

A controlled trial assessing the effect of gradual cessation of milking prior to dry-off on the risk of new intramammary infection and well-being in dairy cows

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Introduction

The importance of the end of lactation and the dry period in the dynamics of intramammary infection (IMI) in dairy cattle has long been recognized. In previous studies, gradual cessation of milking has been shown to decrease daily milk production during the last week of lactation and reduce risk of new IMI during the dry period. Although these results support the use of gradual cessation of milking to end lactation as an aid to improve udder health, only a limited number of recent studies have investigated its suitability in high-producing dairy cows. Consequently, gradual cessation has not been implemented widely in the field and no definite regimen has been recommended to dairy producers. However, due to increased intramammary pressure and subsequent tissue damage, abrupt cessation has been shown to be associated with elevated fecal stress hormones and is therefore subject to increasing concerns regarding animal well-being. The objective of this study, therefore, was to investigate the effect of 2 different drying-off protocols (gradual vs abrupt cessation) on the risk of new IMI, milk production, and somatic cell count (SCC) in the subsequent lactation, as well as concentration of fecal glucocorticoid metabolites in dairy cows. We hypothesized that cows that are enrolled in an intermittent milking schedule (i.e., gradual cessation) for the final week of lactation would have a lower risk of new IMI during the dry period, higher milk production, and lower SCC in the subsequent lactation, as well as lower fecal glucocorticoid concentration compared with their herd mates that are milked 3 times daily and dried-off by abrupt cessation.

Materials and Methods

This study has been carried out at a commercial dairy farm milking approximately 1,600 cows. Holstein cows are housed in free-stall pens, fed a total mixed ration, and milked 3 times per day. The farm uses a dairy management software program, DHIA services, and has a designated weekly dry-off day. Cows that were confirmed pregnant were enrolled 1 week before their designated dry-off day. They were ran-

domly allocated into treatment and control groups. Treatment consisted of an intermittent milking schedule for 7 d prior to dry-off (gradual cessation, GRAD). Gradual cessation cows were milked once daily, whereas cows in the control group (abrupt cessation, CON) were milked 3 times daily until the day of dry-off. Quarter milk samples were obtained for bacterial culture from each cow on the day of dry-off and at 3-4 DIM. Fecal samples were collected from each cow on the day of dry-off and 3 d after dry-off, and analyzed for glucocorticoid metabolites. Udder firmness, pain response following manual palpation of the udder, and presence of milk leakage were assessed 3 d after dry-off. Generalized linear mixed models will be used to study the effect of treatment on the outcome variables of interest. Cow will be included as random effect to account for the correlated structure of the data. Parity at dry-off, DIM at dry-off, and dry period length will be treated as potential covariates.

Results

To date, 99 cows have been enrolled (GRAD, 50; CON, 49). Cows were in their 1st (n = 46), 2nd (n = 28), and ≥3rd (n = 25) lactation and were between 223 and 435 DIM at dry-off. Milk leakage was observed in 2.8% of group GRAD and 2.9% of cows in group CON, respectively. We documented a firm udder in 35% of cows in group GRAD and 44% of cows in the control group. A pain response was documented in 7 (20%) cows in group GRAD and 4 (11%) animals in group CON. Results on udder health parameters and milk production, as well as fecal glucocorticoid metabolites, will be presented.

Significance

We expect that our results will have a substantial impact on proposed drying-off strategies and encourage dairy producers to advance udder health, animal wellbeing, and the sustainability of their farms.