Pharmacokinetics of Intravenous and Subcutaneous Ceftiofur Sodium in Neonatal Foals

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Administration of ceftiofur sodium (5 mg/kg, IV or SC) achieves peak plasma concentrations in equine neonates that are effective against common bacterial pathogens. SC administration of ceftiofur sodium is a safe, effective alternative for treatment of septicemic neonates. Authors’ addresses: William D. Pritchard Veterinary Medical Teaching Hospital, School of Veterinary Medicine, University of California at Davis, Davis, California 95616 (Fowler, Hall); and the Department of Medicine and Epidemiology, School of Veterinary Medicine, University of California at Davis, Davis, California 95616 (Pusterla, Tell); e-mail: tlh.dvm@gmail.com (Hall). © 2009 AAEP.

1. Introduction
Ceftiofur sodium is a third generation cephalosporin approved by the Food and Drug Administration for IM administration in horses. Clinicians administer this antibiotic by IV or SC routes in septicemic foals. The objective of this study was to determine the pharmacokinetics of ceftiofur sodium administered either IV or SC in neonatal foals.

2. Materials and Methods
Twelve foals were randomly assigned to one of two groups to receive 5 mg/kg body weight of ceftiofur sodium administered one time either IV or SC. Plasma samples were collected at set intervals for 12 h after drug administration. Concentrations of ceftiofur free-acid equivalents (CFAE) were determined by high-performance liquid chromatography.

3. Results
A two-compartment model best described the pharmacokinetics of IV and SC administration of ceftiofur in foals. Average (±SD) pharmacokinetic parameters were as follows: area under the concentration time curve0→∞ (86.4 ± 8.5 and 91 ± 22 h*µg/ml for IV and SC, respectively), maximum observed plasma concentration (19.7 ± 3.0 and 13 ± 1.9 µg/ml for IV and SC, respectively), and observed time of maximal plasma concentration (0.075 ± 0.06 and 0.75 ± 0.4 h for IV and SC, respectively).

4. Discussion
No adverse effects were observed in any foal. CFAE reached sufficient plasma concentrations when administered IV or SC to effectively treat common bacterial pathogens.

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