Kansas Agricultural Experiment Station Research Reports

Volume 0
Issue 2 *Dairy Research (1984-2014)*

Article 299

2003

Variations in the ovsynch protocol alter pregnancy rates in lactating dairy cows

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Abstract

Initiation of the Ovsynch protocol at random stages of the estrous cycle produces differences in synchronization and pregnancy rates. Use of two injections of PGF2αadministered 14 days apart, with the second injection given 12 days before initiating the Ovsynch protocol increased the percentage of cows that start the Ovsynch protocol at a more desirable stage of the estrous cycle (e.g., between days 5 and 13). In this experiment, after applying the Presynch-Ovsynch protocol, timing of the second injection of GnRH and insemination were altered to determine their effect on pregnancy rates. Cows that received the second GnRH injection at the same time as they were inseminated at 72 hours after PGF2αhad greater pregnancy rates than cows that received the second GnRH injection at 48 hours after PGF2αand were inseminated 0 or 24 hours later.; Dairy Day, 2003, Kansas State University, Manhattan, KS, 2003;

Keywords

Diary Day, 2003; Kansas Agricultural Experiment Station contribution; no. 04-129-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 919; Dairy; Ovsynch; Presynch; Pregnancy rates

VARIATIONS IN THE OVSYNCH PROTOCOL ALTER PREGNANCY RATES IN LACTATING DAIRY COWS

M.A. Portaluppi and J.S. Stevenson

Summary

Initiation of the Ovsynch protocol at random stages of the estrous cycle produces differences in synchronization and pregnancy rates. Use of two injections of $PGF_{2\alpha}$ administered 14 days apart, with the second injection given 12 days before initiating the Ovsynch protocol increased the percentage of cows that start the Ovsynch protocol at a more desirable stage of the estrous cycle (e.g., between days 5 and 13). In this experiment, after applying the Presynch-Ovsynch protocol, timing of the second injection of GnRH and insemination were altered to determine their effect on pregnancy rates. Cows that received the second GnRH injection at the same time as they were inseminated at 72 hours after $PGF_{2\alpha}$ had greater pregnancy rates than cows that received the second GnRH injection at 48 hours after $PGF_{2\alpha}$ and were inseminated 0 or 24 hours later.

(Key Words: Ovsynch, Presynch, Pregnancy Rates)

Introduction

The effective application of an estrus-synchronization or ovulation control program allows one to determine the time of insemination. Recent studies have reported that cows initiating the Ovsynch protocol in the early to midluteal phase (days 5 to 13) of the estrous cycle have greater pregnancy rates than cows in which the protocol was initiated at random stages of the cycle. To target the initiation of the Ovsynch protocol during this favorable stage of the estrous cycle, it is necessary to presynchronize the estrous cycles of cows before the first injection of GnRH of the Ovsynch protocol. Use of two injections of $PGF_{2\alpha}$ 14 days apart constitutes a practical and relatively inexpensive method for presynchronization. Cows receiving the Presynch protocol have greater pregnancy rates than cows treated only with Ovsynch. Furthermore, establishing the optimal and practical time of insemination in which maximal pregnancy rates might be achieved constitutes the reason for recent investigations. Previous studies demonstrated that cows inseminated at different times (from 0 to 24 hours) after the second GnRH had similar pregnancy rates, whereas those inseminated as late as 32 hours after GnRH had reduced pregnancy rates.

The objectives of the present experiment were to determine pregnancy rates after altering times of the second GnRH injection and insemination in the Ovsynch protocol to accommodate once daily lockup of dairy cows.

[1]We thank Duane Meier of Meier Dairy, Palmer, Kan., and Steve Ohlde of Ohlde's Dairy, Linn, Kan., for cooperating in this study.

Procedures

In the current experiment, 715 lactating dairy cows from two dairy herds in northeastern Kansas were studied. Cows were less than 40 days in milk at the start of the Presynch protocol. They were milked three times daily and produced more than 10,000 kg of milk.

All cows received two, 25-mg injections of $PGF_{2\alpha}$ (5 cc of Lutalyse, Pharmacia Animal Health, Kalamazoo, Mich.) 14 days apart, with the second injection given 12 days before initiating the Ovsynch protocol. Cows were blocked by lactation number and randomly assigned to three treatments (A, B, and C) consisting of variations of the Ovsynch protocol. Treatments were initiated every 2 weeks within herd, with each herd breeding cows on alternate weeks. Body condition (scale of 1 to 5; 1 = thin and 5 = fat) was evaluated during the week of insemination.

