

IMPROVING REPEAT BREEDER COWS FERTILITY BY ESTRUS SYNCHRONIZATION: COMPARISON OF PRID + PGF_{2ALFA} + GNRH AND GNRH+ PGF_{2ALFA} + GNRH PROTOCOLS

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Abstract

The aim of this study was to compare two protocols for estrus synchronization and pregnancy rates for improving repeat breeder cows fertility over 6 months period. The study consisted of 63 Holstein cows from 3 herds. In each herd, 8 cows were allotted to group I, 8 cows were allotted to group II and 5 cows were allotted to control group. In group I (n: 24), repeat breeder cows received Progesterone Releasing Intravaginal Devices (PRID) on day 0 and PGF_{2alfa} injection on day 8th and Gonadotropin-Releasing Hormone(GnRH) injection on the day 9th. The PRID was removed on day 9th and cows were artificially inseminated after the detection of estrus. In group II (n: 24), repeat breeder cows received GnRH on day 0, PGF_{2alfa} on day 7th and GnRH on day 9th. Cows were artificially inseminated after the detection of estrus. In control group repeat breeder cows did not receive any treatment and repeat breeder cows were artificially inseminated after a behavioral estrus. The 2.00 ± 0.41 and 1.12 ± 0.23 days were found between the end of the treatment and time of behavioral estrus in group I and II, respectively the percentages of estrus detection were 95.8% (23/24) in group I and 91.6% (22/24) in group II. The pregnancy rates after artificial insemination were 56.5% (13/23), 36.3 (8/22) and 33.3% (5/15) in group I, II and control group, respectively. There was not a statistical significant difference for the estrus rates and pregnancy rates between the group I, II and control group. As a result, it is concluded that, both protocol in this study did not improve fertility of repeat breeder cows.

Key words: Fertility, GnRH, PRID, Repeat breeder.

INTRODUCTION

Dairy cattle that fail to conceive after several inseminations are a source of frustration and economic loss to the dairy enterprise. These so called 'repeat-breeders' are cows that fail to become pregnant after two or more services but continue to show estrus every 18 to 24 days. There are several potential causes of repeat breeding, including fertilization failure (29 to 41%), embryonic mortality (21 to 35%), defective luteal secretion of progesterone and other hormonal imbalances, errors in heat detection, various defects in sperm or egg function, and nutritional imbalances (Kim et al., 2007).

Ayalon (1978) reported that repeat breeder is a major source of economic loss in dairy herds in North America and its prevalence ranges from 10% to 18% between different states. Maurer and Echterkamp (1985) also reported a higher prevalence of repeat breeder in heifers (15.1%) than in multiparous females (8.3%). Treatment options for repeat breeder in dairy cows have

been reviewed by Dawson (1998) and Levine (1999) and except for the administration of GnRH at the time of insemination, as was conducted by Morgan and Lean (1993), responses to other treatment options have been generally poor. Strategies may be used to optimize the time of insemination, including an intravaginal progesterone releasing device through a controlled internal drug release (CIDR) program, as shown by Day et al. (2000) and the Ovsynch protocol described by Pursley et al. (1995). The objective of this study was to evaluate the effect of two estrus synchronization protocols (PRID + PGF_{2alfa} + GnRH and GnRH + PGF_{2alfa} + GnRH) on the fertility efficiency of repeat breeder cows.

MATERIALS AND METHODS

This study was conducted on 63 repeat breeder Holstein cows which aged 3-5 years in three commercial dairy herds, located in Famagusta provinces in North Cyprus. Repeat breeder Holstein cows which were artificially

inseminated 3 or more, controlled by rectal palpation for determining of activities on ovaries and uterus. The cows which were artificially inseminated 3 or more and show estrus every 18 to 24 days without any abnormalities, included in study as repeat breeder cows. 63 repeat breeder cows are divided into three groups. In group I, repeat breeder cows received PRID[®] (1.55 gr. Progesterone; Sanofi Dogu Ilac, Ankara, Turkey) on Day0 and PGF_{2alfa} (Iliren, Farma Intervet) injection on Day8 and GnRH (*Receptal*[®] inj., 0.0042mg buserelin asetat/ml, Intervet Ltd., Istanbul, Turkey) injection on the Day9. The PRID was removed on Day9 and repeat breeder cows were inseminated after the detection of estrus. In group II (n: 24), repeat breeder cows received GnRH on Day0, PGF_{2alfa} on Day7 and GnRH on Day9. Repeat breeder cows were inseminated after the detection of estrus. In both groups,

repeat breeder cows which did not show estrus after the synchronization were not included to the statistical analysis. In control group, repeat breeder cows did not receive any synchronization and were artificially inseminated after behavioral estrus. The uterus of repeat breeder cows that could not be observed in estrus was palpated per rectum 45-50 days after artificial insemination to determine pregnancy status. The differences in estrus rates and pregnancy rates between two protocols and control group were analyzed by using Chi-square Test.

