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Calf Note #233 – Colostrum Feeding Frequency

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Introduction

Colostrum intake and IgG absorption are critical to the health and long-term performance of newborn calves. So, the appropriate recommendation for when and how much colostrum is really important for producers. The mass of IgG often recommended (>150-200 grams in the first 24 hours of age) may be fed in one, two, or more feedings in the first 24 hours of life. Recent research published in the Journal of Dairy Science (Lopez et al., 2022) evaluated two different feeding options – feeding colostrum in two or three meals after birth. The goal of the study was to see if there was an upper limit of IgG intake and how IgG absorption may be affected by meal size and timing.

The Research

Newborn Holstein male calves (n = 40) were assigned to receive one of two treatments. The first was colostrum replacer (CR) fed at 1 and 12 hours after birth, at 8% and 4% of birth BW, respectively (LOW). The second treatment was feeding at 1, 6, and 12 hours after birth, all at 4% of birth BW (HI). Calves on the LOW treatment weighed 46.5 kg at birth, therefore, the average calf was fed 3.7 liters in the first feeding (262 g IgG) and 1.9 liters (130 g IgG) in the 2nd feeding. Calves on the HI treatment were fed 1.9 liters (130 g IgG) at each feeding. The CR contained 30% IgG and was reconstituted to contain 70.5 grams of IgG per liter. The total IgG intake by the calves was 391 grams of IgG. All CR was administered by esophageal feeder.

Average serum IgG at 24 hours were 25.8 and 25.7 g/L for LOW and HI treatments, respectively. The apparent efficiency of IgG absorption averaged 28 and 28% for LOW and HI, respectively. There was no difference between the two treatments.

Interpretation

This study shows that colostrum (in this case, colostrum replacer) fed at 1, 6, and 12h hours results in similar IgG and AEA statistics as a similar mass of colostrum replacer fed at 1 and 12 hours. This has a couple of implications. The first is that calves seem to be able to efficiently absorb a larger meal offered at 1 hour of age. In this study calves were administered nearly 4 liters of solution and >250 grams of IgG in the first feeding. This does not seem to impair IgG

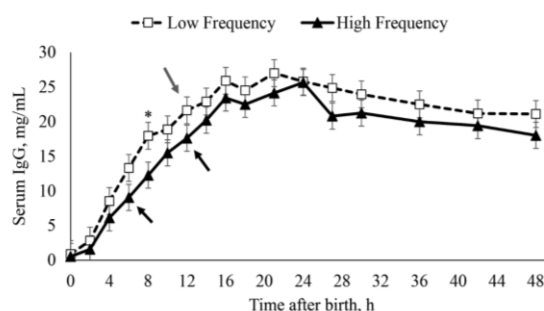


Figure 1. Change in serum IgG in calves fed colostrum in 2 (Low) or 3 (High) feedings. From Lopez, et al. (2022). Arrows indicate feeding times.

absorption or efficiency. Thus, it may not be necessary to feed calves 3x if that is not a management requirement on the farm.

The other implication is more technical in nature. We generally consider that the calf's ability to absorb IgG declines as calves age, to the time of "gut closure" at about 24 hours. Thus, IgG administered later will be absorbed less efficiently than IgG administered earlier. This is the reason for recommending feeding larger volumes in the first feeding. However, much of the research that reported AEA over time don't always show a gradual decrease as some (including myself) have hypothesized. This research suggests that feeding 3x – and feeding part of the colostrum at 6 hours instead of 1 hour – didn't have a measurable effect on IgG concentration or AEA. It's not clear if the substrate used – i.e., a colostrum replacer might influence this result. Some CR are processed to increase IgG above than of native colostrum by removing fat and casein. These processing steps may change curd formation and outflow of whey from the abomasum. Whole, fresh colostrum containing significant fat and casein might react differently.

Summary

This interesting study indicates that feeding the same amount of CR in 2 feedings and 1 and 12 hours of age or feeding at 1, 6, or 12 hours had little effect on IgG absorption. All calves achieved successful passive transfer when fed this mass of CR product.

References

Lopez, A. J., T. T. Yohe, J. Echeverry-Munera, M. Nagorske, D. L. Renaud, and M. A. Steele. 2022. Effects of a low- or high-frequency colostrum feeding protocol on immunoglobulin G absorption in newborn calves. *J. Dairy Sci.* 105:6318–6326. <https://doi.org/10.3168/jds.2021-21284>.

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