

## Phenotypic and Genotypic Characterization of Carbapenem Resistant *Acinetobacter baumannii* Clinical Isolates from Alexandria

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Antibiotic use in Egypt is largely under-regulated leading to the formation of resistant isolates. Carbapenems are last resort agents for treating infections of *Acinetobacter baumannii* that are resistant to other antibiotic classes. Alarming, however, carbapenem-resistant isolates are emerging. This research aimed at characterizing seventy-four carbapenem-unsusceptible A, both phenotypically and molecularly. *Baumannii* isolates from Egypt to detect the various enzymes responsible for the resistance to carbapenem.

Carbapenemase development was assessed using a variety of phenotypic methods: Modified Hodge Test (MHT), Carbapenem Inactivation (CIM), Combined Disk Test (CDT), CarbAcineto NP test, and boronic acid testing. The Polymerase Chain Reaction (PCR) was used to test isolates for the existence of certain genes responsible for carbapenem resistance, as well as sequences for insertion. *Acinetobacter baumannii* has become a pathogen which threatens life. It causes nosocomial infections worldwide, including infections of the skin and soft tissue, wound and bloodstream infections, infections of the urinary tract, meningitis, and ventilator-associated pneumonia, which is the most common and fatal infection from *A. Baumannii*. These infections are especially dangerous owing to the ability of the pathogen to withstand the action of most antibacterial agents currently available, making *A. Baumannii* one of the most dangerous organisms in the ESCAPE. The number of community-acquired A, in addition. Infections of *baumanniis* such as bacteremia, pneumonia, meningitis and endocarditis have been increasing progressively in the last few decades. Resistance to Carbapenem in *A. Baumannii* strains is caused by loss or alteration of porins or, in some rare cases, by alteration of penicillin binding proteins. The key resistance mechanism, however, is the development of  $\beta$ -lactamase enzymes. Four classes of molecular  $\beta$ -lactamase (A, B, C and D) were detected at A. Bas-nii.

Detection of carbapenemases is crucial to determine the extent of the problem and to guide the application of guidelines on antimicrobial stewardship to limit further production of carbapenem-resistant variants between A. They isolate the *baumannii*. The present study reports the prevalence of certain carbapenemases among CR-AB isolates from Alexandria, Egypt, in contrast to the various phenotypic and molecular techniques used in an Egyptian environment to detect these enzymes among CR-AB isolates.

### Discussion

*A. Baumannii* is becoming a big concern due to the awful number of nosocomial infections caused by this pathogen, mainly at ICUs around the world. Moreover, due to the excessive use of antibiotics, *baumannii* has become resistant to many groups of antimicrobials, contributing to the predominance of multidrug-resistant strains, especially in hospitals. What's more, A resistance to carbapenem. *Baumannii* isolates limits the clinical treatment choices for these infections that may lead to higher morbidity and mortality rates. A few earlier studies have commented on the prevalence of Egyptian A carbapenemases. Clinical isolates of the *baumannii*.

Comparing the results of the phenotypic tests with the results of carbapenemase molecular detection, the sensitivity of MHT, CIM, CDT, CarbAcineto NP, imipenem and meropenem boronic acid was 78.4, 68.9, 79.7, 95.9, 56.8 and 70.3 per cent respectively. Four isolates carrying blaOXA-51, blaOXA-23, blaVIM in the CarbAcineto NP test including isolate no. A81 which additionally carried blaOXA-58 developed the positive outcome in less than 15 min which could be attributed to the enzyme activity in these isolates. The false negative result observed with A2 carrying blaVIM, blaOXA-51 and blaOXA-23 could be explained by low concentration of zinc in the culture medium, or by very low activity of carbapenemase in the tested isolate.

