The effect of early vs late pairing on measures of dairy calf health, performance, and behavior through weaning

Whitney A. Knauer, VMD, PhD; **Sandra M. Godden**, DVM, DVSc; **Natalie Barka**, BS
[1]Department of Veterinary Population Medicine, College of Veterinary Medicine, University of Minnesota, St. Paul, MN 55108
[2]Department of Animal Science, College of Food, Agricultural and Natural Resource Sciences, University of Minnesota, Saint Paul, MN 55108

Introduction

Pair housing of dairy calves during the preweaning period improves some measures of performance and socialization as compared to calves housed individually. However, there is little evidence to guide producers and veterinarians as to when to pair preweaned calves to maximize social and performance effects while minimizing potential detrimental health effects. The objective of this randomized trial was to investigate the effect of pairing at birth vs pairing at 30d of age on measures of calf health, performance, and behavior.

Materials and Methods

This randomized clinical trial was conducted on a commercial dairy in west central MN from May to August 2019. All healthy male and female Holstein calves were enrolled by birth order into 1 of 2 treatment groups: Early Pair (EP; calves were paired at birth) or Late Pair (LP; calves were paired at 30 ± 2 d of age). Calves were either housed in a barn (n=34) or modified hutches (n=10). All calves received 6L/d of pasteurized whole milk split into 2 feedings for the first 8 wk of life, and weaned at 60 d by a gradual reduction in milk allowance over a 6 d period. Calves exited the study at 10 wk. Body weights (kg) and hip heights (cm) were measured weekly and starter intake was measured twice per week (g/pair/day). Each enrolled calf was scored for health weekly, with farm treatments collected. Calf position in the hutch/pen was recorded 3 times per week via direct observation. Calf behavior around the time of feeding was observed at both feedings on 1 day per week for 30 min before and after milk feeding. During each of these observation periods, calf posture and behavioral state was recorded by direct observation using instantaneous scan sampling with a 120 sec interval. Generalized linear mixed models were used to determine the effect of treatment (EP/LP) on calf health, performance, and behavioral outcomes, accounting for the fixed effect of time, gender, housing type, the interaction of time and treatment , and accounting for repeated measurements when appropriate. Final significance was determined at $P < 0.05$; trends at $0.05 < P < 0.10$.

Results

A total of 44 newborn Holstein heifer and bull (EP n=11 pairs; LP n=11 pairs) calves were enrolled from May to June 2019. Two enrolled calves in the EP group died during the pre-weaning period. There was no effect of age at pairing on average daily gain (EP vs LP; 0.38 vs 0.39 ± 0.11 kg/d; P = 0.90) or hip height (P = 0.458) over the study period. During week 7, EP pairs consumed more starter grain than LP pairs (792 ± 51 vs 630 ± 46g/pair/d; P = 0.01). There was no effect of age at pairing on the odds of a first treatment event (EP = 45%, LP = 55%, P = 0.55), or on the odds of an abnormal health score (EP = 20.5%, LP = 25.8, P = 0.242). In weeks 1-4, during the 30 min after milk delivery, EP calves spent a larger percentage of observed time laying down (31.4 vs 25.2%; P = 0.04) and a lower percentage of observed time non-nutritive suckling (5.9 vs 10.9%; P = 0.01) as compared to LP calves, housed individually at the time. In weeks 4-8, after milk delivery, both EP and LP calves spent the majority of observed time standing (44 ± 12%) or cross-sucking (18.5 ± 0.1%), with no differences between treatment groups. While paired, EP calves had higher odds of lying down (85.2 vs 77.3%, P = 0.01) and lying on the same side of the pen/hutch (63.2 vs 52.4%, P = 0.01) during observation periods as compared to LP calves

Significance

Under the conditions of this study, there was no effect of pairing at birth vs pairing at 30d of age on the weekly health scores, treatment rates, or growth of pre-weaned dairy calves. However, EP calves did lay down more and lay down more together, suggesting a social benefit to earlier pairing. Given the limited sample size of this study, more research is needed on commercial dairies to understand when pre-weaned calves should be paired to optimize benefits and reduce health risk.