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Resynchronization of ovulation and timed insemination in lactating dairy cows III. Administration of GnRH 23 days post AI and ultrasonography for nonpregnancy diagnosis on day 30

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Abstract

The objective was to compare pregnancy rates to resynchronization and timed AI (TAI) protocols in lactating dairy cows that received GnRH at 23 d and were diagnosed not pregnant at 30 d after the pre-enrollment AI. Nonpregnant cows (624) at ultrasonography on day 30 (study day 0) were classified as diestrus (74.8%), metestrus (5.6%) and without a CL (19.5%). Cows in diestrus were assigned either to the GnRH group ($PGF_{2\alpha}$ on day 0, GnRH on day 2 and TAI 16 h later, $n = 238$) or the estradiol cypionate (ECP) group ($PGF_{2\alpha}$ on day 0, ECP on day 1, and TAI 36 h later, $n = 229$). Cows in metestrus were assigned to the Modified Heatsynch Group (GnRH on day 0, $PGF_{2\alpha}$ on day 7, ECP on day 8 and TAI on day 9, $n = 35$). Cows without a CL ($n = 122$) were classified either as proestrus (10.6%), ovarian cysts (7.5%) or anestrus (1.4%), and assigned to factorial treatments (i.e., use of GnRH versus CIDR) to either the GnRH group (GnRH on day 0, $PGF_{2\alpha}$ on day 7, GnRH on day 9 and TAI 16 h later, $n = 28$), the CIDR group (CIDR insert from days 0 to 7, $PGF_{2\alpha}$ on day 7, GnRH

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on day 9 and TAI 16 h later, $n = 34$), the GnRH + CIDR group (GnRH on day 0, CIDR insert from days 0 to 7, $PGF_{2\alpha}$ on day 7, GnRH on day 9 and TAI 16 h later, $n = 32$), and the control group ($PGF_{2\alpha}$ on day 7, GnRH on day 9 and TAI 16 h later, $n = 28$). For cows without a CL, plasma P_4 concentrations were determined on days 0, 7, 10 and 17 and ovarian structures determined on days 0, 7 and 17. Pregnancy rates were evaluated at 30, 55 and 90 d after the resynchronized AI. For cows in diestrus, there were no differences in pregnancy rates on days 30, 55 and 90 for cows in the GnRH (27.5, 26.5 and 24.2%) or ECP (29.1, 25.5 and 24.1%) groups. In addition, there were no differences in pregnancy losses between days 30 and 55 and 55 and 90 between the GnRH (7.0 and 8.6%) and ECP (9.8 and 5.4%) groups. For cows without a CL, GnRH on day 0 increased the proportion of cows with a CL on days 7 and 17 and plasma P_4 concentration on day 17 in cows with ovarian cysts but not for cows in proestrus. The CIDR insert increased pregnancy rate in cows with ovarian cysts but reduced pregnancy rate for cows in proestrus.

1. Introduction

Systematic breeding programs including synchronization of ovulation and timed AI (TAI) enhance reproductive efficiency and consequently increase the profitability of dairy herds [1]. After first service, nonpregnant cows need to be detected as early as possible and then, resynchronized and inseminated in a timely manner to maintain high reproductive performance [2].

Different strategies for resynchronization of ovulation and TAI include synchronizing the follicular wave in advance by initiating the Ovsynch® protocol 7 d before nonpregnancy diagnosis [3–5]. An alternative was not to induce follicular wave synchronization after previous AI but administer $PGF_{2\alpha}$ to induce luteolysis at the time of nonpregnancy diagnosis and then GnRH [2] or ECP [6,7] to induce ovulation for TAI.

Synchronization of ovulation for TAI is more effective when the first dose of GnRH in the Ovsynch protocol is able to induce ovarian follicular turnover [8,9]. Cows in proestrus obtained acceptable pregnancy rate to the Ovsynch protocol, and the distribution of interestrus intervals after prior AI indicated that most of the nonpregnant cows will be in the peri-estrous period around days 22–23 [7]. Therefore, administration of GnRH on days 22–23 after a previous AI should induce ovulation in the majority of the cows and result in formation of a CL and synchronization of an ovarian follicular wave.

In this study, GnRH was administered on day 23 after a pre-enrollment AI, and pregnancy diagnosis by ultrasononography was conducted on day 30. Nonpregnant cows were assigned to different protocols according to ovarian and uterine characteristics to resynchronize ovulation for TAI. The objective was to compare pregnancy rate in cows in diestrus after synchronization of ovulation with either GnRH or ECP and compare ovarian function and pregnancy rate in cows without a CL after synchronization of ovulation and TAI in a protocol including either GnRH or a progesterone (P_4) intra-vaginal insert.