

Optimizing GnRH-based protocols for timed-AI in Holstein heifers

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Holstein heifers (n=334) were fitted with a collar-mounted automated activity monitoring system (SCR) at ~13.5 mo of age and assigned randomly to one of three different timed-AI (TAI) protocols. Heifers in the G100 group received a standard 5-d CO-Synch protocol [100µg of gonadorelin (GnRH) on Day 0 and 500 µg of cloprostenol (PG) on Days 5 and 6] plus a progesterone device (PRID ® DELTA) between Day 0 and 5. Heifers in the G200 group received similar treatments as G100 except the GnRH dose on Day 0 was of 200 µg. Heifers in the P10 group received a PRID and PG on Day -5, 100µg of GnRH on Day 0, PRID removal on Day 5 and PG treatments on Days 5 and 6. All heifers were TAI ~72 h after PRID removal and concurrently GnRH was administered to those not exhibiting estrus. Inseminations were done by one technician using either sex-sorted (n=265) or conventional (n=69) frozen-thawed semen. Estrus events were recorded and transrectal ultrasonography was done to monitor ovarian dynamics and determine pregnancy per AI (P/AI). All heifers were cycling and ovulatory response to initial GnRH was greater ($P<0.01$) in G200 (51.8%) and P10 (47.7%) compared to G100 (27.9%). Estrus rate tended to be greater ($P=0.08$) in G100 (93.7%) compared to G200 (85.7%) and intermediate in P10 (89.2%). Expression of estrus was positively associated with P/AI at 45 d post TAI ($P<0.01$; 70.2 vs. 31.4% for those expressing or not estrus). G200 heifers had greater ($P<0.05$) P/AI at 28 and 45 d post TAI (79.5 and 75.9%) compared to that in G100 (63.1 and 60.4%) and P10 (64.0 and 62.2%) heifers. Pregnancy loss did not differ among treatments (overall 3.9%).

Take home message: Inconsistent results have been reported in heifers subjected to GnRH-based protocols and poor ovulatory response to initial GnRH has been identified by our research as one of the leading factors explaining those results. Findings from the current study suggest that increasing the dose of initial GnRH from 100 to 200 µg resulted in increased ovulatory response and improved P/AI.

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Comparison of two intravaginal progesterone-releasing devices in Holstein cows synchronized with a 5-d GnRH-based TAI protocol: preliminary results

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Holstein cows fitted with a collar-mounted automated activity monitoring system (Alta Cow Watch) that were either non-cycling after the voluntary waiting period or non-pregnant and non-returning to estrus following AI were enrolled. Cows were subjected to a standard 5-d CO-Synch protocol [100µg of gonadorelin (GnRH) on Day 0 and 500 µg of cloprostenol on Days 5 and 6] and allocated randomly to receive either a progesterone device containing 1.35 g (CIDR; n=220) or 1.55 g (PRID ® DELTA; n=223) of progesterone between Day 0 and 5. All cows received a second administration of GnRH approximately 56 h and timed-AI (TAI) 72 h after device removal. Inseminations were done by one technician using conventional frozen-thawed semen. Estrus events were recorded and transrectal ultrasonography was done on Day 0 to determine cyclicity and 32 and 60 d post-TAI to diagnose pregnancy. Cows had an average of 2.2 lactations, 123 days in milk and milk yield of 44.4 kg/d at enrollment. The percentage of cyclic cows was 60.9% and did not differ between treatments. Expression of estrus prior to TAI did not differ between treatments, but affected P/AI at 32 and 60 d post-TAI ($P<0.01$; 54.0 and 49.6% vs. 35.4 and 31.2% for those expressing or not estrus, respectively). Cyclic cows had greater P/AI at 32 and 60 d post-TAI than acyclic cows ($P<0.01$; 44.8 and 40.7% vs. 32.9 and 28.3%). Pregnancy per AI at 32 d did not differ between treatments ($P=0.7$; 39.5 vs. 40.8% for CIDR and PRID groups). However, P/AI at 60 d tended ($P=0.1$) to be greater in PRID-treated cows (38.6%) compared to CIDR-treated cows (33.2%). Thus, PRID-treated cows had lower pregnancy lost than PRID-treated cows ($P=0.048$; 5.5 vs. 16.1%).

Take Home Message: PRID-treated cows had lower pregnancy lost than CIDR-treated cows. Estrus expression prior to TAI was poor regardless of treatment, but positively associated with P/AI. Future studies should investigate strategies to increase the expression of estrus prior to TAI in cows.

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