

Improved fertility of cows failing to respond to resynchronization of ovulation through presynchronization of ovulation or progesterone supplementation during Ovsynch

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Introduction

The most widely adopted Resynch program by US dairy herds consists of the initiation of Resynch at 32 d after a previous artificial insemination (AI) regardless of pregnancy status. Seven days later pregnancy status is determined so that non-pregnant cows continue in the protocol to receive their next timed AI (TAI). This program guarantees that cows not detected in estrus are re-inseminated within a specific timeframe after the previous AI (42 ± 3 d if groups of cows are enrolled weekly), reducing the interval between inseminations. Retrospective evaluation of pregnancy per AI (P/AI) for cows that complete the protocol and receive a TAI service has shown that cows without a corpus luteum (CL) at the time of Resynch initiation will have an approximate 50% reduction in fertility when compared with cows that do have a CL. Our objective was to evaluate treatments to increase fertility of TAI services of lactating dairy cows without a CL at the time of the prostaglandin $F_{2\alpha}$ (PGF) injection of Resynch initiated 32 ± 3 d after AI.

Materials and Methods

In Experiment 1 (Exp 1), the objective was to identify, based on ovarian ultrasound at the time of non-pregnant diagnosis (NPD), a subgroup of cows expected to have reduced fertility if they receive TAI after Resynch, and therefore would benefit by receiving the experimental treatments tested in Exp 2. The ovaries of non-pregnant cows enrolled in the Ovsynch-56 protocol (GnRH-7 d-PGF-56 h-GnRH) for resynchronization of ovulation were evaluated by ultrasound after NPD at 39 ± 3 d after AI to evaluate ovarian structures. A blood sample was collected to determine circulating concentrations of P4. Regardless of the ovarian structures present on the ovaries, cows continued in the resynchronization of ovulation protocol to receive their next TAI service. These data were used retrospectively to: 1) determine criteria to assign cows to a functional CL and No-CL group based on ultrasound, and 2) evaluate the fertility of AI services for cows in the CL and No-CL group. In Exp 2, cows without a CL or a CL < 15 mm (NoCL) were randomly assigned to: 1) Ovsynch

plus progesterone (P4) (OvP4; GnRH [G1] and CIDR-7d-PGF and CIDR removal-56h-GnRH-16h-TAI; n=212), or 2) presynchronization with GnRH (PreG) 7 d before Ovsynch (PreGOv; GnRH-7d-GnRH[G1]-7d-PGF(P)-56h-GnRH-16h-TAI; n=192). Blood samples for the analysis of P4 concentrations were assayed with a commercial RIA kit. In Exp 1, samples were collected from 555 cows at the time of PGF injection in the resynchronization protocol, whereas in Exp 2, samples were collected from a subgroup of cows (n=334; 170 from Ovsynch+P4 and 164 from PreG-Ovsynch) at the initiation of the experimental treatments (cows with No-CL only at the time of NPD) and the time of the first GnRH and PGF injection of the Ovsynch-56 protocol of the experimental treatments.

Results

Based on the fertility of cows that received a TAI service after completion of the resynchronization protocol in Exp 1, a minimum CL diameter of 15 mm was selected to assign cows to the experimental treatments in Exp 2. The cutoff value for CL size was selected based on the maximum size of the CL at which cows in the No-CL and CL group had a statistically significant difference in P/AI. Based on the selected cutoff value, cows with No-CL had a 23% reduction in P/AI ($P=0.001$) when compared to cows with a CL (10.3% vs 32.7%, respectively). In Exp 2, P/AI at 39 ± 3 d after AI were similar ($P=0.13$) for cows with a CL (30.1%; n=1,604) that completed the resynchronization of ovulation protocol and for cows without a CL inseminated after receiving the Ovsynch+P4 (34.4%; n=212) and PreG-Ovsynch (37.0%; n=192) protocol. Further, no differences in P/AI were observed when P/AI were evaluated separately for cows inseminated after a detected estrus or after a TAI service.

Significance

We conclude that presynchronization with GnRH 7 d before Ovsynch or Ovsynch plus P4 are 2 feasible alternatives to increase P/AI of cows without a CL at the PGF injection of Resynch.