Possibilities of Increasing the Conception Rate after the Termination of the Voluntary Waiting Period in Dairy Cows

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Abstract

The purpose of the paper is to increase the conception rates after termination of the voluntary waiting period in dairy cows by administering synthetic analogs of $PgF_2\alpha$. The first dose of $PGF_2\alpha$ (Proliz: 500 mcg of Cloprostenol) was given on day 46 on calving. Females who did not show heat after first administration were given a dose of 500 mcg of Cloprostenol after 14 days (60 days after calving). In the 46-65 days from culling, out of 26 cows in the experimental group, 24 cows (92.3%) showed heat and of the 18 cows in the control group, 12 cows showed heat (66.66 %). Within the 46-65 days from calving, out of the 24 cows in the experimental group did not return to heat 15 cows (conceptual rate of 62.5%); of the 12 cows in the control group, 6 cows did not return to heat (50.0% conception rate).

Keywords: Cloprostenol, conception rate, dairy cows, voluntary waiting period

1. Introduction

In order to achieve a calving interval of 12-13 months, it is necessary for dairy cows to remain pregnant as soon as possible after calving. In order to achieve such a period between litters, it is necessary to reduce the waiting period from breeding to breeding again (VWP) to 45-50 days. The start of artificial sowing after 45 days after calving has beneficial effects on the number of litters throughout the reproduction period of the females. Cows sown early after calving have lower conception rates and require more IA/gestation [1, 2].

Ovarian follicular growth is resumed immediately after calving, and the first ovulation occurs 10-15 days after calving. No resumption of ovarian functions immediately after calving can be noticed, because the heat is still quiet within 55 days from calving [1, 3]. These quiet heats have beneficial effects on fecundity because the ovary produces estrogens that contribute to normalizing ovarian functions and restoring the uterine environment to allow sperm to rise in female genitalia.

Females with cyclic ovarian activity are not immediately identified because ovulation is silent. It is therefore necessary to induce heat manifestation by administering $PgF_2\alpha$. To shorten the interval between calving, it is important that the voluntary waiting period does not exceed 55-65 days [4].

The purpose of the paper is to increase the conception rates after termination of the voluntary waiting period in dairy cows by administering synthetic analogs of $PgF_2\alpha$.

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2. Materials and methods

The experiments were carried out in two family farms of dairy cows, of the Black spotted Romanian breed, in Timiş County.

$PgF_2\alpha$ and its synthetic analogs have luteolytic effect and are used to induce regression of the luteal body. After regression of the luteal body, the frequency of LH pulses increases significantly the estradiol secretion of the dominant follicle, followed by the occurrence of estrus manifestation.

Recommendations are that the interval between two administrations of $PgF_2\alpha$ to be 11-14 days (5, 6) when all females are at the end of the met estrous stage. Most females show heat between 48 and 96 hours after the end of treatment.

In our experiments, we administered the first dose of $PgF_2\alpha$ (Proliz: 500 mcg Cloprostenol) on the 46th day after calving. Females who did not show heat after first administration were given a dose of 500 mcg of Cloprostenol after 14 days (60 days after calving). Entry of females in heat has been monitored for 5 days after both first and second administration of $PgF_2\alpha$.

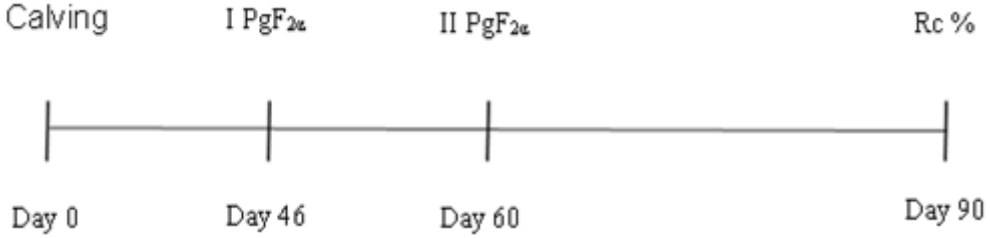

Figure 1. Figure of estrus synchronization with $PgF_2\alpha$ during the voluntary period

Heat rate was calculated 5 days after the first dose of $PgF_2\alpha$ (50 days from calving) in both the experimental group and the control group. In females given the second dose of $PgF_2\alpha$, the heat rate was calculated 5 days after dosing (65 days after calving).

Conception rate was calculated 25 days after sowing (90 days from calving), by reporting the number of females that did not return to heat after sowing, to the number of females that were sown.

The conception rate (Rc) is the ability of a sowing/mounted female to remain pregnant. It represents the percentage ratio between the number of pregnant females after a single sowing/mating and the number of once sowed females [7].

3. Results and discussion

The results obtained with regard to the heat rate in cows for milk treated with $PgF_2\alpha$ at 46 and 60 days after calving are shown in Table 1.

Table 1. Heat rate in cows treated with $PgF_2\alpha$ at 46 and 60 days after calving

Group	Females that have calved (n)	First dose of $PgF_2\alpha$ (46 days from calving) (n)	Females that show heat		A.I. Females (n)	Second dose of $PgF_2\alpha$ (60 days from calving) (n)	Females that show heat		A.I. Females (n)	Heat Rate at 65 days after A.I.	
			n	%			n	%		n	%
Experimental	26	26	18	69.23	18	8	6	75.0	6	24	92.30[a]
Control	18	-	-	-	-	-	-	-	-	12	66.66[b]

(a-b) $p<0.05$

Of the 26 females in the experimental group receiving $PgF_2\alpha$ on the 46th day after calving, 18 showed heat within the next 5 days of administration, with a heat-up rate of 69.23%.

