

Effect of Presence of Claw Lesions in Heifers Prior to First Parturition on Risk of Developing Claw Lesions during Lactation

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Introduction

According to the 2002 National Animal Health Monitoring Systems (NAHMS) survey, 16% of cattle are culled due to lameness. However, this survey may underestimate this number, as cows culled for low production (19%) or reproductive failure (27%) may actually have been lame. Lameness has been shown to reduce milk production (Guard, 1997; Robinson *et al*, 2003) and fertility (Sprecher *et al*, 1997; Hernandez *et al*, 2000; Melendez *et al*, 2002). Furthermore, dairy producers tend to underestimate extent and severity of lameness within their herd (Whay *et al*, 2002). Literature also indicates that previously lame cattle are more prone to future recurrences (Peterse, 1986; Raven, 1989; Enevoldsen *et al*, 1991). Therefore, preventing animals from becoming lame must be a key management objective. However, there is limited data on incidence and severity of claw lesions in calves and heifers. Data is also limited on the impact of claw lesions during the rearing phase on recurrences of claw lesions during lactation. The objective of this study was to determine incidence and severity of claw lesions in heifers from 12 months of age to calving and the impact of claw lesions during the rearing phase on recurrence of claw lesions.

Materials and Methods

Claws of 572 dairy heifers at a commercial heifer rearing facility were evaluated at 12 months of age, one month prepartum and two months after parturition. Heifers originated from one of four source dairies, and were housed at the commercial heifer rearing facility in groups of approximately 100 animals in open, earthen-mounded lots without overhead protection. Concrete feed platforms and manure alleys integral to the open mound lots were scraped twice per week, and mounds were bedded with coarse bark when needed as determined by the operator of the commercial heifer rearing facility.

During the rearing phase, heifers were fed a total mixed ration (TMR) consisting of (dry matter basis) 42%

corn silage, 30.2% haycrop silage, 25.5% hay, 0.4% soybean silage, 0.5% corn gluten meal, 0.2% high moisture corn, 0.3% urea and 0.9% vitamins and minerals. Two dietary treatments were used: a control diet, and a treatment diet with the same ingredient composition as the control diet except for the addition of a complexed trace mineral additive. Results regarding dietary treatments are not reported in this abstract.

After completion of the claw evaluation at one month prepartum, heifers were returned to the source dairy. At the source dairy, heifers were housed in naturally ventilated free stall barns, fed similar TMR with respect to the source dairy and were milked twice daily.

Claws were evaluated by one claw trimmer using a clean, light grind. The claw trimmer was a graduate of the Dairyland Hoof Care Institute (Baraboo, WI). Lesions were noted in the seven zones of the claw (adapted from Greenough, 1997) and each lesion was scored for severity on a scale of 1 to 3 (1=minor, 2=moderate, 3=severe). To assess both incidence and severity of claw lesions, a claw lesion incidence and severity (CLIS) index was calculated. This index was the average number of zones affected per cow, multiplied by the average severity score of the lesion, multiplied by 10.

The CLIS index was analyzed using the MIXED procedure of SAS (1999) with the effects of dietary treatments and source dairies as discrete class variables, and CLIS index in a prior phase and its interaction with dietary treatments as continuous variables. Effects were declared significant at $P < 0.05$.

Results

The CLIS index integrates frequency and severity measurements. At 12 months of age, sole hemorrhage, white line separation and heel erosion were the predominant disorders (CLIS indexes of 9.7, 8.6 and 6.4, respectively). One month prepartum, heel erosion, sole hemorrhage, and to a lesser extent white line separation were the predominant disorders (CLIS indexes of 31.9, 13.2 and 2.9, respectively). More importantly, the effect of claw status at 12 months of age had a signifi-

cant effect ($P < 0.05$) on the CLIS index one month prepartum for both heel erosion and sole hemorrhage, indicating that the incidence and severity of these two diseases at 12 months of age influence the incidence and severity of the same diseases near the end of the rearing period. At two months postpartum, heel erosion, sole hemorrhage, and to a lesser extent white line separation, abaxial wall fissure, and digital dermatitis were the predominant disorders (CLIS indexes of 35.0, 26.4, 6.3, 2.5 and 1.9, respectively). The CLIS status one month prepartum had a significant effect ($P < 0.05$) on the CLIS status two months postpartum for heel erosion, abaxial wall fissure, sole hemorrhage and digital dermatitis.

As indicated by the CLIS index, lesions were less prevalent and less severe at 12 months of age than at one month prepartum. Likewise, claw lesions present at one month prepartum were less prevalent and less severe than claw lesions present at two months postpartum.

Heifers that had at least one claw lesion at 12 months of age were 27.7 times more likely ($P < 0.05$) to have a claw lesion two months postpartum than those that did not have a claw lesion at 12 months of age. Heifers with abaxial wall fissures and sole hemorrhages at 12 months of age were more likely (odds ratio 5.3 and 2.0, respectively) to have these lesions present two months postpartum than those who did not have these lesions.

Heifers that had at least one claw lesion one month prepartum were 15.1 times more likely ($P < 0.05$) to have a claw lesion two months postpartum than heifers that had no claw lesions one month prepartum. The presence of heel erosion or digital dermatitis one month prepartum increased the odds of having the same disorder two months postpartum (odds ratio 1.7 and 4.0, respectively, $P < 0.05$). Presence of lesions such as dorsal wall ridges, white line separation and double soles at either 12 months of age or one month prepartum did not affect the incidence ($P > 0.15$) of these lesions two months postpartum.

Significance

Results of this study indicate that even mild claw lesions during the rearing phase can substantially increase incidence and severity of claw lesions during lactation. This confirms previous research (Peterse, 1986; Raven, 1989; Enevoldsen *et al*, 1991) that cows with claw lesions are more prone to recurrences.

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