

Original Research Article

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Fortification Needs of PGF_{2A} with Bypass Fat, Minerals and Vitamins for Treatment of Silent Oestrus in Crossbred Cows

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ABSTRACT

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A study was conducted to compare efficacy of PGF_{2α} and PGF_{2α} fortified with bypass fat, minerals and vitamins for treatment of silent oestrus in crossbred cows based on oestrus induction response and post treatment conception rate. The study revealed that double intramuscular injection of PGF_{2α} at 11 days apart resulted in 100.00 per cent oestrus response rate and 66.66 per cent post treatment conception rate in silent oestrous crossbred cows. Fortification of PGF_{2α} with supportive treatment comprising oral bypass fat, mineral mixture and injectable phosphorus and vitamins also resulted in 100.00 per cent oestrus response and 66.66 per cent conception rate. With supportive treatment alone only 33.33 per cent oestrus response and 33.33 per cent conception rate could be obtained. It could be concluded that fortification of PGF_{2α} with supportive drugs did not improve its efficacy in the management of silent oestrus in crossbred cattle.

Introduction

Reproductive disorders in cows reduce their breeding efficiency making them incapable of producing a calf a year. The major reproductive disorders of economic importance in cattle are repeat breeding and anoestrus including silent oestrus. An increased calving-to-conception interval as a result of true anoestrus or sub estrus in bovines adversely affects the economics of the dairy sector. Silent oestrus is characterized by lack of behavioural signs although the

genital organs undergo normal cyclical changes. This stands as a major problem for detection of oestrus in cows, specially on the part of the farmer who has to report for breeding the cow in time.

PGF_{2α} has been used for treatment of silent oestrus in cattle with varying results (Agarwal and Shankar, 1997, Honparkhe *et al.*, 2008, Sahatpure and Patil, 2008, Kumar *et al.*, 2011, Venkata Ramana *et al.*, 2013 and Jamsawat *et al.*, 2015).

In the present study an attempt has been made to improve oestrus manifestation and therapeutic efficacy of $\text{PGF}_2\alpha$ in the management of silent oestrus in cows through fortification with fat, minerals and vitamins in view of the fact that Silent oestrus is influenced by nutritional factors such as energy deficiency and metabolic disorders.

Materials and Methods

A total of 18 crossbred cows affected with silent oestrus divided into three groups each comprising six cows to be treated with three treatment regimens.

Silent oestrus was diagnosed on the basis of absence of signs of oestrus for more than three months post partum and detection of palpable corpus luteum on rectal examination. The treatment regimens were as follows.

Supportive treatment

Comprising bypass fat, minerals and vitamins as described below.

Bypass Fat (Fatomax, Intas Pharmaceuticals limited, Ahmedabad, India) @ 150 gm per day per animal with concentrate mixture for 20 days.

Mineral mixture (Minfa Gold, Intas Pharmaceuticals limited, Ahmedabad, India) @ 30 gm daily per animal with concentrate mixture for a period of 30 days.

Injectable Phosphorus (Tonophosphan Vet, containing sodium salt of 4-dimethyl amino-2-methyl phenyl-phosphinic acid, MSD-Animal Health, Pune, India) @ 2 gm intramuscularly per day for three occasions at alternate days

Vitamin A (Intavita H, Intas Pharmaceuticals limited, Ahmedabad, India) @ 5ml intramuscularly for three occasions at alternate days.

$\text{PGF}_2\alpha$

$\text{PGF}_2\alpha$ 500 μg intramuscularly repeated after 11 days (Pragma, Cloprostenol Sodium 250 mcg/ml, Intas Pharmaceuticals limited, Ahmedabad, India).

$\text{PGF}_2\alpha$ + Supportive

All the experimental animals were examined per rectum on day 0 (before treatment), day 14 (after treatment) and on the day of subsequent oestrus to record presence of vaginal discharge, uterine tone and ovarian structures i. e. palpable follicle and corpus luteum. The cows responding to treatment were also observed for other signs of oestrus. Cows under supportive treatment group were inseminated on showing signs of oestrus while $\text{PGF}_2\alpha$ treated cows with or without supportive treatment were inseminated on 4th day of second $\text{PGF}_2\alpha$ injection. Conception rates in different treatment groups of cows were worked out on the basis of actual pregnancy diagnosis.

