

TITLE: LABORATORY DETECTION OF CARBAPENEMASE-PRODUCING *Klebsiella pneumoniae* AT THE HOSPITAL UNIVERSITÁRIO ANTÔNIO PEDRO, NITERÓI.

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ABSTRACT:

Background: Carbapenem-resistant *K. pneumoniae* (CRKP) has been emerged as a problematic infectious pathogens worldwide. The mechanisms underlying carbapenem resistance in CRKP include the production of carbapenem-hydrolyzing β -lactamases. An increasingly diverse range of carbapenem-hydrolyzing enzymes are being recognised, including Class A serine- β -lactamases (KPC), Class B metallo- β -lactamases (NDM) and carbapenem-hydrolysing Class D oxacillinases (OXA-48-like). Here, we performed phenotypic and molecular detection of carbapenemase production among CRKP isolates recovered from Hospital Universitário Antônio Pedro (HUAP). **Materials and Methods:** We included 14 *K. pneumoniae* isolates recovered from clinical samples of patients admitted to HUAP (from July/2018 to April/2019). We only considered one isolate per patient. Bacterial identification and antimicrobial susceptibility testing were performed using the BD Phoenix™. Modified Hodge test and modified carbapenem inactivation method (mCIM) in conjunction with EDTA-modified carbapenem inactivation method (eCIM) were used for phenotypic detection of carbapenemase production. For molecular investigations, bacterial DNA extraction was performed by thermal lysis and a conventional PCR assay was performed to detect carbapenemases genes (*bla*_{OXA-48-like}, *bla*_{KPC}, and *bla*_{NDM}). **Results:** According to the results of the antimicrobial susceptibility testing, the majority of antimicrobials tested showed elevated resistance rate. Ciprofloxacin, cefepime, ceftazidime, imipenem, meropenem, ertapenem, ceftriaxone and piperacillin/tazobactam showed the highest resistance rate (100%, n = 14), followed by ampicillin-sulbactam and sulfamethoxazole-trimethoprim (86.6%, n = 13). Amikacin showed the highest susceptibility rate (86,6%, n = 13). Phenotypic analysis allowed us to discriminate between serine- and metallo-carbapenemases. The presence of *bla*_{KPC} gene was confirmed in 13 CRKP isolates (86.6%). Results obtained from mCIM/eCIM indicated, for *bla*_{NDM}-positive (n=1) CRKP isolate, the zone of inhibition of meropenem was 23mm. None was positive for *bla*_{OXA-48-like}. **Conclusions:** In the past years, the increase in carbapenem-resistant organisms has become an important medical issue around the world. Here, we observed *bla*_{KPC} is the main carbapenemase gene in our hospital. Our study indicate mCIM in conjunction with eCIM is an effective method to identify the carbapenemases producers among CRKP clinical isolates.

Keywords: *Klebsiella pneumoniae*, carbapenem resistance, KPC, NDM.