(HG, 1.9%; BHBA, 16.8%; BHBA+HG, 9.4%). P2 prevalence of puerperal metritis was significantly less in the Norm group compared to cows in the BHBA group but similar to cows in HG group (Norm, 6.7%; BHBA, 16.8%; HG, 1.9%). For primiparous cows there was no difference in incidence of puerperal metritis amongst metabolic categories. There were no differences between metabolic groups for P/AI, pregnancy loss, average DOPN, or P150. In conclusion, hyperketonemia of multiparous cows was associated with increased puerperal metritis; however, hypoglycemia alone was associated with decreased puerperal metritis compared to cows with elevated BHBA with or without concurrent hypoglycemia.

**Keywords:** Hyperketonemia, hypoglycemia, dairy cows, uterine disease

## Effect of GnRH at artificial insemination for dairy cows detected in estrus by an activity monitoring system or by conventional estrus detection

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Artificial insemination (AI) after detected estrus constitutes a substantial proportion of AI's that occur in the US. Moreover, AI after detected estrus may be increasing with the use of activity monitors. We hypothesized that GnRH treatment at AI increases both ovulation and circulating progesterone concentrations, thereby improving pregnancies per AI (P/AI); additionally, we hypothesized that this effect is higher in farms using activity monitors. The objectives of the study were to determine if GnRH treatment at AI increases P/AI for lactating dairy cows detected in estrus on farms using activity monitors (AM) or not (NAM). Holstein cows were blocked by parity and randomly assigned to receive an injection of GnRH at AI (G-AI) or to receive no injection of GnRH (NG-AI) at AI on a farm using AM for estrus detection and on a group of 4 farms using NAM. On the farm with AM, 409 cows were enrolled (G-AI, n = 207; NG-AI, n = 202) and for the farms using NAM, 398 cows were enrolled (G-AI, n = 197; NG-AI, n = 201). Ovarian structures and plasma progesterone concentrations were assessed in a subset of cows (G-AI, n = 52; NG-AI, n = 55) detected in estrus by conventional methods at the time of AI and 7 days later. Data were categorized by milk production quartiles, genomic daughter pregnancy rate (High: > the median, Low: < the median), activity level (AL) for the farm using AM (High: AL > the median AL versus Low: AL < the median AL) and DIM (> 150 DIM versus < 150 DIM). Statistical analyses were performed using logistic regression and a Student's *t*-test. There were no differences in ovulation rate (G-AI = 83.2 ± 6.1%; NG-AI = 77.9 ± 5.5%) between G-AI and NG-AI. There were no differences in plasma progesterone concentrations at day of estrus detection (day 0) (G-AI = 0.16 ± 0.11 ng/ml; NG-AI = 0.09 ± 0.10 ng/ml) nor at day 7 after enrollment between G-AI and NG-AI (G-AI = 2.17 ± 0.15 ng/ml; NG-AI = 2.04 ± 0.15 ng/ml). Data for all farms were analyzed together for P/AI; no difference for P/AI at first pregnancy diagnosis (G-AI = 38.7 ± 3.9%; NG-AI = 40.9 ± 3.9%) or second pregnancy diagnosis (G-AI = 35.1 ± 4.1%; NG-AI = 35.7 ± 4.2%) was identified. No difference in P/AI between G-AI and NG-AI when farms were analyzed separately based on estrus detection method (AM separate from NAM) at first pregnancy diagnosis (AM: G-AI = 39.1 ± 5.0%; NG-AI = 38.6 ± 5.1%; NAM: G-AI = 38.3 ± 5.2%; NG-AI = 43.3 ± 5.2%) or second pregnancy diagnosis (AM: G-AI = 36.3 ± 5.1%; NG-AI = 33.8 ± 5.2%; NAM: G-AI = 33.8 ± 5.3%; NG-AI = 37.8 ± 5.2%) was identified. There was no interaction between treatment and method of estrus detection. For the farm using AM, there was a significant interaction between treatment and AL with the injection of GnRH having a greater impact on cows with high AL. In conclusion, GnRH treatment did not enhance P/AI. Additional studies are warranted to understand the interaction between treating cows with GnRH at AI and AL in herds using activity monitoring systems.

**Keywords:** Dairy cows, estrus detection, activity monitors, GnRH