Within 3 months of A. I. Efficacy of the treatment regimen was found out based on percentage of cows exhibiting signs of oestrus and subsequent conception rate.

Results and Discussion

Per cent response, post treatment oestrus interval and conception rate

Per cent response of silent oestrous cows to different treatment regimen in terms of manifestation of external signs of oestrus as shown in Table 1 was recorded as 33.33, 100.00 and 100.00 for supportive, $\text{PGF}_2\alpha$ and $\text{PGF}_2\alpha$ +supportive treatment groups. The corresponding post treatment oestrus intervals for the cows under the three treatment groups were 27.00, 4.00 ± 0.00 and 4.00 ± 0.00 days. The subsequent conception rates were 33.33,

66.66 and 66.66 per cent for cows under supportive, PGF_{2α} and PGF_{2α}+supportive treatment regimens respectively.

Characteristic genital changes

Table 2 represents frequency of occurrence of different genital changes in silent oestrous crossbred cows at day 0, day 14 and day of post treatment oestrus following treatment with different treatment regimens.

All silent oestrus cows (100.00 per cent) treated with supportive treatment showed absence of vaginal discharge at day 0 as well as at day 14 of treatment. Following treatment only two cows responded to treatment and showed vaginal discharge (33.33%). In cows treated with PGF_{2α} and PGF_{2α}+supportive treatment also all showed absence of vaginal discharge on day 0 but on day 14 which was the day of post treatment oestrus 100.00 per cent showed vaginal discharge.

Uterine tone was absent in all silent oestrus cows treated with supportive treatment on both day 0 and day 14. On the day of post treatment oestrus 33.33 per cent cows showed good uterine tone. In both PGF_{2α} and PGF_{2α}+supportive treatment groups uterine tone was absent on day 0 but 100.00 per cent present on day 14, which was also the day of post treatment oestrus.

Ovaries of all cows (100.00 per cent) under supportive treatment group showed both palpable follicle and palpable corpus luteum on day 0 and only follicle on day 14. In case of both PGF_{2α} and PGF_{2α}+supportive treatment groups ovary in all cows (100.00%) showed presence of palpable follicle as well as palpable corpus luteum on day 0 of treatment but on day 14 or on the day of post treatment oestrus only follicle could be palpated in all cows.

From the results obtained on study of different therapeutic techniques used for addressing silent oestrus, it was clear that PGF_{2α} alone or PGF_{2α} fortified with minerals and vitamins were effective for the management of silent oestrus in crossbred cows. Oestrus response to both the treatment regimens was 100.00 per cent. Post treatment oestrus interval and subsequent conception rate were 4.00 ± 0.00 days and 66.66 per cent respectively in cows treated with each of the two treatment regimens. Supportive treatment alone was not effective in the treatment of silent oestrus, which resulted in poor oestrus response rate of 33.33 per cent and poor conception rate of 33.33 per cent. Therefore, it can be stated that fortification of PGF_{2α} therapy with minerals and vitamins was not advantageous over PGF_{2α} alone as regards to percentage response and conception rate.

Available literature revealed very little information on nutritional fortification need of PGF_{2α} treatment in the management of silent oestrus in cattle. A good amount of information was available on the efficacy of single or double injection of PGF_{2α} for the treatment of silent oestrus in cattle from India (Agarwal and Shankar, 1997; Honparkhe *et al.*, 2008; Sahatpure and Patil, 2008; Kumar *et al.*, 2011 and Venkata Ramana *et al.*, 2013) as well as abroad (Wenkoff, 1978; Kaneda *et al.*, 1981; Mialot *et al.*, 1999; Zeuh *et al.*, 2014 and Jamsawat *et al.*, 2015).

Sahatpure and Patil (2008) obtained 100.00 per cent oestrus response in buffaloes and cattle respectively. Venkata Ramana *et al.*, (2013) reported 81.80 per cent oestrus response and 67.00 ± 0.26 per cent conception rate in silent oestrous cows using double injection of PGF_{2α} given at 12 days interval which was similar to the finding obtained in the present study.