Figure 1 illustrates the treatment protocol. Cows in treatment A and B received two, 100µg injections of GnRH (2 cc of Fertagyl, Intervet, Millsboro, Del.) 7 days before and 48 hours after a $PGF_{2\alpha}$ injection. Fixed-time inseminations were made at the time of GnRH injection (0 hour; treatment A) or 24 hours later (treatment B). Cows in treatment C received the second GnRH injection at 72 hours after $PGF_{2\alpha}$ and were inseminated at the same time. All cows involved in the experiment were treated and inseminated during the morning hours after milking while they were restrained by feed line head locks. If cows were detected in estrus before their scheduled TAI, they were not inseminated until their scheduled treatment time. Pregnancy was diagnosed weekly by palpation of uterine contents on days 40 or 41 after TAI by the same veterinary practitioner. Results for 666 of 715 cows are reported below. Reasons for the loss of data from 49 cows included death culling for various reasons.

Results and Discussion

Based on previous studies we expected an increase in the proportion of cows that initiated the Ovsynch protocol during the early or midluteal phase because of the Presynch injections of $PGF_{2\alpha}$. The effects of treatment on pregnancy rates are summarized by herd in Table 1. Herds differed ($P<0.01$) in overall pregnancy rates. Across herds, pregnancy rates for cows were greater ($P<0.05$) after treatment C than after treatments A and B. First-lactation cows (n = 265) also had greater ($P<0.05$) pregnancy rates (32 vs. 27%) than older cows (n = 401).

Earlier studies evaluated different times of insemination after estrus. Those studies suggested that inseminating cows at 0, 8, 16, or 24 hours after the second GnRH injection produced greater pregnancy rates than inseminating at 32 hours after GnRH. In the previous scenario, all cows were given GnRH 48 hours after $PGF_{2\alpha}$.

In our study, inseminating at 0 and 24 hours after GnRH, when GnRH was administered at 48 hours after $PGF_{2\alpha}$ produced lower pregnancy rates than inseminating and injecting GnRH at 72 hours after $PGF_{2\alpha}$. Treatment C is a novel treatment not heretofore tested. Further, treatment C allows time and labor savings because cows are inseminated and injected on the same day, and all treatments and inseminations can occur at the same time of the day as all previous injections (all AM or all PM).

Pregnancy rates using treatment C would likely improve if cows expressing estrus before their scheduled TAI on Thursday mornings were inseminated based on detected estrus and the remaining cows were inseminated on Thursday morning and given GnRH. This procedure would serve as a clean-up insemination for cows not detected in estrus and inseminated.

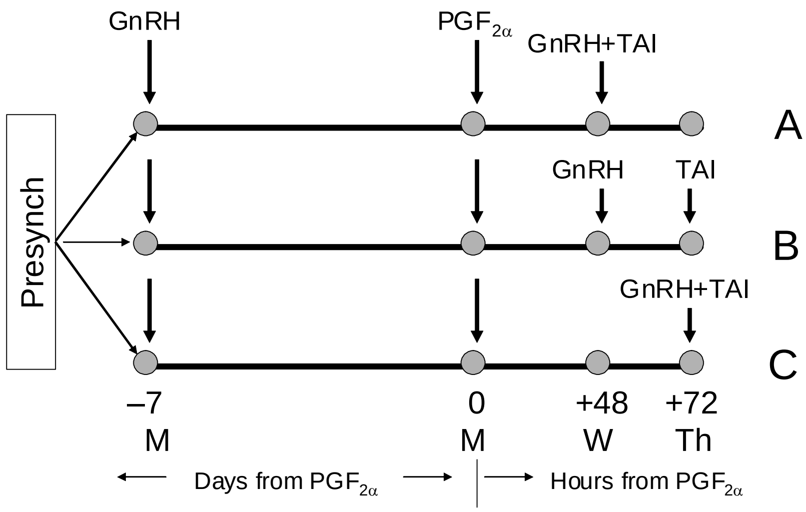

Figure 1. Treatment Protocol for Experiment. All cows received two injections of PGF$_{2\alpha}$ 14 days apart (Presynch), with the second injection given 12 days before initiating the Ovsynch protocol.

Table 1. Pregnancy Rates at 40-41 Days after First Insemination

Herd	Treatment A	Treatment B	Treatment C	Total
1	16 (80)	19 (78)	24 (76)	20 (234)
2	27 (141)	34 (147)	41 (144)	34* (432)
Total	23 (221)	29 (225)	35** (220)	29 (666)

*Different (P<0.01) from herd 1.
**Different (P<0.05) from treatments A and B.