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LETTER

Efficacy and Safety of Different Colistin Administration Routes for Nosocomial Pneumonia Caused by Carbapenem-Resistant Organisms: A Single Centre, Open Label, Prospective Cohort Study [Letter]

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Dear editor

The article titled "Efficacy and Safety of Different Colistin Administration Routes for Nosocomial Pneumonia Caused by Carbapenem-Resistant Organisms: A Single Centre, Open Label, Prospective Cohort Study" has caught our attention. This article discusses the clinical challenges arising in an era of rising microbial resistance, specifically evaluating the role of inhaled antibiotic therapy in the management of carbapenem-resistant infections in critically ill patients. Wei et al used multiple treatment groups (intravenous (IV), inhaled (IH), and combined IV+IH colistin therapies for carbapenem-resistant Gram-negative bacterial pneumonia), thereby enabling a more comprehensive evaluation of therapeutic strategies in real-world settings. Utilizing longitudinal clinical indicators, such as inflammatory biomarkers and oxygenation indices, enhances the reliability of outcome assessments and fosters a more dynamic understanding of treatment responses.[1] This study aligns with existing concerns regarding antimicrobial resistance, as previously demonstrated by research using genomic studies and resistance profiles. This study demonstrates the complexity of pathogens resistant to various drugs, particularly carbapenems, and highlights the need for maximized therapeutic approaches.[2]

However, it is important to acknowledge certain limitations. The study's single-center design and the absence of randomization may introduce potential selection bias, thereby restricting the generalizability of the findings. In addition, the absence of standardization in aerosol delivery systems and nebulization protocols can substantially influence drug deposition and therapeutic outcomes.[1] Previous research using meta-analysis has shown that while inhaled antibiotics can improve the eradication of microorganisms, their impact on mortality rates and clinical recovery remains inconsistent.[3]

We suggest two measures that should be taken to improve future research. First, it is essential to conduct multicentre randomized controlled clinical trials using standardized inhalation protocols to ensure clinical efficacy and improve reproducibility. It is important to stratify patients based on the severity of infection and microbiological profile, given the heterogeneity of the ICU population and the prevalence of multidrug-resistant pathogens. This is particularly important because multidrug-resistant (MDR) pathogens such as *Acinetobacter baumannii* continue to pose significant therapeutic challenges with high mortality rates.[4]

Second, the efficacy of drug delivery in inhaled therapies is contingent upon several factors, including particle size, airway dynamics, and the performance of the delivery device. Evidence from critical care pharmacology suggests that achieving pharmacokinetic (PK) and pharmacodynamic (PD) targets in ICU patients is particularly challenging due to altered physiological states and variable drug distribution.[1,5] Therefore, integrating PK/PD modeling, real-time drug monitoring,

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and host-response biomarkers will be essential to fully elucidate therapeutic effectiveness and guide precision medicine approaches.

In conclusion, while the study provides valuable preliminary insights, further well-designed translational and clinical investigations are needed to fully establish the role of inhaled antibiotic therapy in managing carbapenem-resistant infections.

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Disclosure

The authors report no conflicts of interest in this communication.

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