IMPACT OF POST-BREEDING HORMONAL TREATMENT ON CONCEPTION IN REPEAT BREEDING GIR CATTLE AT A GAUSHALA

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ABSTRACT

Repeat breeding Gir cattle (n=24) of a Gaushala were randomly and equally allotted to buserelin group (post-breeding 0.02 mg buserelin acetate, i.m.), hCG group (post-breeding 1500 IU hCG, i.m.), progesterone group (Day 6 post-breeding 500 mg hydroxyl progesterone caproate, i.m.) and control (no hormonal treatment). The overall conception rate (till cycle II post-treatment) of hormonal treatment groups was higher compared to controls (72.2 *vs* 33.3%, $p<0.05$). Plasma progesterone in cattle that conceived subsequently had a consistently increasing trend till week 6 post-treatment. Plasma total protein, total cholesterol and triglycerides were similar ($p>0.05$) between treatment groups as well as between conceived and non-conceived counterparts. This study indicated beneficial role of the use of hormone therapy for improving conception rate in repeat breeding Gir cattle at Gaushalas.

Keywords: Gaushala, Gir, hCG, Progesterone, Repeat breeding

INTRODUCTION

Delayed ovulation is one of the major causes of repeat breeding in dairy cattle. Various hormones viz. GnRH, hCG and progesterone were used with varying success for enhancing pregnancy rates in repeat breeding dairy animals (Anjum *et al.,* 2009 and Dodamani *et al*., 2010). In addition, plasma progesterone and certain blood biochemical during estrus were associated with reproductive behavior and fertility status of cattle (Kumar *et al.,* 2009). The present study was planned to evaluate the efficacy of post-breeding hormone therapy on conception rate and some plasma constituents in repeat breeding Gir cattle.

MATERIALS AND METHODS

Twenty-four repeat breeding Gir cattle at Gaumandir Gaushala, Vadodara were selected on the basis of history and per rectal gynaeco-clinical examination. Animals managed under loose housing system were fed green fodder, hay and concentrate. Before starting the hormonal treatment, cattle were dewormed (Fenbendazole bolus, 3g) and were administered long acting oxytetracyclin dihydrate (8-10 mg/kg b wt, i.m.) to rule out genital infection, if any. Estrus detection was carried out visually, twice daily, and a fertile bull bred the females in estrus. The cattle were equally and randomly divided into four groups viz. buserelin group (post-breeding 0.02 mg buserelin acetate, i.m.), hCG group (post-breeding 1500 IU hCG, i.m.), progesterone group (Day 6 post-breeding 500 mg hydroxyl progesterone caproate, i.m.) and control (no hormonal treatment). Pregnancy was confirmed by per rectal palpation 60 days post-breeding. All the cows were followed for conception or return to estrus with collection of heparinized jugular blood on day 0 (estrus) and then at weekly interval up to 6 weeks post-breeding, except in group 3 where a sample was also collected on day 6 post-breeding (just before treatment). The plasma samples were stored at -20°C until analyzed. Plasma progesterone concentration was determined by employing standard Radio-Immuno-Assay technique (Kubasic *et al*., 1984). Labeled antigen (I^{125}), antibody coated tubes and standards were procured from Immunotech-SAS, France. The sensitivity of assay was 0.1 ng/ml. Intra-assay and

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inter-assay coefficients of variation were 5.4 and 9.1%, respectively. Plasma total protein, total cholesterol and triglycerides were estimated by standard procedures and assay kits (Crest Biosystems, Goa) in a Chemistry Analyser (Mindray, BS 120). The data of conception rates *versus* various treatments, and of weekly progesterone measurement were analyzed using chi-square test and two factors factorial completely randomized design (4 groups x 6 weeks x 6 replicates/animals) and the data of conceived and non-conceived groups was analyzed by simple completely randomized design, Duncan's NMRT and Student's 't' test.

