TITLE: LABORATORY DETECTION AND MOLECULAR EPIDEMIOLOGY OF *KPC*-PRODUCING *K. pneumoniae* IN PUBLIC HOSPITAL IN SOUTHERN BRAZIL

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ABSTRACT:
Carbapenem-resistant *Enterobacteriaceae*, which cause infections with limited treatment options and high mortality, are a major public health concern. The most common carbapenemase is *Klebsiella pneumoniae* carbapenemase (KPC), since its first report in 2001 (EUA), it has increasingly caused clinical infections worldwide. The aim of this study was to identify the presence of carbapenemase-producing *K. pneumoniae* (CP-KP) by phenotypic and genotypic methods and characterize the clonal diversity of these isolates from a public hospital in the southern of Brazil. Carbapenem-resistant *K. pneumoniae* (CR-KP) from 33 clinical samples and rectal swabs collected from january 2014 to june 2015 were included. The antimicrobial susceptibility profile was determined by *Phoenix* BD™ and carbapenem minimum inhibitory concentration (MIC) was confirmed by E-test, following CLSI guidelines. Phenotypic tests such as Modified Hodge Test (MHT) and enzyme inhibitors - ethylenediaminetetraacetic acid (EDTA), phenylboronic acid (PBA) and cloxacillin - were performed in all isolates and they were submitted to polymerase chain reaction (PCR) for bla_{KPC}, bla_{OXA-48}, bla_{NDM}, bla_{VIM}, bla_{SIM}, bla_{GIM}, bla_{SPM} and bla_{IMP} genes. The genetic relatedness was evaluated using strain clustering by Enterobacterial repetitive intergenic consensus (ERIC)-PCR. All isolates were ertapenem resistant; 60.0% meropenem resistant and 52.0% imipenem resistant. There were 17 (51.5%) isolates KPC-2 producing. Regarding phenotypic tests, all CP-KP were positive in THM and PBA-test. In our study, sensitivity of MHT and PBA-test for KPC detection was 100.0%. Strain clustering by ERIC-PCR identified five *clusters* (A, B, C, D and E) containing 4, 3, 5, 12 and 2 isolates, respectively. The CR-KP dissemination was polyclonal in hospital studied, but 36.4% of isolates were from main *cluster* D. Among KPC-producing isolates, *cluster* D represents 65.0% of these and includes isolates from 2014 and 2015; *Cluster* C represents 24.0% of KPC producers. Prevalence of main *cluster* D is probably resulting of cross-transmission, and standard infection control practices must be emphasized. We report a pattern of polyclonal spread in CR-KP and predominance of clonal populations among isolates of KPC-producing *K. pneumoniae*. More studies to optimize the detection of carbapenemases are required, thus contributing to the control and prevention of healthcare-associated infections and implementation of public policies to control spread of these pathogens.

Keywords: *Enterobacteriaceae*, KPC, phenotypic test, clonal dissemination.