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ORIGINAL RESEARCH

Nephrotoxicity and Efficacy Assessment of Polymyxin B Use in Renal Transplant Patients

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Purpose: This study investigates the nephrotoxicity and efficacy assessment of polymyxin B (PMB) use in renal transplant patients.

Patients and Methods: This retrospective study included adult (>18 years of age) renal transplant patients who received PMB intravenous drip for more than 72 hours. Efficacy assessment of PMB included clinical treatment efficacy, microbiological efficacy at the end of PMB treatment, and in-hospital all-cause mortality. Nephrotoxicity of PMB was evaluated for further group comparison.

Results: We enrolled 235 renal transplant patients in our study. After PMB treatment, 45 patients occurred PMB-nephrotoxicity, and the nephrotoxicity rate was 19.15%. Among them, 44 patients were RIFLE R stage, and one patient was RIFLE I stage. The dose of PMB used in patients was 40.0 (40.0–50.0) mg q12h with a loading dose of 41.8±9.8 mg. Multivariate logistic regression analysis showed that ICU admission, vasoactive agents, aminoglycosides, creatinine clearance rate before PMB use, and mean total hospital stay were independent risk factors of PMB-nephrotoxicity in kidney transplant patients. The clinical effective rate was 97.9%, and the microbiological clean rate was 66.7%.

Conclusion: Our study demonstrated that PMB low dose regimens might achieve good efficacy and less nephrotoxicity in renal transplant patients. We should evaluate the severity of the infection and renal function of patients, avoid the combined use of other nephrotoxic drugs, and minimize the course of use to reduce the occurrence of PMB-nephrotoxicity.

Keywords: polymyxin B, nephrotoxicity, renal transplant patients, adverse reactions

Introduction

Polymyxins are old antimicrobials discovered in the 1940s, and clinical use started in the late 1960s.[1] Due to the emerging of multidrug-resistant (MDR) Gram-negative bacteria infection, currently available antibiotics are limited. Polymyxins, including colistin and polymyxin B (PMB), were the last resort to defense against the Carbapenem-resistant gram-negative bacteria (CR-GNB) infection.[2] PMB is administered to patients in its active form, while colistin is used in the form of its inactive prodrug colistimethate (CMS), which is required conversion to colistin in vivo.[3]

Although PMB as the "last-line" antibiotics to CR-GNB infection showed powerful and broad-spectrum anti-negative bacteria, PMB-associated nephrotoxicity limits the optimization of its dose, thus limiting the increase of its efficacy.[4] Acute kidney injury (AKI) occurs in a substantial proportion of patients receiving PMB and is the major dose-limiting adverse effect of the polymyxins.[3,5] PMB's pharmacokinetics and pharmacodynamic properties are limited.[6,7] There is a paucity of information regarding its clinical use, especially in special populations, such as renal transplant patients.[8–10]

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