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PERFORMANCE ASSESSMENT OF THREE PHENOTYPIC TESTS FOR CARBAPENEMASE DETECTION IN *ENTEROBACTERALES*

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Carbapenemase-producing *Enterobacterales* (CPE) pose a significant threat in hospital settings, especially in intensive care units, from both therapeutic and epidemiological perspectives. Rapid identification is crucial. This study aimed to evaluate the three phenotypic methods used in routine diagnostics. The study included 56 clinical isolates of carbapenem-resistant *Enterobacterales* collected from patients hospitalized at the University Clinical Center (UCC) in Niš. Among these isolates, 52 were confirmed as carbapenemase producers, while four lacked carbapenemase genes. Genotypic detection was performed using multiplex polymerase chain reaction targeting the *bla*KPC genes encoding *Klebsiella pneumoniae* carbapenemase, *blaVIM gene* encoding Verona integron metallo-beta-lactamase (VIM), *bla*NDM gene encoding New Delhi metallo-beta-lactamase, and *bla*OXA-48 genes encoding Oxacillinase-48 carbapenemase. The evaluated phenotypic methods included the NG-Test Carba 5, the RAPIDEC Carba NP test (RCNP), and a commercial combination disk test (CDT)—KPC, MBL, and OXA-48 Confirm Kit: Carbapenemases. Multiplex PCR revealed: 2 KPC producers; 24 NDM producers; 16 OXA-48-like producers; 10 isolates producing both NDM and OXA-48 enzymes. One isolate of *Enterobacter cloacae* was identified as a co-producer of NDM, KPC, and OXA-48 enzymes, and one isolate of *Klebsiella pneumoniae* was identified as a co-producer of NDM and KPC enzymes. The sensitivity and specificity of the NG-Test Carba 5 were 98.08% and 100.00%, respectively. In the Carba NP test, after 120 minutes, sensitivity and specificity were 90.38% and 100%, respectively. For the CDT method, the sensitivity and specificity for detecting metallo-β-lactamases using dipicolinic acid were 80.56% and 100%, respectively, while for detecting class D carbapenemases using temocillin, they were 95.65% and 100%, respectively. The best results in detecting specific classes of carbapenemases were achieved with the NG-Test Carba 5 and the CDT method. These methods could be employed for rapid and reliable detection of carbapenemases in routine diagnostics.

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