



ISSN: 2456-2912
VET 2017; 2(5): 18-20
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www.veterinarypaper.com
Received: 14-07-2017
Accepted: 15-08-2017

MS Wankar
Post Graduate Institute of
Veterinary and Animal Sciences,
Akola, Maharashtra Animal and
Fishery Sciences University,
Nagpur, Maharashtra, India.

MV Ingawale
Post Graduate Institute of
Veterinary and Animal Sciences,
Akola, Maharashtra Animal and
Fishery Sciences University,
Nagpur, Maharashtra, India

SW Hajare
Post Graduate Institute of
Veterinary and Animal Sciences,
Akola, Maharashtra Animal and
Fishery Sciences University,
Nagpur, Maharashtra, India

RS Ingole
Post Graduate Institute of
Veterinary and Animal Sciences,
Akola, Maharashtra Animal and
Fishery Sciences University,
Nagpur, Maharashtra, India

Correspondence

MS Wankar
Post Graduate Institute of
Veterinary and Animal Sciences,
Akola, Maharashtra Animal and
Fishery Sciences University,
Nagpur, Maharashtra, India

Efficacy of clomiphene citrate and ovsynch protocol treatment on fertility during summer in buffalo heifers

MS Wankar, MV Ingawale, SW Hajare and RS Ingole

Abstract

The present study was conducted to study the clinical efficacy of clomiphene citrate and Ovsynch protocol treatment on fertility in buffalo heifers during summer season. Total eighteen buffalo heifers were given initial treatment and after ten days of initial treatment, the selected buffalo heifers were divided into three groups. In Group-I (n=6) two tablets of 1% copper sulphate solution was administered to each buffalo heifer and after 30 minutes 300 mg tablet of clomiphene citrate was administered orally for five consecutive days. In Group-II (n=6) buffalo heifers were treated with Ovsynch synchronization protocol while Group-III (n=6) was untreated control group. The percentage of estrus exhibition was 50, 100 and 0 per cent in Group-I, Group-II and Group-III, respectively. The average time required for onset of estrus in buffalo heifers was 136 ± 8 hrs in Group-I while 67.83 ± 4.12 hrs in Group-II. The result is statistically significant at ($P < 0.01$) level. The pregnancy rate was 30 % in Group-I and II. From the present study it can be concluded that clomiphene citrate and Ovsynch are equally effective in buffalo heifers during summer season however the clomiphene citrate is cost effective and easy for administration to animal owners.

Keywords: Clomiphene citrate, Buffalo heifer, Ovsynch, summer

1. Introduction

India possesses 108.702 million buffaloes and contributes around 21.23% of the total livestock population as well as 51 % of total milk production (19th Livestock census) and so named as “Black Gold” has a pivotal and pre-eminent importance in the livestock sector of the country. Reproduction is the back bone of animal production and breeding of buffaloes throughout the year plays a vital role for maintaining dairy as viable unit. The anoestrus, poor estrus symptoms, erratic duration of estrus and low conception rate are encountered usually in buffalo heifers. The delay in conception is one of the constraints that cause the low reproductive efficiency not only hampered the net calf crop but also life time milk production leading to basic economic losses to buffalo owners. Out of these constraints, anoestrus particularly summer anoestrus is major infertility problem showing suspension of sexual activity with inactive smooth ovaries (Qureshi *et al.*, 1999) [21] and abnormal hormonal profile (Razdan, 1988) [22].

The different treatment regimes like herbal heat inducer drugs (Mohanty *et al.*, 2007) [18], biostimulation (Ahmed *et al.*, 2010), vitamin and mineral mixture supplementation (Mathur *et al.*, 2005) [16] and hormonal preparations (Mavi *et al.*, 2007) [17] are practiced to induce estrus. Out of these, clomiphene citrate treatment orally (Kadu and Chede, 1992) [12] is most convenient and effective treatment practiced by dairy owners. Clomiphene inhibits estrogen receptors in hypothalamus inhibiting negative feedback of estrogen on gonadotropin release leading to up regulation of hypothalamic-pituitary-gonadal axis. Since estrogen no longer effectively exert negative feedback on hypothalamus, GnRH secretion becomes more rapidly pulsatile which results in increased pituitary gonadotropin (FSH and LH) release. After administration of clomiphene citrate, FSH level rises steadily resulting in to the development of new follicles. Those follicles in turn produce estrogen which circulates in the blood and thus the onset of estrus takes place. Ovsynch is synchronization of ovulation protocol widely utilized by veterinarian. The main advantage of Ovsynch protocol is estrus synchronization that can be done in buffaloes at all the stages of cycle (Paul and Prakash, 2005) [20]. Synchronization of estrus as well ovulation occurs in Ovsynch protocol is found very effective

for improving reproductive performance in Murrah buffalo heifers (Roy and Prakash, 2009) [24] as well as during non breeding season (Karen and Darwish, 2010) [14].

Keeping in view the major problem of summer anoestrus in buffalo heifers which are maintained at field level and use of clomiphene citrate and Ovsynch protocol treatment in anoestrus, the present research was conducted to study fertility evaluation after clomiphene citrate and Ovsynch protocol treatment during non-breeding season.

