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Characterization of carbapenem resistant Gram-negative bacteria and clinical epidemiology

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Background: Carbapenemase-producing Gram negative bacilli (CPGNB) have increasingly been associated with hospital acquired infections in recent years leading to limitations of treatment options. The present study was undertaken to detect CPE, risk factors for acquiring them and their impact on clinical outcomes in a tertiary care hospital from March 2018 to June 2019.

Methods: This prospective observational study included 120 clinically significant Carbapenem resistant isolates (including fermenters and non-fermenters), isolated from samples like blood, lower respiratory tract, urine, pus and tissues etc from March 2018 to June 2019 at a tertiary care hospital in India. Screening for Carbapenemase production was done by phenotypic methods, and Polymerase chain Reaction was performed for genotypic confirmation and to detect genes encoding them. The patients were assessed daily until discharge/death to ascertain the risk factors for infections with Carbapenemase producing Gram negative bacilli and their impact. Both clinical as well as microbiological outcomes were followed up and documented.

Results: Carbapenemase-encoding genes were detected in 77 isolates. The genes detected were New Delhi metallo- β -lactamase, Verona integron-encoded metallo- β -lactamase, and oxacillinase-48 and 181. The significant risk factors associated with acquisition of Carbapenemase producing GNBs were: Transfer from another hospital(53%), mechanical ventilation(85%) recent surgery(55%), hemodialysis(36%), presence of chemoport(6%), tracheostomy(31%), peripheral venous catheter(90%), urinary catheterization(85%), central venous catheter(75%), presence of infected wound(29%) to name a few. The overall adverse outcome was seen on 39% of the cases with CPGNBs.

Conclusion: Infections caused by CPGNBs present daily challenges to Microbiologists as well as Clinicians throughout the world. Unfortunately, the growing problem of multidrug resistance in Gram negative bacteria has become cosmopolitan. As a result, there is an ever-growing problem of increased CPGNBs in hospitals with limited therapeutic options. This return to the pre antibiotic era has unfortunately become the reality of many parts of the world especially in developing countries including India. There is an urgent need to form government policies and assess the processes of antimicrobial prescription and delivery.

Biography

Pooja Sahai is a Consultant Clinical Microbiologist and Infectious Disease (ID) Specialist at a tertiary care hospital in the Eastern part of India (Medica Superspecialty Hospital). She specializes in Molecular Diagnostics including Polymerase Chain Reactions (PCRs), and Nucleic Acid Amplification Technique based Assays in various sub-branches of Infectious Diseases as well as Clinical Microbiology like Bacteriology, Virology, Immunology and Mycology. Her field of interest lies in curbing Antimicrobial Resistance which is spreading its wings in a rampant manner all over the world but especially in India. She is a part of antimicrobial resistance (AMR) surveillance in India and is actively involved in policy making wing of the government associated with Antimicrobial Resistance Surveillance program in India.

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