INCREASING PREGNANCY RATES AT FIRST SERVICE IN DAIRY COWS EXPOSED TO HIGH AMBIENT TEMPERATURES BEFORE AND AFTER CALVING[1]

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Summary

Cows exposed to heat stress before or after calving or both are prone to reduced fertility because of reduced expression of estrus and less embryonic survival if pregnant. Cows calving on three dairy farms during the summer of 1998 were studied. First inseminations were programmed to occur between 50 and 70 days in milk using the Ovsynch protocol, which included a timed artificial insemination. Control cows were treated similarly but did not receive the second injection of gonadotropin-releasing hormone and were inseminated only after estrus was detected (Select Synch). The Ovsynch protocol increased pregnancy rates from 17.6 to 31.3%, because AI submission rates were 100% and conception rates were not different from those of control (Select Synch) cows.

(Key Words: Ovsynch Protocol, Heat Stress, Estrus.)

Introduction

Cows that are heat stressed around the time of calving, during late gestation, and during the breeding period have reduced fertility compared to those in a more comfortable, thermally neutral environment. Decreased expression of estrus and reduced embryonic survival are major contributors to the unacceptable pregnancy rates observed during summer months. Breeding programs, such as the Ovsynch protocol, that synchronize ovulation before a timed artificial insemination (TAI) eliminate the need for estrus detection, result in all cows being inseminated, and can improve pregnancy rates in lactating dairy cows. If a TAI protocol that does not require estrus detection were successful during heat stress, it could decrease the number of repeat breeders and the average interval from parturition to conception.

The Ovsynch protocol has produced acceptable conception rates in previous studies. In fact, in most studies, conception rates are equal to those achieved when cows are inseminated after detected estrus. The Ovsynch protocol consists of two injections of gonadotropin-releasing hormone (GnRH) administered 9 days apart with an injection of prostaglandin $F_{2\alpha}$ (PG) given 2 days before a second GnRH injection. Cows then are inseminated by appointment 16 to 20 hrs after the second GnRH injection.

The objective of this experiment was to determine the success of a breeding protocol during summer months that synchronized ovulation before a TAI compared to a similar protocol that depended entirely upon estrus detection. We compared the pregnancy rates of cows treated according to the Ovsynch protocol with those of cows receiving a similar treatment minus the second injection of GnRH and inseminated only after a detected estrus. If conception rates (the proportion pregnant of those inseminated) are not different between these two protocols, then pregnancy rates (the proportion pregnant of all cows treated) should be in-

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creased after the Ovsynch protocol because all cows are inseminated.

Procedures

Cows (n = 371) from three cooperating dairies in northeast Kansas that calved between April and October 1998 were assigned randomly to each of two treatments in 3-week breeding clusters before first inseminations occurred between 50 and 70 days in milk. Figure 1 shows the treatments Ovsynch (OVS) and Select Synch (SS). Cows in the OVS treatment were all inseminated 15 to 18 hrs after the second injection of GnRH. Cows in the SS group were inseminated only after a detected estrus during the target-breeding week.

Blood was collected prior to each hormone injection regardless of whether or not the cow was injected. Concentrations of progesterone in the blood were assayed to determine luteal status of cows before insemination.

Pregnancy was confirmed using transrectal ultrasonography 27 days after insemination and reconfirmed by palpation of the uterus at 40 to 50 days by the herd veterinary practitioner. Estrus detection rate or AI submission rate (proportion of cows detected in estrus of total treated), conception rate, and pregnancy rate then were determined.

Cows were housed in freestall barns. Cows in two herds were managed with overhead fans and feed-bunk misters. Cows in the third herd were managed only with overhead sprinklers on the feed-bunk side of the barn. Cows were fed a total mixed ration consisting of chopped alfalfa, corn silage, whole cottonseed, and concentrate-mineral mix to meet or exceed their daily requirements for maintenance and milk production.

Results and Discussion

The AI submission rate (percentage of cows detected in estrus) in the SS group was less ($P<.01$) than that of cows in the OVS protocol (Table 1). Although conception rate was not different (31.3 vs. 28.7%) between protocols, the 27-day pregnancy rate (31.3 vs. 17.5%) was increased ($P<.01$) by the Ovsynch protocol.

Table 1. Effects of Select Synch vs. Ovsynch Protocols during Heat Stress

	Treatments[1]	
Item	Select Synch	Ovsynch
No. of cows	189	182
AI submission rates, %	61.5	100[x]
Conception rates, %	28.7	31.3
Pregnancy rates, %	17.6	31.3[x]

[x]Different ($P<.01$) from Select Synch.
[1]See Figure 1.

These results indicate that using a TAI protocol during times of high ambient temperature and humidity can improve pregnancy rates compared to breeding only after a detected estrus. We conclude that application of the Ovsynch protocol for synchronization of cows during heat stress increased pregnancy rate because it is independent of expression or detection of estrus.

Furthermore, when conception rates are equal, using a TAI protocol will always increase pregnancy rates, because all cows are inseminated. Therefore, the limiting factor becomes the estrus detection or AI submission rate. Regardless of weather conditions, when estrus detection rates are poor, the Ovsynch protocol will prove superior to any program that is dependent on heat detection.

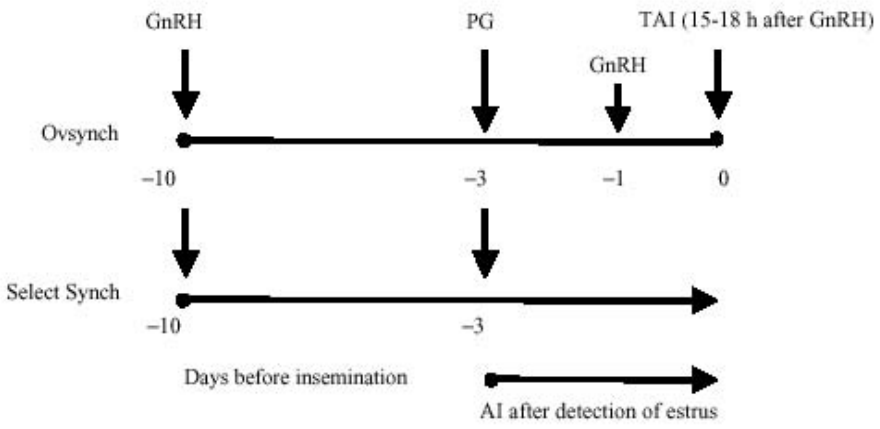

Figure 1. Treatment Protocols. GnRH = gonadotropin-releasing hormone (100 μg of Fertagyl®, Intervet, Millsboro, DE); PG = prostaglandin $F_{2\alpha}$ (25 mg of Lutalyse®, Pharmacia and Upjohn, Kalamazoo, MI); and TAI - timed artificial insemination.