

Research Summaries 2

A herd-level study of colostrum management and its association with success of passive transfer in newborn dairy calves

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Introduction

Many individual animal-level studies have been conducted to investigate the risk factors for success of passive transfer (SPT) in dairy calves. However, a much smaller number of studies are available to identify risk factors for SPT at the herd level. Therefore, the first objective of this study was to describe colostrum management in dairy herds when considering colostrum quality (IgG concentration and bacterial contamination) and feeding (volume and timing). The second objective was to quantify the prevalence of SPT in these herds and to investigate its association with colostrum management at the herd level.

Materials and Methods

A cross-sectional study was conducted in which a total of 18 dairy herds from the ambulatory clinic of the Université de Montréal were selected by convenience based on their willingness to investigate the colostrum management of their farm. In each herd, farmers were asked to collect a colostrum sample at the first colostrum meal of their calves ($n=20$ calves/herd); samples were taken to specifically represent the colostrum that the calf would drink (from the nipple or feeder). These samples were tested for IgG concentration using a Brix refractometer and for bacterial contamination using standard bacteriology laboratory plate count (aerobic count and coliform count). Adequate contamination was defined as $<100,000$ cfu/mL for aerobic (ADEQAERO) and $<10,000$ cfu/mL for coliform (ADEQCOLI). Farmers also completed a questionnaire to investigate colostrum management for all calves (volume fed, timing of feeding relative to birth, feeding material used, etc.). Data of colostrum volume fed and its IgG concentration were combined to estimate the amount of IgG ingested by calves; a sufficient amount was defined as ≥ 150 g IgG (SAIGG). Ingestion of colostrum within the first

6 hours of life was considered adequate (ING6H). Within 1 and 7 days of age, enrolled calves were bled from the jugular vein to quantify total solids using a Brix refractometer to determine if the calves had SPT (defined as $\geq 8.4\%$ Brix). Statistical analyses were computed in SAS considering the herd as the unit of interest.

Results

A total of 333 calves (colostrum samples) from 18 commercial herds (herd size from 50 to 250 lactating cows) were enrolled in the study. All colostrum samples were tested for total solids and bacterial contamination. Of enrolled calves, 219 were bled to evaluate SPT. The median herd-level SPT ranged from 41 to 100% (median: 70%; lower quartile: 63%; higher quartile: 80%). The median herd-level prevalence of SAIGG ranged from 18% to 100% (median: 66%; lower quartile: 58%; higher quartile: 80%). The median herd-level prevalence of ING6H ranged from 47% to 96% (median: 77%; lower quartile: 61%; higher quartile: 90%). The median herd-level prevalence of ADEQAERO ranged from 3% to 75% (median: 38%; lower quartile: 16%; higher quartile: 55%). The median herd-level prevalence of ADEQCOLI ranged from 47% to 100% (median: 96%; lower quartile: 92%; higher quartile: 100%). Good colostrum management (adequate timing, amount of IgG and bacterial contamination) was associated with greater SPT prevalence.

Significance

Overall, these results show that colostrum management is variable between herds and can influence the prevalence of SPT. These results also highlight the low proportion of colostrum with adequate aerobic bacterial contamination. Further investigation should be done to better understand its impact on SPT prevalence.