DOUBLE INSEMINATIONS AND TREATMENT OF REPEAT BREEDERS WITH GONADOTROPIN-RELEASING HORMONE

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Summary

An experiment was conducted in one Kansas and five California dairy herds to determine if double inseminations with and without treatment with 100 μg gonadotropin-releasing hormone (GnRH) would improve conception rates of repeat-breeding dairy cattle (n=723). Both lactating cows and virgin dairy heifers were assigned randomly to treatments as repeat breeders, if they had failed to conceive to at least two previous services. Cows inseminated once and treated with GnRH had the best conception rates (41%), which were higher (P<.01) than those of cows inseminated once without GnRH treatment (32%) and higher (P<.01) than those of cows inseminated twice without treatment with GnRH (33%). Cattle bred twice that received the GnRH treatment had intermediate rates (37%). We conclude that treatment of repeat breeders with GnRH at the time of insemination (only one service given according to the am-pm, pm-am rule) improved conception rates.

Introduction

We have demonstrated in three previous experiments that conception rates of repeat breeders are improved significantly when 100 μg GnRH or Cystorelin® are administered intramuscularly immediately after insemination. Our first experiment in 1981 included 97 cows at our KSU Dairy Teaching and Research Center (DTRC). A second study in 1986 also conducted at KSU included 115 cows. In both Kansas studies, conception rates were improved from either 51 to 66% or 39 to 54%. In a third study of 513 cows in Oklahoma, we reported that conception rate was improved from 36 to 47% after GnRH treatment of repeat breeders.

In our present experiment, we wanted to test whether or not double inseminations would increase conception rates of repeat breeders. Many have suggested that one cause of repeat breeding is delayed ovulation. That is, the interval from the onset of standing estrus to ovulation of the egg or ovum is much longer in repeat breeders than the normal 24 to 30-hr period. Therefore, a second insemination given about 12 hr after the first AI might prove beneficial. The purpose of our study was to compare a double-insemination treatment to a control single insemination. In addition, we included two more treatments in which GnRH was given at insemination in one-half of the cows assigned to either the single or double-insemination groups.

Procedures

Repeat-breeding, lactating cows and virgin heifers were assigned randomly to four treatment groups: 1) Single AI + no injection; 2) Single AI + 100 μg GnRH; 3) Double AI + no injection; and 4) Double AI + 100 μg GnRH. We administered Cystorelin® (CEVA Laboratories, Inc., Overland Park, KS) intramuscularly to cows in the appropriate treatments

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immediately following the single insemination or after the first AI of the double-insemination groups. Inseminations were based on the am-pm, pm-am rule. Cows were observed for estrus either two or three times daily.

Cows were utilized in five California herds (Foster Farms) and in one Kansas dairy farm (KSU DTRC). The study was conducted in the fall and winter of 1987-88 in the California herds and year-round in our KSU herd (1986-88). Conception rates were determined by palpation of the uterus per rectum beginning 40 days after the last service.

Results and Discussion

Table 1 summarizes the results of the experiment in each of the six herds. All six herds had a numerical increase in conception when treated with GnRH immediately after a single AI. However, only four of six herds showed a numerical improvement when treated with GnRH after the first of two inseminations (Double AI). It is unclear why administering a second insemination would negate the positive effect of GnRH.

Table 1. Conception Rates in Six Herds Involved in the Field Trial

Herd[a]	Single AI				Double AI			
	No injection		GnRH		No injection		GnRH	
CA-1	17/52	(33)[b]	23/54	(43)	18/46	(39)	15/46	(33)
CA-2	15/42	(36)	19/42	(45)	17/65	(26)	23/62	(37)
CA-3	19/50	(38)	23/50	(46)	20/48	(42)	21/48	(44)
CA-4	13/48	(27)	20/48	(42)	16/48	(33)	18/48	(38)
CA-5	32/106	(30)	54/140	(39)	30/96	(31)	37/96	(39)
KS-1	22/69	(32)	25/64	(39)	19/58	(33)	20/62	(32)

[a]The California herds were Foster Farms and the Kansas herd was our KSU DTRC herd in Manhattan.

[b]Percentages.

Table 2 presents the overall results of this large field trial. Cows given GnRH after a single AI had higher ($P<.01$) conception rates than those receiving no injection and inseminated either once or twice. This result rejects the notion that a double insemination would help improve conception rates of repeat breeders and confirms our earlier recommendations for utilizing GnRH at insemination. Cows receiving both the GnRH treatment and double AI had conception rates that appeared to be higher than those of noninjected controls, but were statistically similar. Combining results across treatments showed that a double AI was not better than a single AI (35 vs 37%), and the injection of GnRH increased ($P<.01$) conception rates compared with noninjected controls (39 vs 33%).

Table 2. Combined Results of the Field Trial

	Single AI		Double AI	
	No injection	GnRH	No injection	GnRH
Number	118/367	164/398	120/361	134/362
%	32.2[a]	41.2[b]	33.2[a]	37.0[a,b]

[a,b]Percentages with unlike superscripts differ (P<.01).

This experiment provides evidence for the continued recommendation of the GnRH treatment to improve conception rates of repeat breeders. Given the cost of GnRH, we continue to recommend its use only at third or greater services. Now coupled with the results of this experiment, we recommend that cows treated with GnRH receive only one insemination, because two inseminations either with or without GnRH were not better than a single AI plus GnRH treatment.