SHORT COMMUNICATION **Pakistan Vet. J., 2007, 27(3): 153-154.**

EFFECT OF GONADOTROPIN RELEASING HORMONE ON SEMEN CHARACTERISTICS IN NILI-RAVI BUFFALO BULLS

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ABSTRACT

The study was aimed at determining the effect of gonadotropin releasing hormone (GnRH) on semen characteristics in two Nili-Ravi buffalo bulls. The study was conducted in two phases. In the first phase comprising 4 weeks, the bulls were not given GnRH. In second phase comprising 4 weeks, the same bulls were given 2 ml GnRH at weekly intervals 12 hours prior to semen collection. Semen samples were collected at weekly intervals, and were evaluated for ejaculatory volume, sperm motility, sperm concentration, pH of semen and sperm abnormalities. Semen volume, sperm motility, sperm concentration and semen pH did not differ significantly in two phases of the experiment. However, sperm mid-piece and sperm tail abnormalities in phase II decreased ($P<0.05$) compared to phase I. In conclusion, GnRH treatment resulted in decreased sperm mid-piece and tail abnormalities in Nili-Ravi buffalo bulls.

Key words: GnRH, semen volume, sperm motility, sperm concentration, pH, sperm abnormalities.

INTRODUCTION

Gonadotropin releasing hormone (GnRH) is the key hormone of reproduction synthesized in the hypothalamus, and stimulates secretion of gonadotropins viz. leuteinzing hormone (LH) and follicle stimulating hormone (FSH) from the anterior pituitary. These gonadotropins are actively involved in male reproductive functions (Bearden and Fauquay, 1980) and stimulate the secretion of testosterone hormone required for spermatogenesis and sperm transport. A few studies on the effect of GnRH on semen characteristics in cow bulls are available (Malak and Thibier, 1985; El-Azab *et al*., 1996; Gabor *et al*., 1998); however, such studies on Nili-Ravi buffalo bulls are lacking. The present paper describes the effects of GnRH on semen characteristics in Nili-Ravi buffalo bulls.

MATERIALS AND METHODS

The study was conducted in two phases with each phase of four weeks duration at the National Agriculture Research Centre (NARC), Islamabad, Pakistan. In the first phase, two adult Nili-Ravi bulls were given no GnRH. In the second phase, they were given 2 ml of GnRH (Dalmarelin-Fatro containing lecirelin acetate 25 mg/ml) at weekly interval, 12 hours prior to semen collection. Semen was collected once a week with artificial vagina at 42^{o}C and was evaluated for ejaculatory volume, sperm motility (%), sperm concentration (10^{6}/µl), pH and morphologically abnormal sperms. Sperm concentration was measured by spectrophotometer. Sperm motility (%) was assessed by observing a drop of semen sample on a glass slide under light microscope. The pH was measured with a digital pH meter. For morphological study of spermatozoa, the semen sample was fixed using 2.9% formal citrate solution. Sperm morphology was studied at 1000X under oil immersion. A total of 100 sperms were counted for each semen sample. Data on semen characteristics collected in two phases of experiment were analyzed by t-test, using software Minitab (version 11.12 32 Bit).

RESULTS AND DISCUSSION

In the present study, GnRH treatment did not affect ($P>0.05$) mean semen volume (Table 1). Malak and Thibier (1985) also reported non significant effect of exogenous GnRH treatment on semen production in post-pubertal bulls. However, El-Azab *et al*. (1996) reported beneficial effect of GnRH on ejaculate volume in 8 to10 years old Friesian bulls.

GnRH treatment did not affect ($P>0.05$) sperm motility (Table 1). However, Gabor *et al*. (1998) reported increase in the percentage of live spermatozoa after GnRH therapy. In the present study, the GnRH treatment did not affect ($P>0.05$) mean sperm concentration (Table 1). However, beneficial effect of GnRH on sperm concentration was reported in Frisian bulls (El-Azab *et al*., 1996; Gabor *et al*., 1998). This may be due to the species differences. Malak and Thibier (1985) reported no effect of exogenous GnRH treatment on semen production in young Montbeliarde

post-pubertal bulls. It is well known that most enzyme systems require a particular pH range for optimum response. pH of suspension medium affects motility, liveability, fructolysis, respiration and fertility of sperm cells directly or indirectly. In the present study, mean pH of semen was not affected by GnRH treatment (Table 1).

The sperm mid piece and tail abnormalities decreased after GnRH treatment ($P<0.05$; Table 2). In bulls, GnRH treatment resulted in increased testosterone level (Dhami *et al*., 2003; Ronayne *et al*., 1993; Herbert *et al*., 2004). A similar increase in testosterone levels might have been involved directly or indirectly to decrease the sperm abnormalities in bulls of the present study. This study suggests to investigate comprehensive effect of GnRH in which large group of bulls should be used at the same time and effects should be studied for at least 90 days.

Table 1: Semen characteristics of Nili-Ravi buffalo bulls in two phases (mean ± SE)

Phases	Semen characteristics			
	Ejaculatory volume (ml)	Sperm motility (%)	Sperm concentration (10^6/µl)	pH
I	4.4 ± 1.9	48.8 ± 1.3	0.75 ± 0.04	7.31 ± 0.19
II	6.22 ± 0.59	47.5 ± 2.5	0.92 ± 0.01	7.06 ± 0.06

Values in the same column did not differ ($P>0.05$).

Table 2: Sperm abnormalities (%) of Nili-Ravi buffalo bulls in two phases (mean ± SE)

Phases	Sperm abnormalities (%)		
	Head	Mid-piece	Tail
I	2.1 ± 0.04	0.5 ± 0.25^a	11.7 ± 1.2^a
II	1.4 ± 0.54	0.0 ± 0.00^b	05.8 ± 1.5^b

Values in the same column with different superscripts differ significantly ($P<0.05$).

It was concluded that GnRH treatment in Nili-Ravi buffalo bulls did not affect ejaculatory volume, sperm motility, sperm concentration and pH of the semen. However, GnRH treatment resulted in decreased sperm mid-piece and tail abnormalities in Nili-Ravi buffalo bulls.

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