Carbapenem resistance Bacteria and Extended Spectrum Beta-Lactamase Challenge

Carbapenems, such as imipenem and meropenem, are often used to treat infections caused by extended-spectrum beta-lactamase (ESBL)-producing Gram-negative bacteria. A new class of bacterial enzymes capable of inactivating carbapenems, known as *Klebsiella pneumoniae* carbapenemases (KPCs), rapidly spread in the United States and continues to be extensively reported elsewhere in the world.

It causes infections associated with significant morbidity and mortality. KPCs are class A carbapenemases that reside on transferable plasmids and can hydrolyze all penicillins, cephalosporins, and carbapenems. The epidemiology of KPC-producing organisms continues to evolve. Although most KPCs are detected in isolates of *Klebsiella* and *Escherichia coli*, KPCs have been extensively reported in other genera of the Enterobacteriaceae family, such as *Proteus*, *Serratia*, *Salmonella*, and *Citrobacter*.

Although KPCs do not represent the first or the sole mechanism of carbapenem resistance, they are remarkable because they are often not detected by routine susceptibility screening and possess an exceptional potential for dissemination. In addition to the infection control challenges that have arisen, infections
caused by these organisms present clinicians with serious treatment challenges, due to limited antibiotic options.

KPC-producing bacteria are often misidentified by routine microbiological susceptibility testing and incorrectly reported as sensitive to carbapenems; however, resistance to the carbapenem antibiotic is common and a better indicator of the presence of KPCs.

The best therapeutic approach to KPC-producing organisms has yet to be defined; however, common treatments based on in vitro susceptibility testing are the polymyxins, tigecycline, and less frequently aminoglycoside antibiotics.

KPC-producing bacteria present a big challenge to clinicians. These include the need for special techniques for microbiological detection, the potential for nosocomial transmission, and therapeutic challenges related to limited antimicrobial treatment options.

CONDA efforts are underway to address this clinical challenge and has developed ESBL Cat. 2062 which allows early detection of ESBL (Extended Spectrum Beta-Lactamase) -producing bacteria and KPC Cat. 2063 for detection of gram-negative bacteria with a reduced susceptibility to most of the carbapenem agents. The early and well-identified detection of these bacteria minimizes the impact and the spread of infections and customize therapeutic patient treatment.

Bibliography

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