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Adapting laboratory techniques for the detection of carbapenamase producing enterobacteriaceae (CPE) carriage to changing trends in the prevalence of CPE in Singapore

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The local epidemiology of CPE has been evolving over the last decade; since 2010, this 1500-bed-hospital has adopted an expanding screening program for CPE detection. The high-risk screening strategy has been replaced by a combined proactive (selective on-entry screening) and reactive (contact-tracing) strategy for early identification of asymptomatic carriers. Between 2010 and 2015, the number of CPE detected on screening has increased from one to 31, genotypes from one to eight and enterobacterial species from three to 14. Laboratory protocols too have evolved over this period. A rectal swab (or stool sample) was initially processed using the CDC-TSB-Enrichment-Method with 10 μg ertapenem disc. Since 2013, to improve turn-around-time and sensitivity, samples were plated onto chromogenic agar (chromID™ CARBA, bioMerieux) and colonies with characteristic colors were investigated further. From April 2016 the selective plate has been changed to chromID™ CARBA-SMART Agar to improve detection of $OXA_{-48\text{-type}}$ CPE. Species identification is by MALDI-ToF-MS (Bruker Daltonics) and antimicrobial susceptibility testing by VITEK-2 (bioMerieux Vitek, Inc.), interpreted according to revised (June 2010) breakpoints set by CLSI. A few isolates harboring OXA-48-type and IMI-1 carbapenemases were not detected with this protocol. The genotype of meropenem non-susceptible isolates was determined using a multiplex RT-PCR assay targeting Class A (KPC, IMI, GES, SME), Class B (NDM, IMP, VIM) and Class D (OXA-48-type) carbapenemases. No protocol is ideal for the early detection of all CPEs; an algorithm to investigate all Enterobacteriaceae with meropenem MIC>0.25 mgs/L as proposed by Hrabak J. et al could lead to a more sensitive CPE detection workflow.

Biography

Prabha Unny Krishnan is a Senior Consultant in Laboratory Medicine and the Deputy Head of the National Public Health Laboratory, Singapore. She is also an Adjunct Associate Professor and the Lead for Microbiology at the Lee Kong Chian School of Medicine, Singapore. Her areas of special interest are multi-drug resistant pathogens and nosocomial infections.

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