACT

Klebsiella pneumonia can cause a wide range of infections, including meningitis, bacteremia, wound infection, pneumonia, urinary tract infection, etc. This organism is becoming resistant to a large group of antibiotics, especially β-lactam antibiotics. Polymerase chain reaction PCR was used to detect carbapenemases-encoding genes. Clonal relationships were analyzed by Pulsed Field Gel Electrophoresis (PFGE). Evolution of these enzymes in Palestinian hospitals.

Keywords: Infection; Pneumonia; Antibiotics

INTRODUCTION

Klebsiella pneumonia can cause a wide range of infections, including meningitis, bacteremia, wound infection, pneumonia, urinary tract infection, etc. This organism is becoming resistant to a large group of antibiotics, especially β-lactam antibiotics. The reason for multidrug resistance may be the production of extended-spectrum β-lactamases (ESBLs), carbapenemases/metallo β-lactamases or AmpC β-lactamases or changes in the bacterial cell wall structure. The aim of the present study was to isolate and characterize of Carbapenemases resistant Klebsiella pneumonia isolated from the patients admitted to one of three Palestinian hospitals (Palestinian medical complex, Rafedia Surgical hospital, and Beit Jala Governmental hospital) west bank Palestine.

MATERIALS AND METHODS

19 Klebsiella pneumoniae CRE isolates collected from three hospitals during the period from June 2017 to February 2018. Antibiotics susceptibility testing was performed by standard disc diffusion method (Kirby Bauer) Except Colistin and Meropenem (done by E test) as recommended by CLSI 2017 and CLSI 2018, Combination disc method, Modified Hodge test, Modified Carbapenem Inactivation Method mCIM, EDTA Carbapenem Inactivation Method eCIM, EDTA-IPM vs IPM disc synergy test and Cefoxitin disc test were performed for detection of ESBLs, carbapenemases, metallo β-lactamases, and AmpC β-lactamases, respectively. Polymerase chain reaction PCR was used to detect carbapenemases-encoding genes. Clonal relationships were analyzed by Pulsed Field Gel Electrophoresis PFGE.

RESULTS

19 carbapenem-resistant Klebsiella pneumoniae were isolated from wounds, sputum and blood specimens, all the isolates were resistant to all the β-lactam antibiotics including the Carbapenems and all these isolates harbored blaNDM-1 genes. Two clinical Klebsiella pneumoniae isolates harboring both blaNDM-1 and blaOXA48. Two others harboring both blaNDM-1 and blaKPC2, the blaCTXM, blaSHV and blaTEM genes were also present in most isolates. PFGE analysis showed that blaNDM-1 producing Klebsiella pneumoniae were clonally related.

CONCLUSION

Increased frequency of multi-drug resistance supports the need for continuous surveillance to determine prevalence and evolution of these enzymes in Palestinian hospitals.

REFERENCES


