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Infection Control: Clinical epidemiology of nosocomial infections

First description of KPC-3 producing *Klebsiella pneumoniae* in an acute care hospital in the north of Portugal

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Objectives:

Klebsiella pneumoniae andKPC-carbapenemases share a common history. *Klebsiellapneumoniae* isolates producing KPC-carbapenemases were described worldwide,and are today an endemic public health threatening problem, in some countries,with a relatively high hospital infection specific mortality. In Portugal,KPC-3 producing *Klebsiella pneumoniae*has been reported in multiple isolates in the center of the country, but in theNorth, KPC-3 has never been reported in *Klebsiellapneumoniae,* till now. A KPC-3harboring *Escherichia coli* isolatehas already been reported in our previous work. Here we describe the arrival of KPC-3 producing *Klebsiellapneumoniae* to an acute care hospital in the North of Portugal.

Methods:

Identification and susceptibility tests wereperformed by Vitek2 automated system. Carbapenem resistance mechanism wasinvestigated by phenotypic methods by E-test IP/IPI. Carbapenemase coding genes(*bla*$_{IMP}$, *bla*$_{VIM}$, *bla*$_{NDM}$, *bla*$_{KPC}$and *bla*$_{OXA-48}$) were screened by PCR using specificprimers. Amplified products were sequenced and compared to sequences availablein the GeneBank database.

Results:

Three multidrug-resistant *Klebsiellapneumoniae* isolates were detected from November 2012 to September 2013,from different biological samples (urine n=1, bronchial aspirate n=1, expectoration n=1). Patient agesvaried from 38 to 97 years old. One of the patients was admitted to the intensivecare ward and two of them were in medicine. All the isolates showed resistanceto at least one carbapenem (ertapenem n=3 MIC≥8, meropenem and imipenem n=2MIC≥16). However, antimicrobial susceptibility phenotypes were found to bedifferent. The only associate resistance common to all isolates was tothrimethoprim/sulfamethoxazole. One isolate showed a resistance phenotype to aminoglycosides (resistant to gentamicin and tobramycin; intermediate to amikacin), asecond one to nitrofurantoine, minocicline and fluoroquinolones (resistant tociprofloxacin and levofloxacin), and the third one was also resistant tociprofloxacin, and intermediate to levofloxacin and tobramycin.Metallo-beta-lactamases detectionby Etest MIC determination for imipenem and imipenem+EDTA was negative. PCRamplification and sequence revealed the presence of *bla*$_{KPC-3}$ in all isolates.

Conclusion:

Asfar as we know, this is the first description of KPC-3 producing *Klebsiella pneumoniae* clinical isolates, in the North of Portugal, althoughseveral isolates have already been described in the center of the country. Urgent application of strict infection control measures andactive antibiotic resistance surveillance should be implemented to avoidfurther dissemination in the hospital. One of the patients from whom aKPC-3 producing *Klebsiella pneumoniae*was isolated, was transferred from a hospital in the center of Portugal.Importation by inter-hospital dissemination of KPC-3 producing *Klebsiella pneumoniae* is therefore somethingto consider. Nevertheless we cannot exclude horizontal gene transfer, once wehave already described a KPC-3 producing *Escherichiacoli* isolated in the same hospital. Clonal relationships and conjugationmust be addressed in future work.