

# Efficacy of pain control strategies for caustic paste disbudding in very young dairy calves

C.N. Reedman, BSc<sup>1</sup>; T.F. Duffield, DVM, DVSc<sup>1</sup>; T.J. DeVries, BSc, PhD<sup>2</sup>; K.D. Lissemore, DVM, DVSc<sup>1</sup>; N. Karrow, BSc, PhD<sup>2</sup>; C.B. Winder, DVM, DVSc<sup>2</sup>

<sup>1</sup>Department of Population Medicine, University of Guelph, Guelph, Ontario, N1G2W1 Canada

<sup>2</sup>Department of Animal Biosciences, University of Guelph, Guelph, Ontario, N1G2W1 Canada

## Introduction

Dairy producers disbudding calves with caustic paste are less likely to provide pain control than those using cautery. Little research has been conducted on pain control for this method and no studies have specifically examined calves under a week of age although producers will commonly apply this product at this time. The objective of this study was to evaluate the efficacy of local anesthesia and nonsteroidal anti-inflammatory drug (NSAID) analgesia in very young dairy calves disbudded with caustic paste.

## Materials and Methods

140 heifer calves aged 1-9 d were enrolled into 28 blocks and randomly allocated to 1 of 5 interventions: sham control; positive control (no pain control); lidocaine cornual nerve block; meloxicam; and lidocaine cornual nerve block and meloxicam. Samples collected and analyzed included serum cortisol, serum haptoglobin and pressure sensitivity. Serum cortisol and serum haptoglobin samples were collected via jugular catheter at standardized time points throughout each day, relative to disbudding. Pressure sensitivity measurements were collected through use of a pressure force algometer at 4 locations equidistant around each horn bud at standardized time points throughout each day, relative to disbudding. Data were analyzed using mixed models with a fixed effect for baseline values and a random effect for trial block.

## Results

At 0 minutes relative to disbudding (directly before paste was applied), serum cortisol values did not differ between the treatment groups. Compared to no local anesthetic,

lidocaine reduced serum cortisol at 15, 30, 45, and 60 min post-disbudding (60 min; -138 pg/ml, 95% CI -200 to -76 pg/mL). Cortisol values were not different between lidocaine treated calves and sham controls at these time points. At 60, 90, 120, and 180 min post-disbudding, calves treated with lidocaine and meloxicam had reduced cortisol compared to lidocaine alone (180 min post disbudding, -61 pg/mL, 95% CI -112 to -10 pg/mL), and values did not differ between lidocaine/meloxicam treated calves and sham controls at these time points. At 3-4 d post-disbudding, treatment with lidocaine and meloxicam tended to reduce haptoglobin (+0.16 mg/mL, 95% CI 0.00 to 0.32), but no differences were found between groups at 3 h and 6-7 d post-disbudding. At 60, 90, and 120 min post-disbudding, lidocaine treated calves had decreased pressure sensitivity compared to other groups (90 min, -2.26 kgf, 95% CI -3.15 to -1.37). Although results showed that the lidocaine nerve blocks were successful at decreasing pressure sensitivity, there was no significant difference seen between sham controls and non-lidocaine treated calves at these time points. This suggests that this behavioural test may not be suitable for very young calves. No differences were seen in pressure sensitivity between groups at 180 min, 3-4 or 6-7 d post-disbudding.

## Significance

These findings suggest that the combination of local anesthesia with NSAID analgesia are beneficial at reducing pain indicators and inflammation in very young calves disbudded with caustic paste.