VALIDITY OF PREPARTUM TEMPERATURE CHANGES TO PREDICT CALVING IN DAIRY COWS

Onno Burfeind, Wolfgang Heuwieser

Clinic for Animal Reproduction, Faculty of Veterinary Medicine, Freie Universität Berlin, Berlin, Germany

Introduction: Body temperature in cattle exhibits a circadian rhythm with a minimum in the morning and a maximum in the afternoon. Beside several external variables (e.g. heat stress, cooling methods) the animals’ physiological status has an important influence on temperature (e.g. oestrus, pregnancy). There is evidence that cows exhibit a decrease in temperature before the onset of parturition.

Objective: The objective of this study was to determine sensitivity and specificity of a decline in vaginal temperature to predict calving in dairy cows.

Materials and methods: Temperature loggers were inserted in the vagina 6±2d before calving in 30 heifers to measure vaginal temperature. At initiation of calving the loggers were expelled from the vagina.

Results and discussion: There was a drop in vaginal temperature comparing the daily mean at the day of calving to one (-0.3±0.3°C; P< 0.001), two (-0.6±0.3°C; P< 0.001), and three days ante partum (-0.7±0.4°C; P< 0.001). A drop ≥0.3°C comparing a particular time of the day with the same time on the preceding day predicted parturition in the next 24h with a sensitivity (Sen) of 69% and a specificity (Spe) of 83%. When comparing only differences on a 24h basis in the early morning or late afternoon, a drop ≥0.3°C predicted the onset of calving within 24h more precisely (0500: Sen=83%, Spe=87%; 0600: Sen=83%, Spe=88%; 0700: Sen=87%, Spe=88%; 0800: Sen=80%, Spe=84%; 1700: Sen=77% Spe=78%).

Conclusions: In conclusion a drop in temperature is indicative for the event of calving within 24h. The predictive value can be improved by comparing only temperature values taken in the early morning (0500 to 0800) or the late afternoon (1700). It remains unclear why the predictive value is higher during these particular periods. Interestingly, these periods coincide with the minimal (morning) and maximal (afternoon) body temperatures during the course of a day. We speculate that within the diurnal rhythm the body temperature is most consistent during these intervals. Comparing differences on a 24h basis during a period where body temperature is increasing (morning to afternoon) or decreasing (over night) might bias the calculated difference. The bias might be minimized in early morning and late afternoon due to more consistent temperatures during these periods.

Further research is warranted to develop temperature-based protocols to accurately predict calving in dairy cows.

Keywords: Parturition, body temperature, dairy cow