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Fertility following ovulation synchronization protocols as therapeutic strategies in crossbred dairy cows with ovarian follicular cyst

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Abstract

Present study was carried out to evaluate the efficacy of ovulation synchronization protocols on fertility in the treatment of ovarian follicular cyst in post-partum crossbred dairy cows. A total of 20 crossbred cows with follicular cysts were divided into two groups *viz.* Group I, received Ovsynch treatment and Group II, received Ovsynch plus progesterone impregnated intravaginal device (PIID) treatment. Presence of CL on day 7 after GnRH treatment was significantly higher ($p < 0.05$) in Ovsynch plus PIID group. The conception rate for Group I and Group II treatment was 10 and 50% respectively.

Keywords: Follicular cyst, dairy cow, fertility, Ovsynch, PIID

1. Introduction

Ovarian follicular cysts are follicles that fail to ovulate at the time of estrus and most common in dairy cows [1]. This condition causes great economic loss in terms of fertility as long as the condition persists [2]. Ovarian follicular cysts are much more common than approximately 18 to 29% in dairy cows [3]. Studies revealed that Ovsynch could be used for the treatment of cystic ovarian follicles in dairy cows [4]. In addition, it has been stated that an underlying mechanism in the development of ovarian cysts involves a hypothalamic defect which causes follicular estrogen to be ineffective in inducing a gonadotropin-releasing hormone/ luteinizing hormone (GnRH/LH) surge at the time of estrus, and that this hypothalamic defect could involve the estrogen receptor α (ER α). Further, it has been speculated that treatment with progesterone may upregulate the ER α in the mediobasal hypothalamus, which will foster a GnRH/LH surge in response to follicular estrogen [5]. In this context, the study was carried to evaluate the effectiveness of Ovsynch with or without exogenous progesterone as therapeutic strategies for follicular cyst in crossbred cows.

2. Materials and Methods

A total of 20 post-partum crossbred dairy cows with follicular cysts were randomly and equally divided into two equal groups. Group I cows received Ovsynch treatment consisted of GnRH analogue on day 0, PGF $_{2\alpha}$ analogue on day 7, GnRH on day 9 and fixed-time artificial insemination (FTAI) 16-18 hour later. Group II cows were treated alike Group I, in addition PIID was inserted intra-vaginally for 7 days starting from first GnRH injection (day 0) to PGF $_{2\alpha}$ injection (day 7). The presence of corpus luteum (CL) on day 7 after treatment with GnRH and the presence of pre-ovulatory follicles at the day of insemination were assessed. Pregnancy was confirmed absence of subsequent estrus and per rectally on day 60 post AI. Cyclicity rate of treated cows was also assessed by presence of CL on day 21 per rectum as reported by Crane *et al.* [6].

3. Results and Discussion

In the present study, presence of CL on day 7 after GnRH treatment was significantly higher ($p < 0.05$) in Ovsynch plus PIID group (Table 1). Similar findings were obtained by previous researcher in dairy cows with follicular cyst [7]. However, Yilmaz *et al.* [8] reported non-significant presence of CL in dairy cows with follicular cyst treated by Ovsynch and Ovsynch with progesterone releasing intra-vaginal device (PRID) i.e. 55 versus 66%.

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Table 1: Presence of CL on day 7, pre-ovulatory follicle at AI, conception and cyclicity rate following hormonal treatments

Parameters	Group I (Ovsynch)	Group II (Ovsynch plus PIID)
CL on day 7 (%)	30 ^a	70 ^b
Pre-ovulatory follicle at AI (%)	20 ^a	70 ^b
Conception rate (%)	10 ^a	50 ^b
Cyclicity rate (%)	70	90

Significant at $p < 0.05$, values bearing different superscripts differ significantly.

The presence of pre-ovulatory follicles at the day of insemination was significantly higher in Group II than Group I (Table 1), which was concurred by the findings of other [7].

The conception rate for Group I and Group II treatment was 10 and 50% respectively. However, Yilmaz *et al.* [8] obtained higher conception rate in cows with follicular cyst using Ovsynch and Ovsynch plus PRID treatments. The higher conception rate in Group II was due to presence of pre-ovulatory follicles at the day insemination (Table 1). It has been stated that a new follicle develops following first GnRH treatment within 7 days and a newly developed follicle ovulated either in response to second GnRH treatment or spontaneously upon progesterone withdrawal, regardless of the type of ovarian cyst [9].

The percentage of cows returning to cyclicity in Group I and Group II was similar to that found by Ambrose *et al.* [9] and Crane *et al.* [6]. It has been stated that ovarian follicular cysts are associated with high LH pulse frequency and administration of exogenous progesterone leads to suppress LH pulse frequency and consequently, regression of follicular cyst [10]. Yilmaz *et al.* [8] opined that increased pre-ovulatory follicle diameter in progesterone based Ovsynch protocol compared to Ovsynch protocol (1.84 versus 1.60 cm, $P < 0.05$), suggested that progesterone based Ovsynch protocol could be more effective on return to cyclicity rate than Ovsynch treatment.

In conclusion, the use of Ovsynch with exogenous progesterone responded better in terms of ovarian activity and conception rate than Ovsynch alone in crossbred cows with follicular cyst. However, the cyclicity rate was not significant.

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