

Comparative analysis of clinical outcomes in bacteraemia caused by third-generation cephalosporin non-susceptible and susceptible Enterobacterales in a tertiary care hospital

ABSTRACT

Introduction

Bacteraemia caused by Enterobacterales poses a significant threat in hospitalized patients, with rising non-susceptibility to third-generation cephalosporins (3GC), which complicates empirical antibiotic (EAB) treatment decisions. Early administration of effective EAB is essential in critical settings like sepsis, where treatment should begin before in-vitro susceptibility results are available. Choice of EAB can impact clinical outcomes. This study aimed to investigate the impact of 3GC non-susceptibility and the susceptibility for the received EAB on outcomes in patients with Enterobacterales bacteraemia.

Methods

A cohort study was conducted at Sri Jayewardenepura General Hospital, including patients with Enterobacterales bacteraemia from March 2022 to March 2024. Data were obtained from hospital records, laboratory database and follow-up calls. Isolates were categorized as 3GC non-susceptible Enterobacterales (3GCNSE) or susceptible (3GCSE) based on in-vitro testing, and also according to the isolate's susceptibility to EAB. Outcomes included severity of illness, 7-, 14-, and 30-day all-cause mortality, healthcare cost, hospital stay, and readmission. Comparative and regression analyses were conducted to evaluate associations, adjusting for confounders

Results

Among 335 patients with Enterobacterales bacteraemia, 59.4% were infected with 3GCNSE. These patients were older and had more comorbidities. Urinary tract infections was the most common source in both groups. *E. coli* and *K. pneumoniae* predominated, showing high resistance rates. Mortality, cost, and duration of hospital

stay were significantly higher in the 3GCNSE group, but regression analysis identified only increased healthcare cost as significantly associated with 3GC non-susceptibility. Of the 326 cases qualified for EAB therapy analysis, 44.8% received non-susceptible EAB. 3GCs were the most frequently used EAB. 3GC use was higher in the non-susceptible EAB group, while carbapenem use was higher in the susceptible group. Chi-square analysis showed significant differences in mortality and hospital stay between these two cohorts. Regression analysis revealed no significant association between receiving non-susceptible EAB and outcomes.

Conclusions

Approximately 60% of Enterobacterales bacteraemia cases were 3GCNSE, which significantly increased healthcare costs, highlighting the economic burden of antimicrobial resistance. Lack of association between in-vitro non-susceptibility and adverse outcomes suggests that some patients may respond clinically to the EAB to which the isolate was non-susceptible. These finding highlights the complex relationship between in-vitro results and outcomes. Controlled studies are needed to better understand these associations.