Table.1 Per cent response, post treatment oestrus interval and conception rate in silent oestrous crossbred cows treated with different treatment regimen

Treatment Regimen	No. of cow treated	response		Post treatment oestrus interval (days)	Conception rate	
		No. showing vaginal discharge	%	(Mean ±S.E.)	No. of cows pregnant	%
Supportive	6	2	33.33	27.00 * (25, 29)	2	33.33
PGF ₂ α	6	6	100.00	4.00±0.00	4	66.66
PGF ₂ α+ Supportive	6	6	100.00	4.00±0.00	4	66.66

* S.E. not calculated as the no. of observation was only 2.

Figures in the parentheses indicate individual observation on two cows

Table.2 Characteristics of vaginal discharge, uterine tone and presence of ovarian structures in silent oestrous crossbred cows at different days of treatment with different treatment regimen

Characteristic genital changes	Frequency of occurrence (%)								
	Supportive treatment (n=6)			PGF ₂ α (n=6)			PGF ₂ α+Supportive (n=6)		
	Day 0	Day 14	Post treatment oestrus	Day 0	Day 14/ Day of post treatment oestrus	Post treatment oestrus	Day 0	Day 14/ Day of post treatment oestrus	Post treatment oestrus
Vaginal discharge									
Present	0.00 (0)	0.00 (0)	33.33 (2)	0.00 (0)	100.00 (6)	100.00 (6)	0.00 (0)	100.00 (6)	100.00 (6)
Absent	100.00 (6)	100.00 (6)	-	100.00 (6)	0.00 (0)	0.00 (0)	100.00 (6)	0.00 (0)	0.00 (0)
Uterine tone									
Good	0.00 (0)	0.00 (0)	33.33 (2)	0.00 (0)	100.00 (6)	100.00 (6)	0.00 (0)	100.00 (6)	100.00 (6)
Moderate	0.00 (0)	0.00 (0)	-	16.66 (1)	0.00 (0)	0.00 (0)	16.66 (1)	0.00 (0)	0.00 (0)
Absent	100.00 (6)	100.00 (6)	-	100.00 (6)	0.00 (0)	0.00 (0)	83.33 (5)	0.00 (0)	0.00 (0)
Ovarian structure									
Palpable Follicle	100.00 (6)	100.00 (6)	33.33 (2)	100.00 (6)	100.00 (6)	100.00 (6)	100.00 (6)	100.00 (6)	100.00 (6)
Palpable CL	100.00 (6)	16.66 (1)	-	100.00 (6)	0.00 (0)	0.00 (0)	100.00 (6)	0.00 (0)	0.00 (0)

Figures in the parentheses indicate number of observations

Similarly Kumar *et al.*, (2011) also reported 91.30 per cent oestrus induction response and 71.43 per cent conception rate in sub-oestrous cows using single injection of PGF₂α. The conception rate obtained by Honparkhe *et al.*, (2008) in sub-oestrous cows treated with PGF₂α was somewhat low (50.00 per cent). Similar lower oestrus response rate and conception rate in sub-oestrous cows following PGF₂α treatment had been reported by Wenkoff (1978) from Canada, Kaneda *et al.*, (1981) from Japan and Mialot *et al.*, (1999) from France. All these reports indicated that post treatment oestrus interval in silent oestrous cows following PGF₂α treatment ranged from 2-5 days. In the present study, all the animals were inseminated on 4th day of second PGF₂α injection and showed signs of oestrus on that day.

As regards to genital changes of the treated silent oestrus cows detected on 14th day after treatment also there appeared no difference i. e. the efficacy of the two treatment regimens in PGF₂α alone and PGF₂α with minerals and vitamins. In both the treatment groups on 14th day of treatment characteristic genital changes were presence of vaginal discharge, presence of good uterine tone and presence of palpable follicle on the ovary in 100.00 per cent animals. These findings clearly indicated that all silent oestrous cows treated with PGF₂α with or without supportive treatment responded to treatment. On the other hand in silent oestrous cows under supportive treatment there appeared no good response on 14th day of treatment. Available literature did not reveal information on nutritional fortification need of PGF₂α for treatment of silent oestrus in cattle.

In conclusion, it must be stated that, fortification of PGF₂α treatment with minerals and vitamins was not advantageous over PGF₂α alone in the treatment of silent oestrus in crossbred cows or PGF₂α was effective for

treatment of silent oestrus in crossbred cows and fortification with supportive treatment comprising oral bypass fat and mineral mixture and injectable phosphorus and vitamin A did not produce better result in terms of conception rate.

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