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Abstract

In one large dairy herd, we examined the reproductive performance of 943 cows following early postpartum hormonal therapy utilizing gonadotropin-releasing hormone (GnRH or Cystorelin®) and prostaglandin F2-α (PGF). None of our hormonal treatments improved reproductive efficiency in this herd, whereas earlier studies at the KSU Dairy Teaching and Research Center had proved beneficial. However, cows given PGF to induce estrus at the beginning of the breeding period had similar reproductive performance to control cows, suggesting a potential use for one injection of PGF to allow the breeding of more cows by a target date after calving (e.g., by 65 days).; Dairy Day, 1987, Kansas State University, Manhattan, KS, 1987;

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FURTHER STUDIES UTILIZING HORMONES TO ALTER ESTROUS CYCLES AND FERTILITY

J.S. Stevenson, R.E. Stewart, and E.P. Call

Summary

In one large dairy herd, we examined the reproductive performance of 943 cows following early postpartum hormonal therapy utilizing gonadotropin-releasing hormone (GnRH or Cystorelin®) and prostaglandin F_2-alpha (PGF). None of our hormonal treatments improved reproductive efficiency in this herd, whereas earlier studies at the KSU Dairy Teaching and Research Center had proved beneficial. However, cows given PGF to induce estrus at the beginning of the breeding period had similar reproductive performance to control cows, suggesting a potential use for one injection of PGF to allow the breeding of more cows by a target date after calving (e.g., by 65 days).

Introduction

Several studies have reported that GnRH, given between 10 and 18 days after freshening, will: (1) help the uterus return to normal more rapidly, (2) shorten the interval to the cow's first ovulation after calving, (3) shorten the average interval to the first observed heat, and (4) reduce calving intervals. In addition, some reports suggested that PGF, when administered between 14 and 28 days after calving, will: (1) increase conception rates at first services and (2) shorten calving intervals (see pp 40-42 in the 1985 Dairy Day, KAES Rep. Prog. 484). The benefits of these hormonal treatments appear to be associated with estrous cycles. A direct effect on the reproductive tract is suggested, but the mechanism of therapeutic benefit is not well understood. The objective of this experiment was to reaffirm our earlier work using a large commercial herd and to determine if one injection of PGF given early in the breeding period could promote improved calving intervals compared to nontreated, control cows bred as they showed heat spontaneously.

Procedures

During the fall of 1985, 1,049 cows were assigned randomly as they calved between September 23 and December 17 to five experimental groups: (1) GnRH (100 µg or 2 cc Cystorelin®) injected (im) once between 11 and 25 days postpartum, (2) early PGF (25 mg or 5 cc Lutalyse®) injected (im) once between 11 and 25 days, (3) late PGF given once between 25 and 40 days, (4) breeding PGF given once between 48 and 59 days (beginning of the breeding period), and (5) no hormonal treatment. All cows were milked 3X daily for 4 min and 15 sec. Breeding began at the first observed heat after 40 days postpartum except for cows in the fourth experimental group (breeding PGF), in which inseminations were carried out

after cows were given PGF and detected in heat. In the breeding PGF group, PGF was administered 6 days after breeding began in each breeding group.

Results and Discussion

Results of this study are summarized in Table 1. Only 943 of the 1,049 cows (90%) treated were inseminated at least once. Intervals from calving to first estrus and first service were unaffected by hormonal treatments. Most cows, on the average, were first inseminated by 75 days postpartum. Calving to conception intervals in controls averaged 100 days or projected to an acceptable 380-day calving interval. Cows given one injection of PGF to initiate the breeding period had calving to conception intervals of 105 days or 385-day calving intervals similar to control cows. In contrast, treatments with GnRH and PGF prolonged conception intervals by 11 to 21 days. We have not observed previously a detrimental effect of these treatments and cannot explain why this occurred.

The remaining reproductive traits examined were similar among treatment groups except for services per conception. Cows given the late PGF treatment (25 to 40 days after calving) tended to require more services and also had the longest intervals to conception (Table 1).

Table 1. Reproductive performance

Trait	GnRH	Early PGF_2-alpha	Late PGF_2-alpha	Breeding PGF_2-alpha	Control
No. cows bred once	211	215	190	109	218
Calving to first estrus	69.1	71.4	64.7	70.0	68.3
Calving to first AI	72.6	76.7	71.3	71.6	72.2
Calving to conception	111.7*	111.7*	121.2*	105.0	100.4
Conception at first AI, %	37.4	35.3	35.3	41.3	41.7
No. cows pregnant	177	177	159	93	189
Conception rate, %	83.9	82.3	83.7+	85.3	86.7
Services/conception	2.2	2.2	2.6+	2.1	2.0

*Different from control ($P<.05$).

+Different from control ($P=.09$).

Other experiments have shown improvements for cows given GnRH at 8 to 18 days after calving. In addition to our recent data (see pp 40-42, 1985 Dairy Day, KAES Rep. Prog. 484), reproductive performance of abnormal cows in New York, and of cows with retained placentas in Ontario, was improved by GnRH when early breeding was practiced.

Results of other studies, however, have not been quite as promising. In two Colorado herds in which early breeding was practiced, treatment with 250 µg GnRH improved fertility in only one herd. Another study in a Florida herd

practicing 3X daily milking also reported that various doses of a GnRH analogue (Buserelin®) had no effect on reproductive performance. A Canadian study found 250 µg GnRH given on day 15 to be detrimental because it increased the incidence of uterine infection and irregular cycling — unless PGF was given 10 days later.

We are uncertain why GnRH or PGF treatments given early postpartum are not consistently effective in all herds, but it is apparently due to a number of factors including dose and management. It appears that consistent results are possible when using doses of 200 to 250 µg GnRH in herds where early breeding is practiced (starting at 40 to 50 days postpartum) and cows are milked twice daily.