RESULTS AND DISCUSSION

Following treatment with GnRH, hCG and progesterone, the conception rate in treatment cycle was 50, 83.3 and 50%, respectively compared to 16.7% in control (Table 1). The overall conception rate (till cycle II post-treatment) of hormonal treatment groups was higher ($p<0.05$) compared to controls (72.2 *vs* 33.3%, Table 1). In addition, the overall number of services per conception for treatment groups (2.5) was much less compared to control (8.0, Table 1), thus, indicating the beneficial role of use of hormone therapy in improving conception rate in repeat breeding Gir cattle at Gaushalas. The higher conception rates obtained in present study with buserelin, hCG and progesterone treatment was also reported earlier (Shukla and Mishra, 2008; Anjum *et al.,* 2009; Kumar *et al.*, 2009 and Dodamani *et al*., 2010). The hormonal treatment administered to increase plasma progesterone concentration may improve pregnancy rates, particularly in repeat breeding animals (Kastelic, 1994).

Plasma progesterone concentration in the cattle that conceived subsequently revealed a consistently increasing trend till week 6 post treatment, whereas, in their non-conceiving counterparts, these concentrations revealed a cyclic pattern with regular peak and drop (Table 2). Similar trend was reported in conceived and non-conceived HF cattle over first 3 weeks post-insemination (Lakum, 2004). In the present study, plasma progesterone at the end of first week post-treatment/breeding was lower ($p<0.05$) in non-conceived cattle as compared to the conceived cattle (Table 2). These results were similar to a previous study using GnRH or hCG treatment in dairy cattle (Schmitt *et al*., 1996). This suggested that low progesterone due to poor luteal function during early luteal phase is one of the causes of repeat breeding in dairy cattle (Kimura *et al.*, 1987). In present study, the overall plasma total protein, total cholesterol and triglycerides were 9.79±0.08 g/dl, 217.86±2.57 mg/dl and 61.01±1.14 mg/dl, respectively, however, there was no difference ($p>0.05$) among treatment groups as well as between conceived and non-conceived cattle suggesting that nutritional profile of all the animals under study was similar. In brief, the present study reported beneficial impact of hormonal treatment in repeat breeding Gir cattle housed at a Gaushala.

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Table 1: Conception rates following hormonal treatment and post-treatment first and second estrus cycle in repeat breeding Gir cattle

Groups (n=6 each)	Conceived during			Conception rate	Services/ conception
	Treatment cycle	Post-treatment estrus cycle			
		I	II		
Buserelin	3 (50.0%)	-	1 (16.7%)	4 (66.7%)	3.0
hCG	5 (83.3%)	-	-	5 (83.3%)	1.6
Progesterone	3 (50.0%)	-	1 (16.7%)	4 (66.7%)	3.0
Control	1 (16.7%)	-	1 (16.7%)	2 (33.3%)	8.0

Table 2: Plasma progesterone (P_4) **profile** (ng/ml, mean±SE) **in repeat breeding Gir cattle. Wk - week after hormonal treatment, P - Pregnant, NP - Non pregnant**

Wk	Groups (n=6 each)				Pregnancy Status	
	Buserelin post-breeding	hCG post-breeding	P_4 day 6 post-breeding	Control	P (n=12)	NP (n=12)
0	0.3±0.03	0.3±0.05	0.2±0.03	0.3±0.03	$0.3±0.02^{a}$	$0.3±0.03^{a}$
1	3.3±0.2	4.7±0.2	2.9±0.5	3.5±0.8	$4.3±0.2^{b}$	$2.9±0.4^{b*}$
2	5.4±0.7	5.2±0.4	5.4±0.4	3.3±0.5	$5.4±0.2^{c}$	$4.2±0.5^{c}$
3	3.5±1.2	5.1±0.9	3.9±1.4	2.0±1.0	$6.3±0.3^{cd}$	$1.0±0.1^{a*}$
4	4.2±0.9	6.5±0.6	5.3±1.4	2.9±1.2	$7.0±0.5^{d}$	$2.4±0.3^{b*}$
5	5.9±0.6	5.6±0.5	6.2±1.1	5.1±0.7	$6.8±0.4^{d}$	$4.6±0.4^{c*}$
6	3.1±1.0	6.0±1.0	3.8±1.3	2.5±1.3	$6.5±0.4^{d}$	$1.1±0.1^{a*}$

*p<0.05 between conceived and not conceived, Means with different superscripts (a, b) differ significantly (p<0.05) within a column

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