Material and methods

The present research work was carried out during summer season on total eighteen buffalo heifers in between age of 3.5 to 4.5 years, who attained optimum body weight with normally developed genitalia and exhibited estrus cyclicity were selected from Pailpada and Katepurna, village of Akola District and Purnathadi Buffalo Unit, Post Graduate Institute of Veterinary and Animal Sciences, Akola, Maharashtra. All the selected buffalo heifers were dewormed using injection Ivermectin @ 1 ml per 50 kg body weight subcutaneously and initial treatment with injection vitamin AD₃E&H, 5 ml I/M (5 days apart), injection Toldimphos sodium 20% w/v per ml @ 5 ml I/M (5 days apart), one microelement bolus daily orally for 10 days and chelated mineral mixture 50 gm daily orally. After initial treatment, these buffalo heifers were randomly divided into three groups comprising six buffalo heifers in each group. In Group-I, two tablets of 1% copper sulphate solution was administered with drinking water to each buffalo heifer and after 30 minutes, 300 mg tablet of clomiphene

citrate was administered orally for five consecutive days. In Group-II, buffalo heifers were treated with Inj. Buserline acetate 10µg i/m on day 0, Inj. Cloprostenol sodium 500 µg on day 7 and Inj. Buserline acetate 10µg i/m on day 9 while Group-III were kept as untreated control. Those buffalo heifers responded to the treatment were inseminated with french mini straw as per A.M. and P.M. rule. The inseminated buffalo heifers were diagnosed for pregnancy detection by per-rectal examination after 60 days. Statistical analysis was carried out by using using statistically Web Based Agricultural Statistics Software Package (WASP 1.0).

Results and discussion

In Group-I out of six, three buffalo heifers were exhibited estrus whereas in Group-II, all six buffalo heifers exhibited estrus. In Group-III (Control) none of buffalo heifers has exhibited estrus during experimental period. The percentage of estrus exhibition was 50, 100 and 0 per cent in Group-I, Group-II and Group-III, respectively (Table 1). Ovsynch treatment gives better response than clomiphene citrate for estrus induction in buffalo heifers. The average time required for onset of estrus in buffalo heifers is 136 ± 8.00 hrs in Group-I while 67.83 ± 4.12 hrs in Group-II (Table 1). The results are statistical significant at 1% level of significance. One out of three buffalo heifers inseminated is found pregnant with 33.33 per cent conception rate in Group-I while two out of six buffalo heifers inseminated are found pregnant with 33.33 per cent conception rate in Group-II. The first service conception rate is 33.33 per cent in both treatment groups.

Table 1: Efficacy of Clomiphene citrate and Ovsynch protocol on fertility in buffalo heifers.

Groups (n=6)	No. of buffalo heifers exhibited estrus	Average time required for onset of estrus (hrs)	No. of buffaloes pregnant and pregnancy rate (%)
Group-I	3 (50%)	$136 \pm 8.00^{**}$	1 (33.33)
Group-II	6 (100%)	67.83 ± 4.12	2 (33.33)

** Significant at (P<0.01)

The estrus induction rate (50 per cent) in anoestrus cows and cross bred cows, respectively after clomiphene citrate treatment was reported by Deshpande *et al.* (1976) [7], Kankal *et al.* (2008) [13] which is accordance with result of present study. A much higher estrus induction response was reported by Reddy (1990) [23], Hukeri *et al.* (1979) [9] and Deshpande *et al.* (1976) [7] as 85, 85.72 and 100 per cent, respectively in anoestrus buffaloes. The first service conception rate after clomiphene citrate treatment is in agreement with Kurien and Madhawan (1985) [15] recorded 30.30 while lower conception rate than the result of present study was reported by Deen and Tanwar (1988) [6] recorded 25 per cent. The higher conception rate than the result of present study were reported by Hukeri *et al.* (1979) [9] 80 per cent, Varma and Kharche (1983) [25] 100 per cent, Banerjee and Roychoudhary (1989) [3] 75 per cent, Kadu and Chede (1992) [12] 61.53 per cent and Ingawale *et al.* (2011) [11] 75 per cent in buffaloes. The variation in the result of clomiphene citrate for induction of estrus and pregnancy rate might be difference in the body condition of animals, heat detection methods, season and follicular status of animal at the time of initiation of treatment and type of breeding technique. The present research experiment is conducted during summer season which might affect the growth of follicles and in turn estrogen production leading to weak or sub-estrus condition in buffalo heifers. Also the gonads are comparatively small compared to pleuriparous animals leading to lesser size follicle and lower estrogen production leading to lower response.

The results of present study for estrus exhibition or synchronization after Ovsynch treatment (Group-II) are in agreement with results obtained by Ghuman *et al.* (2009) [8] and Nakrani *et al.* (2014) [19], reported 100 per cent estrus exhibition in in Ovsynch treated buffaloes. The present finding regarding first service conception rate in Ovsynch treated buffaloes (Group II) is in agreement with Ali *et al.* (2010) [2] and Buhecha *et al.* (2016) [5] who reported 33.33 per cent conception rate. The lower conception rate than the results of present study was reported by Baruselli (2001) [4] 7 per cent, Karen and Darwish (2010) [14] reported 18 per cent, Ghuman *et al.* (2009) [8] reported 18 per cent and Ingawale *et al.* (2007) [10] reported 23.7 per cent conception rate in buffaloes. The variation in the estrus response and pregnancy rate could be due to differences in parity, management practices, estrus detection methods, body score of animals, cyclic stage of animals and type and dose of agonist used in the protocol and season. From the present study it may be concluded that Clomiphene citrate and Ovsynch are equally effective in buffalo heifers however the Clomiphene citrate is cost effective and easy for administration to animal owners.

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