Regional Limb Perfusion of Amikacin Sulfate Alone and in Combination With Ticarcillin/Clavulanate in Horses

Ashlee E. Watts, DVM, PhD, Diplomate ACVS*; Alanna J. Zantingh, DVM; Wayne S. Schwark, DVM, PhD; and Susie L. Fubini, DVM, Diplomate ACVS

The results of our study indicate that antimicrobial activity of amikacin is reduced when used for regional limb perfusion with ticarcillin and that this combination should be avoided in regional limb perfusion when optimal amikacin activity is desired. Authors’ addresses: Department of Large Animal Clinical Sciences, College of Veterinary Medicine and Biomedical Sciences, Texas A&M University, College Station, TX 77845 (Watts); Murdoch University Veterinary Hospital, 90 South Street, Murdoch, WA 6150 Australia (Zantingh); Department of Molecular Medicine (Schwark) and Department of Large Animal Clinical Sciences (Fubini), College of Veterinary Medicine, Cornell University, Ithaca, NY 14853; e-mail: awatts@cvm.tamu.edu. *Corresponding and presenting author. © 2013 AAEP.

1. Introduction
The purpose of this study was to determine the effect of regional limb perfusion with amikacin alone and in combination with ticarcillin/clavulanate on synovial fluid concentration and antimicrobial activity of amikacin.

2. Materials and Methods
Regional limb perfusion with amikacin alone (group A: 2.5g) or amikacin and ticarcillin/clavulanate (group AT: 2.5 g of amikacin, 7 g of ticarcillin/clavulanate) was performed with a tourniquet placed at mid-antebrachium in sedated horses. Perfusate blood was collected immediately after injection and again before tourniquet release. Blood from the jugular vein was collected before tourniquet release. Synovial fluid from the middle carpal joint was collected at 0, 30, and 60 minutes after tourniquet release. Amikacin concentration and antimicrobial activity of synovial fluid against amikacin- and ticarcillin-resistant and susceptible cultures were determined.

3. Results
There was significantly lower amikacin concentration in the middle carpal joint synovial fluid in group AT compared with group A at 30 minutes (group AT: median, 4.4 µg/mL; group A, 17.5 µg/mL) and 60 minutes (group AT: median, 4.6 µg/mL; group A: 15.0 µg/mL) after tourniquet release. The zones of inhibition against ticarcillin-resistant Klebsiella pneumoniae from group AT were significantly smaller than group A from synovial fluid at 30 minutes and 60 minutes and in the perfusate serum before tourniquet release.
4. Conclusions

The combination of amikacin with ticarcillin/clavulanate during regional limb perfusion resulted in significantly lower amikacin synovial concentration and antimicrobial activity on amikacin-susceptible and ticarcillin-resistant cultures compared with amikacin alone.

This study was approved by the university’s institutional animal care and use committee.