

Pharmacokinetic of Cefiderocol during CRRT and CytoSorb therapy

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Introduction

Cefiderocol is a new broad-spectrum cephalosporine antibiotic with promising activity against Gram-negative bacteria, including carbapenem-resistant strains. PK/PD analyses on the use of Cefiderocol in critically ill patients subjected to extracorporeal procedures are still limited. The pharmacokinetic and pharmacodynamic (PK/PD) properties of Cefiderocol have been evaluated during CRRT and Cytosorb.

Methods

A 16-year-old male was admitted to the Pediatric Intensive Care Unit (PICU) following acute respiratory failure caused by adenovirus pneumonia, and acute obstructive renal failure as consequence of hemorrhagic cystitis. Patient was treated off-label with Cefiderocol 2 g every 8 hours for suspected septic shock in the context of severe immunodeficiency. Antibiotic was administered intravenously with an infusion over three hours. Blood samples were taken immediately before the start of HA (T0), and then at 1 hour (T1), 3 hours (T2), 5 hours (T3-Cmin), 16 hours (T4-Cmin), and 24 hours (T5-Cmin)

Results

Regarding the contribution of hemofilter clearance (CLHF) we observed a maximum CLHF at T 3 (3.07 L/h) and a minimum CLHF at T 2 (0.99 L/h) (Figure 1). We have calculated Cytosorb removal rates (RR%) at the different time points: 23% (T 1), 58% (T 2), 53% (T 3), 6% (T 4), 18% (T 5). Hemofilter removal rates (RR%) 45% (T 0), 34% (T 1), 36% (T 2), 55% (T 3), 14% (T 4), 3% (T 5). The overall mass removal for Cytosorb[®] was -590 mcg/hour and for the Hemofilter -95 mcg/hour (Figure 1).

Conclusion

Based on the results described here, we could suggest that a supplementary dose of cefiderocol should be administered during the first 120 minutes of hemoadsorption with Cytosorb[®]. The pharmacokinetic behavior of cefiderocol during CRRT suggests that cefiderocol infusions could be prolonged over a longer duration (2-3 hours) with every 6 hours instead of 8 hours interval.

Figure 1: Upper and left section: Time course of the antibiotic unbound concentrations (patient green line), (posthemofilter bluline), (post-cartridge red-line). Upper and right section: Time course of the hemofilter and cartridges' removal ratio at the different time points. Lower and left section: Time course of the hemofilter and cartridges' mass removal at the different time points.

