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RESEARCH ARTICLE

Frequencies New Delhi Metallo-β-Lactamase (NDM) in Klebsiella pneumoniae Isolates from Clinical Samples in Al-Basrah Governorate, Iraq

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ABSTRACT

Background: Metallo-β-lactamases (MBL) genes are crucial for resistance to antibiotics, and early detection is essential for infection control and prevention of nosocomial outbreaks.

Methods: One hundred fifty clinical samples from Basrah hospitals were collected between October and December 2022 and categorized equally into 50 samples for each sputum, urine, and wound swab. *K. pneumoniae* isolates were identified morphologically and tested on MacConkey and blood agar. The *Klebsiella pneumoniae* chromogenic medium and Vitek®2 system was used as confirmation tests. Genomic DNA extracted from *K. pneumoniae* isolates using a commercial purification kit. The DNA extraction was amplified using PCR for 16S rDNA amplification *K. pneumoniae* isolates using a specific primer of approximately (130bp). *K. pneumoniae* carbapenemase (KPC) chromogenic agar and modified hodge test, according to CLSI were used to test the *K. pneumoniae* isolates for detect the ability of carbapenemase production. Plasmid DNA was extracted from *K. pneumoniae* isolates and plasmid DNA was amplified using PCR to detect the bla_{NDM} gene using a specific primer of approximately (621bp).

Results: From November to December 2022, one hindered fifty samples were investigated for bacterial growth, of which gave 82 (56%) were positive and 68 (45.4%) had negative results. Grame-positive bacteria were 28(34.1%), while Gram-negative bacteria were 54(64.9%), including *Klebsiella pneumonia* 32(59.26%), *E. coli* 16 (29.63%), *Klebsiella spp.* 3 (5.56%), *Pseudomonas spp.* 2 (3.7%), and 1(1.85%) *Proteus spp*. All *K. pneumoniae* isolates showed mucoid pink, white, and purple appearances on MacConkey agar, blood agar, and *K. pneumoniae* chromogenic medium, respectively. The vitek®2 system showed 100% accuracy results in biochemical tests and *K. pneumoniae medium*. The PCR technology was used to diagnose gene 16S rDNA. The results showed that all (n = 32) *K. pneumoniae* isolates had a molecular weight of (130 bp) when compared with the standard molecular DNA ladder (200 bp). On the other side, the (n=32) *K. pneumoniae* isolates tested on *Klebsiella pneumoniae* carbapenemase chromogenic agar and modified Hodge test, 16 (50%) showed positive results and 16 (50%) showed negative results for carbapenemase production in both methods. On the other side PCR molecular diagnostics the bla_{NDM} gene results showed that all (n = 32) *K. pneumoniae* isolates revealed a molecular weight of (621 bp), when compared with the standard molecular DNA ladder (200 bp).

Conclusions: To select the best treatment and avoid losses time and money, use *Klebsiella pneumoniae* carbapenemase (KPC) chromogenic agar, modified Hodge test, and PCR techniques for daily antibiotic susceptibility testing in hospital and private clinical laboratories.

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