Pharmacokinetics of multiple-dose subcutaneous flunixin meglumine in lactating dairy goats

J.S. Smith, *DVM, MPS*[1]; **J.A. Angelos**, *DVM, PhD, DACVIM*[2]; **J.D. Rowe**, *DVM, PhD, DACPVM*[2]; **J.L. Carlson**, *BS*[3]; **L.A. Tell**, *DVM, DABVP, DACZV*[2]
[1]*William R. Pritchard Veterinary Medical Teaching Hospital, University of California-Davis, Davis, CA 95616*
[2]*Department of Medicine and Epidemiology, University of California-Davis, Davis, CA 95616*
[3]*Department of Animal Science, University of California-Davis, Davis, CA 95616*

Introduction

Flunixin meglumine (FM) is a non-steroidal anti-inflammatory drug that is approved by the US Food and Drug Administration (FDA) for intravenous (IV) administration in cattle and intramuscular (IM) administration in swine for the control of pyrexia associated with respiratory disease. FM is commonly administered by the SC route in lactating goats; however, pharmacokinetic data is lacking for this administration route.

Materials and Methods

This study evaluated the multiple-dose pharmacokinetics of FM in lactating goats (n=8) dosed at 0.5 mg/lb (1.1 mg/kg) body weight. Goats were administered FM by either IV or SC routes, using a 2-way crossover study design with a 2 week washout period. Plasma concentrations the primary metabolite, flunixin 5-OH (5-OH), were measured using ultra performance liquid chromatography with mass spectrometric detection in samples collected at 0, 5, 10, 15, 30, and 45 minutes post-treatment as well as 1, 2, 4, 6, 8, 12, 18, 24, 30, 36, 48, 60, 72, 84, 96, 108, and 120 hours after single dose administration. Milk samples for 5-OH were measured in samples collected at 0, 1, 2, 4, 6, 8, 12, 18, 24, 36, 48, 60, 72, 84, 96, 108, and 120 hours after administration. Preliminary non-compartmental pharmacokinetic parameters were then derived from the time versus 5-OH milk concentration data. Injection sites were also evaluated for reactions.

Results

Subcutaneously administered FM in goats has similar milk pharmacokinetic parameters to FM administered by the IV route following multiple dosing.

Significance

Subcutaneous dosing of FM in goats may provide a useful alternative to IV dosing when venous access is limited.

Penetrating captive-bolt euthanasia of goats: optimal shot placement and evaluation of polled and horned goats

P. Plummer, *DVM, PhD, DACVIM, DECSRHM*[1]; **J. Shearer**, *DVM, MS, DACAW*[1]; **A. Ramirez**, *DVM, MPH, PhD, DACVPM*[1]; **K. Kleinhenz**, *DVM, MS*[1]; **W. Weber**[2]; **L. Shearer**[1]
[1]*Veterinary Diagnostic and Production Animal Medicine, Iowa State University, Ames, IA 50011*
[2]*Veterinary Biomedical Sciences, Iowa State University, Ames, IA 50011*

Introduction

Anatomical placement of a penetrating captive bolt device (PCB) when euthanizing animals is critical to ensure vital structures are damaged, thereby rendering animals immediately unconscious and death occurring without a return to sensibility. Although PCB are an approved method for euthanizing small ruminants, the current peer-reviewed literature contains discrepancies regarding the appropriate anatomic site to be used for euthanasia procedures. Currently, 2 important documents, American Veterinary Medical Association's 2013 Euthanasia Guidelines (AVMA) and World Organization for Animal Health's Terrestrial Code (OIE), are in disagreement over the recommended site for captive bolt placement in small ruminants. The

© Copyright American Association of Bovine Practitioners; open access distribution.

AVMA 2013 guideline recommends use of a frontal site high on the forehead aiming towards the foramen magnum as an alternative site in horned goats. The OIE recommends the frontal site be used for gunshot only. Exact positioning of a PCB at the poll is poorly described in the literature. The objective of this study was to determine the optimal anatomical site for PCB placement in horned and polled goats to ensure brainstem disruption consistently occurs.

Materials and Methods

Eight cadaver skulls (horned and polled) were used to determine the ideal anatomical site for conducting euthanasia of goats. Using a metal protractor to evaluate the proper trajectory, anatomical sites were established for both horned and polled animals with the objective of determining simple and clear guidelines resulting in consistent placement of PCB for damage to the brainstem. Once determined these sites were confirmed as accurate by euthanasia of 10 anesthetized goats.

Results

The site determined to best result in brainstem damage from the cadaver study was on the midline 2 cm caudal to a line drawn between the lateral canthus of each eye. This site could also be determined by identifying the intersection of lines drawn from the lateral canthus of each eye to the middle of the opposite ear.

Confirmation of this site was established by the euthanasia of 10 adult anesthetized goats. Using the site as described above, investigators were able to effectively euthanize all 10 animals without the need for an adjunctive step to assure death. Post-mortem sagittal section of skulls demonstrated damage to the brainstem of all 10 goats using this site.

Significance

To ensure brainstem damage during euthanasia via penetrating captive bolt devices, the proper anatomical site must be used; otherwise animals are likely to undergo extreme distress. Frontal shots will not consistently result in penetration of the cranium and are unlikely to damage structures associated with the brainstem.

© Copyright American Association of Bovine Practitioners; open access distribution.

Producer concern and prevalence of subclinical intramammary infections between lactations on 10 dairy goat farms in Ontario, Canada

G. Zobel, *MSc*[1]; **K. Leslie**, *DVM*[2]; **D. Weary**, *PhD*[1]; **M.A.G. von Keyserlingk**, *PhD*[1]
[1]*Animal Welfare Program, University of British Columbia, Vancouver, BC, Canada V6T 1Z4*
[2]*Department of Population Medicine, University of Guelph, Guelph, ON, Canada N1G 2W1*

Introduction

For many dairy goat producers, a key deciding factor for keeping does in the herd is the animal's ability to maintain milk production. Subclinical intramammary infections (IMIs) are known to decrease milk production in does by as much as 20% (Contreras et al, *Livest Prod Sci*, 2003). Somatic cell count (SCC) is a reliable and inexpensive predictor of infection in dairy cows; however, this measure is highly variable in goats depending on factors such milk production, stage of lactation, and estrus activity (Leitner et al, *J Dairy Sci*, 2004; Paape et al, *Small Rumin Res*, 2007; Persson et al, *Small Rumin Res*, 2014), making identification of infected glands by SCC level problematic. Thus, it is likely that producers underestimate infection prevalence on their farms. While IMIs are possible throughout lactation, the highest risk period for infection is when does are transitioning from one lactation to the next. On many farms, goats are dried-off (i.e., milking is ceased) and during the dry period infections may go unchecked and new infections begin. In other situations, does are not dried-off between lactations. The aims of this study were 2-fold: 1) to assess the attitudes of the producers regarding IMIs on their farms, and 2) to determine the prevalence of these infections during the dry period.

Materials and Methods

A total of 400 does on 10 commercial farms in Southern Ontario (40 ± 19 does per farm) were studied. For each doe, 2 milk samples were aseptically collected