Comparison of serum estradiol, progesterone and luteinizing hormone concentrations, follicular development and timing of ovulation in dairy heifers treated with 4- or 5-day CoSynch+CIDR protocols

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The use of 5-day CoSynch+CIDR protocols in dairy heifers has resulted in pregnancy per timed AI (P/TAI) ranging from 52.2 to 61%. A previous study evaluating a Monday to Friday 4-day CoSynch+CIDR protocol in dairy heifers showed an adequate P/TAI (55.0%) which was not statistically different from that in the 5-day CoSynch+CIDR (63.3%). However, there was a tendency of higher (8.3%) P/TAI in the 5-day group, which might be associated with differences in follicular development and timing of ovulation between groups. We hypothesized that heifers treated with 4-day CoSynch+CIDR protocol have longer interval from CIDR removal to ovulation and different levels of estradiol (E2) and luteinizing hormone (LH) compared to heifers treated with a 5-day CoSynch+CIDR protocol. The objectives were to compare follicular growth and timing of ovulation (interval from CIDR removal to ovulation) in dairy heifers treated with 4- or 5-day CoSynch+CIDR, using ultrasonography (USG) per rectum and determine the serum progesterone (P4), E2, and LH levels in the same heifers using radio-immunoassay (RIA). Twelve cycling Holstein heifers (12-15 mo), were randomly assigned to either the 4- or 5-day Co-Synch+CIDR groups (n=6/group) to receive an intravaginal Eazi-Breed CIDR® insert containing 1.38 g of P4 for 4 or 5 days, respectively. At CIDR removal, 25 mg of PGF2α (Lutalyse®) was injected intramuscularly (IM); 72h after CIDR removal, heifers received 100 µg of GnRH (Factrel®) IM and AI with commercial frozen-thawed semen. Follicular growth and timing of ovulation were assessed using ultrasound per rectum every 12h on the first day and every 6h on the subsequent three days after CIDR removal. Blood samples were collected at initiation of protocols for determination of P4, and at TAI for determination of P4 and E2, and every 6h during the first and second day after CIDR removal and every two hours during the third day after CIDR removal, to assess LH levels. Descriptive statistics were calculated for timing of ovulation, follicular diameter and hormone concentrations (mean ± SD). Heifers in the 4-day group had smaller follicles at the time of CIDR removal, TAI and before ovulation (7.2±2.8, 12.0±1.2, and 12.3±1.4 mm) compared to heifers in the 5-day group (10.7±2.7, 13.1±2.8, and 14.0±2.0 mm). Five out of 6 heifers (83.3%) in the 4-day group ovulated at 90-96h after CIDR removal, while most heifers in the 5-day group (4/6; 66.6%) ovulated at 84-90h after CIDR withdrawal. Progesterone concentration at TAI was <1 ng/mL in all the heifers. Serum E2 concentration at TAI was higher in the 4-day group than the 5-day group (3.7±2.7 vs 0.8±0.6 pg/mL). Heifers in the 5-day group reached higher LH levels (10.01 ± 5.8 ng/mL) than heifers in the 4-day group (6.6 ± 2.7 ng/mL) during the sampling period. In conclusion, heifers in the 4-day group had smaller follicular diameter, longer interval from CIDR removal to ovulation (6h longer), higher concentrations of E2 at TAI, and lower LH levels during the evaluation period than heifers in the 5-day group. These results support our hypothesis and suggest that prolonging the interval from CIDR removal to TAI by 6 hours (from 72 to 78h) in heifers treated with 4-day CoSynch+CIDR would increase P/TAI.

Keywords: Co-Synch+CIDR, heifer, LH, estradiol, timing of ovulation