

# An evaluation of the relationship between hyperketonemia and pre- and post-calving hoof lesions in dairy cattle

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## Introduction

Recent research has suggested changes related to fat mobilization are an important risk factor for lameness development. The objective of this study was to determine the relationship between beta-hydroxybutyrate (BHB) blood concentration of cows post-calving and hoof lesions during the first 150 DIM.

## Materials and Methods

The study was an observational cohort with cows enrolled from 5 free-stall dairy herds in Minnesota. Primiparous and multiparous cows were enrolled at the time of their pre-calving hoof trim, at the end of their lactation. Enrolled cows were hoof trimmed twice: pre-calving within 90 d prior to parturition, and post-calving within 150 d following parturition. Commercial hoof trimmers trained in lesion identification trimmed cows and determined the lesion type. After parturition, all cows between 3 and 16 DIM were tested once weekly for hyperketonemia using a handheld ketone meter. Cows were classified as hyperketonemic if they had a blood BHB  $\geq 1.2$  mmol/L. Logistic regression models were constructed to determine the association between having a lesion at the pre-calving hoof trim, having a lesion at the post-calving hoof trim, and hyperketonemia.

## Results

A total of 517 cows had both a pre- and post-calving hoof trim and at least 1 BHB measurement. At the pre-calving trim, the lesion prevalence was 12% (62/517). The lesions

present were: corkscrew claw (32%), digital dermatitis (30%), thin soles (11%), white line (8%), sole ulcer (6%), and other (11%). The incidence of hyperketonemia was 30% (118/517). At the post-calving hoof trim 26% (136/517) of cows had a lesion. The lesions present were: corkscrew claw (44%), digital dermatitis (27%), white line (9%), sole ulcer (5%), and other (15%). The incidence of newly developed lesions was 22% (100/455). A logistic regression model was constructed for the odds of having a lesion at the post-calving hoof trim (n=517). The odds ratio for the association between post-calving lesion status and hyperketonemia was 0.82 CI: 0.48 – 1.4 (P=0.45). Cows with a lesion pre-calving had higher odds (OR: 4.5 CI: 2.5 – 8.1) of having a lesion post-calving. The precision of the estimate was low due to sample size. There was no interaction between pre-calving lesion status and hyperketonemia (P=0.53).

## Significance

Lesion incidence for sole ulcers and white line was lower than estimated and limited our ability to determine associations with hyperketonemia. When post-calving hoof lesions were considered as a group, hyperketonemia did not appear to be a risk factor.