RESULTS AND DISCUSSIONS

Consummately, 63 repeat breeder cows were used in the study. 24 of them were allocated in group I, 24 in group II and 15 in control group. Estrus rate and timing of estrus in group I and II are presented in Table 1.

Table 1. Estrus rate and timing of estrus in group I and group II

	Estrus Rate	Timing of Estrus (Day)
Group I (PRID + PGF_{2alfa} + GnRH)	95.8% (23/24)	2.00 ± 0.41
Group II (GnRH + PGF_{2alfa} + GnRH)	91.6% (22/24)	1.12 ± 0.23
P	(p>0.05)	

In group I, 23 repeat breeder cows were detected in estrus and these repeat breeder cows were artificially inseminated. 13 repeat breeder cows were palpated as pregnant by rectal palpation 45-50 days after the artificial insemination in group I. In group II, 22 repeat breeder cows were detected in estrus and these

repeat breeder cows also were artificially inseminated and 8 repeat breeder cows were palpated as pregnant by rectal palpation 45-50 days after artificial insemination in group II. In control group, 5 repeat breeder cows were palpated as pregnant (Table 2).

Table 2. Pregnancy Rates at Day 45-50 in group I, II and control group

	Pregnancy Rates at Day 45-50
Group I (PRID + PGF_{2alfa} + GnRH)	56.5% (13/23)
Group II (GnRH + PGF_{2alfa} + GnRH)	36.3% (8/22)
Control Group	33.3% (5/15)
P	p>0.05

The main objective of this study was to compare the effectiveness of the PRID + PGF_{2alfa} + GnRH and GnRH + PGF_{2alfa} + GnRH protocols for improving repeat breeder cows fertility. The treatments of repeat breeder cows have been evaluated for estrus rates, timing of estrus and pregnancy rates and statistically significant difference were not found between pregnancy rates of groups in the study.

In this study, timing of estrus was detected after 2.00 ± 0.41 day in group I and 1.12 ± 0.23 day in group II. Xue et al. (1984) reported 52.0 ± 5.8 hours as a time of estrus after removal PRID and Ozyurtlu et al. (2008) reported 3.22 ± 0.97 days as a time of estrus in their study. In group I, same results were observed after removal of PRID in repeat breeder cows. Aral and Colak (2004) reported 62.6 hours after

PGF_{2alfa} injection as time of estrus in GnRH + PGF_{2alfa} + GnRH protocol. Beside similar results were obtained in group II. Estrus rates are over 90% in two groups because of application of the treatment focus on the cyclic cows. Many studies indicated the conception rate following Ovsynch program varied from 27 to 39% (Burke et al. 1996; Pursley et al. 1997; Pursley and Mee 1995). Kasimanickam et al. (2005) reported a 21.0% pregnancy rate following treatment with the Ovsynch protocol in repeat breeder cows. In group II, it was reported 36.3% pregnancy rate for Ovsynch protocol at 45-50 days and it's similar to the other results of studies. 56.5% of pregnancy rates reported for the PRID protocols in this study. Hokmabad et al. (2005) reported a significant pregnancy rate (28%) in the improvement of fertility by CIDR in repeat breeder cows. In the other studies of PRID, pregnancy rates reported between 14.28% and 73% after first inseminations (Kacar and Aslan 2004; Lopez et al. 2001; Penny et al. 2000; Zonturlu et al. 2005). In the comparison of the pregnancy rates, it's shown that there was not any significant difference between group I, II and control group in this study.

CONCLUSIONS

In the comparison of the results of two protocols in the improvement of fertility on repeat breeder cows, statistically significant results were not found for PRID + PGF_{2alfa} + GnRH and GnRH + PGF_{2alfa} + GnRH protocols.

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