Increased prevalence of 16S rRNA methylase genes in Entero bacterial isolates in two Greek hospitals in a three year period

Galani I1, Moraitou H2, Orlandou K1, Nafplioti K1, Vogiatzakis E2, Petrikkos G1, Souli M1
1nd Department of Internal Medicine, Athens University School of Medicine
2Department of Clinical Microbiology, ‘Sotiria’ General and Chest Diseases Hospital

ABSTRACT

The worldwide dissemination is becoming a serious global concern and this potential to spread horizontally and may in part explain the rapid worldwide distribution among Enterobacteriaceae family and non-glucose-fermenting bacilli of human and animal origin.

One great concern is the multidrug resistance development in RMT producing pathogenic bacteria through further accumulation of various antimicrobial resistance genes such as carbapenem-hydroplyzing β-lactamases. More worrisome is the emergence of members Enterobacteriaceae family co-producing NDM-1 metallo-β-lactamase and RMTs (RmtB, RmtC and ArmA) often located on the same broad 

INTRODUCTION

Methylation of 16S rDNA with RNA methylase genes in Entero bacterial isolates has been reported previously in 0.2% of Klebsiella pneumoniae isolates isolated from November 2007 to October 2009 in “Attikon” University Hospital. Klebsiella pneumoniae, Providencia stuartii, Providencia rettgeri, Morganella morganii and Providencia rettgeri produced 16S rRNA methyltransferases (RMTs) in 8/31 (25.8%) strains, which were highly resistant to all the used antibiotics and showed different resistance patterns to colistin, amikacin and tigecycline. Only one out of 31 Providencia rettgeri and Providencia rettgeri isolates were isolated in a tertiary hospital in Athens during 2011, 2012 and 2013, whereas the rest belonged to the same clone while two other clones included 22 and 15% of the isolates, respectively. All RMT producing isolates were multidrug-resistant, and highly resistant to all clinical used antibiotics. Thus far, RMTs have been reported from at least 30 countries or regions. RMTs (RmtB, RmtC and ArmA) often located on the same broad 

METHODS AND MATERIALS

One hundred and five (n=105) Enterobacteriaceae isolates resistant to both amikacin and gentamicin consecutively collected during a three year period (March 2010 - Feb 2013) in our Infectious Diseases Laboratory, as well as 70 MDR (including antimicrobics) K. pneumoniae isolates isolated from November 2007 to October 2009 at “Attikon” University Hospital. Providencia rettgeri isolates were collected at different times during a three year period. All of them were positive for both and highly resistant in all clinical used antibiotics. Providencia rettgeri and Providencia rettgeri isolates were isolated at the same clone while two other clones included 22 and 15% of the isolates, respectively. All RMT producing isolates were multidrug-resistant, and highly resistant to all clinical used antibiotics. Thus far, RMTs have been reported from at least 30 countries or regions. RMTs (RmtB, RmtC and ArmA) often located on the same broad 

RESULTS

Thirty-one RMT bearing isolates were highly resistant to all clinical used antimicrobics tested (MICs ≥512 μg/mL) and highly resistant to all used clinical aminoglycosides. All but one Providencia rettgeri and Providencia rettgeri isolates belonged to the same clone while two other clones included 22 and 15% of the isolates, respectively. All RMT producing isolates were multidrug-resistant, and highly resistant to all clinical used antibiotics. Thus far, RMTs have been reported from at least 30 countries or regions. RMTs (RmtB, RmtC and ArmA) often located on the same broad 

CONCLUSIONS

Increased prevalence of RMT-positive K. pneumoniae and Providencia rettgeri isolates in Greek hospitals, may have been increasing isolated in Greek hospitals as a result of the extensive use of antibiotics of last resort such as colistin and tigecycline.

The spread of RVT producing both carbapenemases and 16S rRNA methylasises raises clinical concern and may become a major therapeutic threat in the future.