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Antibiotic-Anesthetic Combo Effective Lower Limb Treatment

During regional limb perfusion, the practitioner places a tourniquet above the injury site, isolating blood flow to the lower limb before injecting antibiotics directly into the vein below the tourniquet.

If a horse has a severe lower limb infection, the veterinarian must treat it immediately and aggressively, using the appropriate antibiotics. To do so, some use a technique called regional limb perfusion (RLP), in which the practitioner places a tourniquet above the injury site, isolating blood flow to the lower limb before injecting antibiotics directly into the vein below the tourniquet. This localizes high concentrations of appropriate antibiotics at the site of infection, injury, or fracture.

Using an anesthetic during this procedure is important, but some antibiotics become ineffective when combined with other drugs.

Aimee Colbath, VMD, of Colorado State University's Orthopaedic Research Center, in Fort Collins, described her study evaluating a combination of the antibiotic amikacin with the anesthetic mepivacaine at the 2015 American Association of Equine Practitioners Convention, held Dec. 5-9 in Las Vegas

Colbath noted that, because mepivacaine is an effect anesthetic, this combination could be very useful for repairing wounds or flushing synovial (joint) structures in the sedated, standing horse without having to resort to general anesthesia, which can have its own set of complications. Historically researchers have shown that combining amikacin with another antibiotic (ticarcillin) reduced amikacin levels and effectiveness, so Colbath wanted to be sure it wouldn't be the case with mepivacaine, amikacin, and RLP. In this study she aimed to answer three questions:

1. Does mepivacaine in this combination sufficiently reduce the mechanical nociceptive threshold (essentially, the horse's nerve cells' ability to sense potential harm, in this case in the form of pressure/pinching)?
2. If it does, then is there any effect on amikacin concentration?
3. Is there any effect on antibiotic efficacy?

Colbath used this combination on nine Quarter Horses, aged 2 to 6 years. Her team administered one of two RLP treatments—either amikacin only, or an amikacin/mepivacaine combination—in 14 limbs, using the middle carpal (knee) joint as the test area and the top of the cannon bone to evaluate sensation. The researchers then sampled synoval fluid from the middle carpal joint to assess amikacin concentration and antimicrobial activity based on bacterial culture and sensitivity testing in the lab.

The researchers found that 30 minutes following treatment, horses receiving the combination had decreased limb sensation (measured by algometry, a device used to test sensitivity to pain caused by pressure) compared to horses treated with amikacin alone. Amikacin concentration in the synovial fluid was not significantly different between treatment groups at 30 or 60 minutes. Similarly, when mepivacaine was combined with amikacin, the amikacin exerted the same anti-bacterial inhibition on media plates cultured with *Staphylococcus aureus* and *Escherichia coli* as did amikacin without mepivicaine.

Take-Home Message

Administering mepivacaine along with amikacin via RLP significantly anesthetizes the lower limb's mechanical nociceptive threshold. Further, mepivacaine does not affect amikacin concentration or antimicrobial activity in the synovial fluid. Veterinarians can use this combination to safely and effectively treat lower limb injuries in standing, sedated horses, Colbath said.