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Calf Note #252 – Oxytocin to Increase Colostrum Yield

Introduction

Harvesting enough high quality colostrum from fresh cows remains a challenge. Cows often produce insufficient volume and/or quality (IgG concentration) to provide for sufficient passive immunity to the newborn calf. So, when you're faced with a cow reluctant to "let down" her colostrum in the first milking after calving, what are the options? One attractive approach is to treat the cow with oxytocin, the hormone responsible for milk release. Recent research by Mann et al. (2024) from Cornell University and the University of Bern, Switzerland evaluated the use of oxytocin on colostrum yield with 636 cows on a commercial New York dairy farm.

The Research

Cows (all Holstein breed) of all parities were selected for the trial if they were milked at the morning milking. Treatments were not applied at the afternoon milking. Cows calved normally according to management on the farm and they were moved to the milking parlor as soon as they were ambulatory after calving. Cows were injected IM with 20 or 40 IU of oxytocin. The control group was not injected. Injections occurred about 45 seconds prior to attaching the milking unit.

Volume of colostrum was measured and the IgG concentration of a representative sample was measured by radial immunodiffusion and BRIX refractometry. The researchers also collected data regarding days dry, sex of calf, calf birth BW, calving score, and other demographic information. This information will be the topic of a future Calf Note.

Effect of Oxytocin

The effect of administration of oxytocin on colostrum yield is in Figure 1. There was a clear and statistically significant improvement in yield of colostrum in primiparous cows when treated with 40 IU of oxytocin, but no effect in multiparous cows. Treatment with 20 IU had no effect in either group.

There was no effect on oxytocin on the concentration of IgG in any treatment group, nor were there effects on BRIX or colostrum DM concentrations, indicating that total IgG yield was increased when 40 IU was administered to heifers only.

Why Only Heifers?

An interesting question resulting from the research was – why did oxytocin increase yield only at the highest concentration and why only in heifers?

The authors hypothesized that the increase in heifers may be related to the ability of exogenous

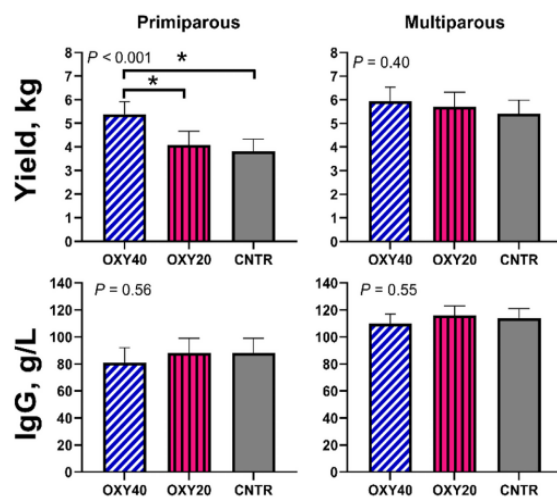


Figure 1. Effect of administration of 0 (control; CNTR), 20 (OXY20), or 40 (OXY40) IU of oxytocin IM to primiparous or multiparous Holstein cows after calving. From: Mann et al., 2024.

oxytocin to “override the inhibition of endogenous oxytocin release by stress” (Mann et al., 2024) – in other words, the heifers are being milked for the first time and the process is likely novel and stressful for them, which inhibits the heifers from releasing their own oxytocin. Injection with 40 IU of oxytocin overcame that inhibition and allowed greater production colostrum. Older cows, on the other hand, had experienced the milking process and were not stressed by the events of calving and milking; therefore, oxytocin wasn’t effective in increasing colostrum yield.

The authors summarized their study and that of others by concluding that the data supporting routine use of oxytocin for colostrum harvest in all cows is quite limited and their data don’t support this as a routine practice. On the other hand, Sutter et al. (2019) reported that use of 20 IU oxytocin administered IM about 3 minutes prior to udder stimulation and milking increased colostrum IgG concentration by about 6 g/L, suggesting that the methods and timing of administration may be important. Also, methods of collection may be important. In the study by Sutter et al. (2019), cows were individually milked in a chute immediately after calving, which may be less stressful than milking in a parlor.

Summary

Treatment of fresh cows with oxytocin after calving resulted in increased colostrum volume only in first-calf heifers treated with 40 IU of oxytocin administered about 45 seconds prior to collection of colostrum. These data suggest that heifers may experience greater stress when milked in parlors (though this wasn’t evaluated expressly) and the novel experience of calving and colostrum collection may be sufficiently stressful to limit milk let-down and colostrum yield. A higher dose of oxytocin was more effective in this study. However, different conditions and timing of oxytocin administration may lead to different results.

References

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