

Milk residues following multiple doses of meloxicam and gabapentin in postpartum and mid-lactation dairy cows

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Introduction

Management of pain is a significant welfare concern for lactating dairy cattle. There is a lack of approved pain medications for lactating dairy cattle. A combination therapy of gabapentin, a GABA analog and meloxicam, a nonsteroidal anti-inflammatory drug, are commonly used for analgesia in cattle in an extra-label manner. The objective of this study was to determine the number of days milk residues could be detected when meloxicam was administered alone or in combination with gabapentin in both postpartum and mid-lactation cows following multiple doses.

Materials and Methods

Two different groups (8 cows per group) were enrolled. Both groups had 4 early-lactation cows and four mid-lactation cows enrolled in the study. The first treatment group (MX) were treated only with meloxicam (0.45 mg/lb [1.0 mg/kg], by mouth, once daily) for 6 days. The second group (GM) were co-administered meloxicam (0.45 mg/lb [1.0 mg/kg], by mouth, once daily) and gabapentin (9.1 mg/lb [20 mg/kg], by mouth, once daily) for 6 days. Blood samples were collected by venipuncture, and milk samples collected by in-line sampling during normal milking times from each cow immediately prior to treatment, and every 12 hours during and after treatment for 6 more days following the last dose. Plasma and milk drug concentrations were determined over

6 days post administration by HPLC/MS/MS followed by non-compartmental pharmacokinetic analyses.

Results

In postpartum cows, the mean (\pm SD) milk C_{max} for meloxicam administered alone (1.48 ± 0.52 μ g/ml) was significantly different from cows also treated concurrently with gabapentin (0.81 ± 0.06 μ g/ml). The T_{max} in postpartum cows (124 ± 11.3 hours) did not vary significantly from those postpartum cows who also received gabapentin (132 hours). Milk meloxicam residues persisted in the postpartum and mid-lactation cows following the last dose until 120 hours and 132 hours, respectively and were not affected by gabapentin administration. Milk gabapentin residues fell below the limit of detection by 48 and 60 hours following the last dose in postpartum and mid-lactation cows, respectively.

Significance

The results of this study suggest that milk from cows treated with multiple doses of meloxicam alone or in combination with gabapentin will have low drug residue concentrations, and an appropriate withdrawal interval will be calculated using this data.