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Polymyxin B Examination for Surveillance Purposes

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Before their discontinuation due to their toxicity, which manifested as nephrotoxicity and neurotoxicity, polymyxin antibiotics were frequently employed in the treatment of severe infections brought on by gram-negative bacilli. This was treated as the last line of treatment; these bacteria have developed resistance because of their greater use in clinical settings, which results in less usage. Among other Enterobacteriaceae, polymyxins resistance was discovered in P. aeruginosa, A. baumannii, Campylobacter species (spp.), including K. pneumoniae. Bacterial resistance to polymyxins has been noted for more than a decade,and evidence suggests that chromosomal alterations are to blame for it.

The research was at 37 °C for conducted at King Faisal University's College of Medicine's Microbiology Division of the Department of Biomedical Science. Urine, sputum, wound swabs, transtracheal aspirates, and blood was among the samples from which they have been isolated. By cultivating on MacConkey agar and incubating aerobically between 18 and 24 hrs, isolates were obtained from the -80 °C micro bank. The overnight growth that resulted was once more plated out on MacConkey agar, cultured under the same circumstances, and used for bacterium identification and an antibiotic susceptibility test. Another test for disc diffusion susceptibility testing, Colistin 10 L disc (Condalab, Torrejon de Ardoz, Madrid) was utilized. Each bacterial isolate was separately seeded into a Muller Hinton Agar (MHA) plate before a colistin disc was added. All plates underwent a 24 hrs aerobic incubation period at 37 °C.

Genomic DNA extraction and detection of mcr-1 gene by PCR amplification: According to the manufacturer's instructions, bacterial genomic DNA was extracted using a Qiagen DNA extraction kit. Ethidium bromide (10 mg mLG1) was used to stain the PCR products that were produced (Agarose gel at 2% concentration). The stained amplified samples were examined using electrophoresis. Using a UV transilluminator, the results are seen.

Inhibitory assay of dilutions of colistin and polymyxin B against the isolates: To prepare the bacterial suspension in 2 mL of Muller-Hinton broth, fresh overnight-grown bacterial cultures were employed. The procedure is how Badger-Emeka described it. Before adding the medications to the tubes, there was initial bacterial turbidity. All prepared macro-dilutions underwent a 24 hrs aerobic incubation period at 37 °C.

A total of 91 clinical isolates with origins from various clinical samples were included in the

investigation. Urinary tract infections accounted for the bulk (51%) of the isolates, whereas skin and soft tissue infections made up 21% of the isolates. Other isolates were from the bloodstream and respiratory infections (15 and 11%, respectively). Additionally, there was no intermediate susceptibility to these medications. Other medications like levofloxacin (90%) and ciprofloxacin had high resistance (84%). Tigecycline (69%) and amikacin had significant sensitivity (87%). This analysis emphasizes once more the significant threats to global health posed by resistant bacterial isolates. The isolates in this study are resistant to the polymyxins (colistin and polymyxin B), which are only employed as a last option in the treatment of MDR Gram-Negative Bacterial (GNB) isolates.

JOURNAL REFERENCE

Emeka, P.M., L.I. Badger-Emeka, E. Estrella, G.B. Angeles and H.E.K. Ahmed, 2022. Investigation of colistin and polymyxin B on clinical extreme resistant *Enterobacteriaceae* isolates for surveillance purposes. Int. J. Pharmacol., 18: 699-713.

KEYWORDS

Polymyxin B, colistin, susceptibility, extremely drug-resistant, mcr-1 gene, gram-negative bacteria