In the other 8 females who did not show heat, they were given a second dose of $PgF_2\alpha$, 14 days after the first administration (60 days after calving). Of these, 6 showed heat, which represents a 75.0%

heat rate. Between 46 and 65 days after calving, 24 females in the experimental group were found in heat, which is a heat incidence rate of 92.3%.

Of the control group consisting of 18 females, 12 showed heat up to 65 days after calving, which represents a 66.66% heat rate. The differences between the control group and the experimental group are significant ($p<0.05$). All females that showed heat were artificially sown.

Table 2 shows the dynamics of heat entry of cows after administration of $PgF_2\alpha$. Of the 26 cows that received $PgF_2\alpha$ at 46 days from calving, 18 showed heat. Of these, 6 cows have entered heat 2 days after administration (33.33%), 8 cows have entered heat 3 days after administration (44.45%), 2 cows have shown heat after 4 days (11.11%) and two more cows at 5 days after $PgF_2\alpha$ (11.11%). The eight remaining cows were given a second dose of $PgF_2\alpha$ after 14 days, of which 6 cows showed heat (75.0%). Of these, 2 cows (33.33%) entered the heat 2 days after administration and 4 cows showed heat on the third day (66.67%).

Table 2. Dynamics of heat entry of cows after $PgF_2\alpha$ administration

Group	N	Females that show heat		Days from $PgF_2\alpha$ administration									
				1		2		3		4		5	
		n	%	n	%	n	%	n	%	n	%	n	%
1st exp. (46 days)	26	18	69.23	-	-	6	33.33	8	44.45	2	11.11	2	11.11
2nd exp. (60 days)	8	6	75.0	-	-	2	33.33	4	66.67	-	-	-	-

Concerning the rate of conception, the results are shown in Table 3. In the experimental group, of the 18 females who showed heat and were sown after the first administration of $PgF_2\alpha$, 10 females remained pregnant, is 55.55%. Of the 6 females who showed heat and were sown after the second dose of $PgF_2\alpha$, 5 females remained pregnant, which represents an 83.33% conception rate. Of the 24 females in the experimentally sown group, 15 did not return to heat, which represents a 62.5% conception rate.

Table 3. Conception rate (Rc%) in $PgF_2\alpha$-treated cows at 46 days post-calving

Group	A.I. Females after 1st admin.of $PgF_2\alpha$	Females diagnosed as pregnant		A.I. Females after the 2nd admin. of $PgF_2\alpha$	Females diagnosed as pregnant		Total number of A.I. Females	Females diagnosed as pregnant after A.I. carried out within 46-65 days of calving	
		n	%		n	%		n	Rc (%)
Experimental	18	10	55.55	6	5	83.33	24	15	62.5[a]
Control	-	-	-	-	-	-	12	6	50.0[b]

(a-b) $p<0.05$

Of the 18 females in the control group, 12 showed heat and were sown within 46-65 days of calving. Of these, 6 females remained pregnant, representing a conception rate of 50.0%. The differences between the experimental group and the control group are significant ($p<0.05$).

After calving, in most cows, there arise problems which delay the resumption of ovarian functions, and in those with high milk production, the manifestation of heat is delayed for a longer period of time [1, 8]. The interest of dairy cows breeders is to identify cows with ovarian cycling as soon as possible after the end of the uterine involution period (45 days) and to reintroduce them into the reproductive cycle. Cows that do not show heat after the two $PgF_2\alpha$ administrations should be examined by the veterinarian who will apply the appropriate treatment. From our experiment, it appears that heat is shown with 25.6% more in cows treated with two doses of $PgF_2\alpha$ at 14 days as compared to those that were not stimulated by hormone. Conception rate is 12.5% higher in $PgF_{2\alpha}$-treated cows as compared to cows in the control group. But this is only possible in females with ovarian activity.

Synergy of the estrogen with $PgF_2\alpha$ is successful if the cows are AI after estrus detection [9, 10] due to the fact that estrogen detection is improved and

AI management is much more effective compared to daily estrogen detection. Cows with a functional luteal body will enter heat within 7 days of treatment with $PgF_2\alpha$ [2, 3].

4. **Conclusions**

- In order to shorten the interval between calves, the first AI must be carried out within 46-65 days of calving (voluntary waiting period);
- Cyclic cows, with the functional genital apparatus, can be identified by administering $PgF_2\alpha$ on day 46 after calving because they show heat after administration;
- In females receiving $PgF_2\alpha$ on day 46 after calving, the rate of heat is 69.23%; females given the second dose of $PgF_2\alpha$ after 14 days (60 days after calving) show 75.0% heat;
- Within the 46-65 days from calving, 24 cows out of 26 (92.3%) in the experimental group showed heat. At the same time, of the 18 cows in the control group, 12 cows showed heat (66.66%). The differences between the two lots are significant ($p<0.05$);
- Cows show heat within 2 to 5 days after $PgF_2\alpha$ administration, heat manifestation is grouped on days 2 and 3. Most cows show heat on day 3 of $PgF_2\alpha$ (44.45%-66. 67%). Apparently, after the second administration of $PgF_2\alpha$, a better cluster of heat occurred on day 3 (66.67%).
- In 46-65 days from calving, of the 24 cows in the experimental group that were AI, 15 cows (62.5% of the conception rate) did not return in heat. At the same time, of the 12 cows in the control group that were IA, 6 cows did not return to heat (50.0% conception rate). The differences between the two lots are significant ($p<0.05$).

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