Effect of oral Ca boluses on serum Ca concentration, health events, milk yield, activity and rumination behavior in Holstein cows

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Holstein cows (with one or more previous lactations) fitted with a collar-mounted automated activity monitoring (AAM) system (Heatime®, SCR Engineers) were blocked by previous 305 ME milk yield, parity and day of calving and assigned randomly to receive no treatment (Control; n=23) or two 50 g oral Ca chloride boluses (RumiLife® CAL24™; n=23) within 6 h after calving. Blood samples were collected at treatment or within 6 h after calving (SCa1) and 24 h later (SCa2) to determine total serum Ca concentrations at the Animal Health Laboratory (University of Guelph). Cows were observed for health disorders by farm personal. Rumination and activity behavior were monitored continuously by the AAM system for 21 d after calving and milk yield recorded daily up to 8 wks after calving. Data were analyzed using PROC MIXED in SAS. SCa1 did not differ between treatment groups, but SCa2 was greater in treated cows compared to Control (2.0 ± 0.06 versus 1.7 ± 0.06 mmol/L; P=0.009). Lactation number negatively affected SCa1 and SCa2, but there was no interaction between lactation number and treatment on serum Ca concentrations. Health events were recorded in 9 treated and 10 Control cows with 1 and 4 cases of clinical hypocalcemia for treated and Control cows, respectively. Average daily activity was reduced by 2.8% in cows given oral Ca boluses compared to Control cows, however, rumination (573.2 ± 3.6 min) and milk yield (46.4 ± 0.5 kg) did not differ between treatment groups.
Take home message: Administration of oral Ca boluses increased total serum Ca concentrations 24 h after treatment and numerically reduced the cases of clinical hypocalcemia. Although, oral Ca boluses treatment was associated with a small reduction in activity, it did not affect rumination time nor milk yield.

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Associating reproductive physiology and automated monitoring technologies to predict fertility of dairy herds: II. lactating Holstein cattle

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The display and intensity of estrous expression, measured by automated activity monitors (AAM), have been associated to improve fertility of lactating Holstein cattle. Although the exact mechanism controlling intensity of estrus in dairy cows remains elusive, progesterone (P4) concentrations prior to estrus have been shown to be positively associated with intensity of estrous expression. However, the unanswered questions were: Would be possible to manipulate the intensity of estrus and thus fertility by controlling P4 concentration before estrus? Could AAM data be used to refine fertility indexes of genetic selection programs used in dairy cattle? First, we evaluate if different exposure of P4 prior to estrus would impact the intensity of estrous measured by AAM. Additionally, we evaluate the P4 association on luteinizing hormone (LH) and prostaglandin metabolite (PGFM) profiles. The second study was conducted to evaluate the association of intensity of estrus and the LH profile following gonadotropin-releasing hormone (GnRH) administration at the supposed time of artificial insemination. In the first study, elevated P4 concentration prior to estrus was associated to greater intensity of estrous expression and lower PGFM profile. Although no differences in LH concentration between different P4 concentration were observed, the peak of LH occurred earlier for cows with lower P4 concentration compared to elevated P4. In the second study, there was an increase in LH concentration following GnRH administration, but no association of intensity of estrus on LH profile was observed independently of GnRH administration. Next steps include refine estrus data to improve reproductive indexes used in genetic selection programs.
Take home message: The modulation of estrous expression through manipulation of physiological parameters could provide insights on the underlying physiology of fertility traits used in genetic selection programs.