The Journal of Animal and Plant Sciences, 22(2 Suppl.): 2012, Page: 51-54
ISSN: 1018-7081

THE EFFECT OF PGF 2 α ANALOGUE WITH OR WITHOUT GnRH ON FERTILITY RATE OF ANESTRUS KUNDHI BUFFALO

Q. Khan[*], Z. U. Rehman[**], M. U. Samo[***], A. Raziq[****], I. Ahmad[**], F. A. Khan[**], M. Younus[**], F. H. Samo[***] and D. Muhammad[****]

[*]Directorate of Livestock and Dairy Development, Peshawar; [**]Agriculture University, Peshawar; [***]Sindh Agriculture University, Tandojam; [****]Directorate General (Research) Livestock and Dairy Development Department, Peshawar
Correspondence author: drzia80@gmail.com

ABSTRACT

This study was designed to determine conception rate in Kundhi buffaloes treated with prostaglandin F2 alpha (PGF2α) after timed insemination and simultaneous treatment with or without gonadotrophin releasing hormone (GnRH). A total 40 anestrus Kundhi buffaloes were randomly selected in the vicinity of Sindh Agricultural University, Tandojam and were divided in to 4 equal groups, each comprising of ten animals (n=10). Animals in group A, were injected intramuscularly with 2 ml Dalmazine, a synthetic analogue of prostaglandin PGF2α (2 ml Dalmazine = 0.150 mg cloprostenol, Fatro, Itly), on day 1 followed by the same treatment on day 11 with fixed time artificial insemination (72 h) after the 2nd dose of prostaglandin injection. In group B, same treatment as in group A but in addition gonadotrophin releasing hormone (GnRH) @2 ml of Dalmarelin (Lecirelin aetate Fatro, Itly), a synthetic analogue of GnRH was injected at the time of fixed time AI. In group C, same protocol as in group A, but with 2 ml of Dalmazine and 2 ml of Dalmarelin were injected simultaneously on day 11. In group D, animals were kept as control. The conception rate in group A, B, C and D was 20.2%, 30.3%, 30.3% and 10.1% respectively. The mean conception rate in treated group was higher (26.6%) than control (10.1%). It was concluded from the present study that a 16.6% increase in conception rate was achieved in anoestrus Kundhi buffalo through hormonal therapy in field condition.

Key words: Prostaglandin, Kundhi buffalo, Insemination, GnRH, Conception rate.

INTRODUCTION

Buffalo is a major dairy animal in Pakistan with the total population of 28.4 million, 64%, 27%, 7%, 3% in Punjab, Sindh, North West Frontier and Balochistan provinces respectively and 0.487 million in Azad Jammu and Kashmir (DOP, 2006). About 67.5% milk is produced by buffaloes, 30% by cattle and only 2 to 3% by goats and other species (Anonymous, 2006). Buffaloes and cattle are kept in different parts of the country under different production system. The production of these animals is much below their genetic potential because of feed shortage, unscientific management and inadequate disease control program (Ahmad *et al*., 2004).

Nili Ravi and Kundhi buffalo are famous for their highest milk production in the world. Nili Ravi buffaloes are found in Punjab while Kundhi in Sindh province. In buffalo breeding, there are many factors, which hinder its potential efficiency. One of these factors is anoestrus or unobserved estrus. There are numerous causes of anestrus e.g. poor nutrition, season, prolong suckling of dam during lactation, acquired abnormalities of female reproductive tract, hormonal imbalance etc. (Beg *et al*., 1997). Prolonged post-partum acyclicity and anestrus are major source of economic loss to buffalo breeders, anestrus being the most common single cause of infertility in buffaloes (Dessouky, 1973). The survey of more than 12,000 infertile buffalo-cows revealed that 65% causes of infertility were due to functional disorders of ovaries (Rao, 1982).

Previous research has suggested that after estrus was induced by use of prostaglandin, conception rates in dairy cows and buffaloes were increased through the use of gonadotrophin releasing hormone at the time of artificial insemination (Schels *et al*., 1978). However there are also reports that do not support this concept. (Stevenson *et a*l.1995). The exact phenomenon of GnRH treatment at the time of AI or prior to it is not known. But it has been speculated that GnRH treatment might induce an early LH surge and ovulation which results in synchronization of ovulation and insemination.

The prostaglandin and its synthetic analogue are considered as drug of choice in reproductive management (Seguin, B.E. 1981). It has also been used successfully for treating subestrus and unobserved estrus in dairy cattle and buffaloes and can be used either singly or in combination with other drugs for synchronization of ovulation and fixed time insemination between 72 and 80 hours following treatment (Archbald *et al.*1992). The GnRH hormone is considered as a drug of choice in improving efficiency of dairy animals by improving ovulation process. It stimulates the release of both FSH and LH in domestic species (Foster J. P, 1980). Administration of GnRH hormone or its analogue during

early postpartum period improves calving interval by inducing early post partum estrus in buffaloes (Samo *et al.,* 2005). The objective of this study was to determine the effect of exogenous treatment of prostaglandin double dose regime and its role in combination with GnRH to increase the conception rate in anestrus Kundhi buffaloes in field conditions. The study was therefore designed to investigate the effect of PGF2 α analogue with or without GnRH on fertility rate of anestrus Kundhi buffaloes after fixed time insemination using fresh semen. All the Kundi buffaloes were of same age, body score and calving interval.

MATERIALS AND METHODS

This study was completed at the department of Animal Reproduction, Faculty of Animal Husbandry and Veterinary Sciences Sindh Agricultural University, Tandojam. In this experiment 40 anestrus Kundhi buffaloes were selected randomly in the area of Mir Colony, Tando Qaisar and in the village of Jam Samo near Kisana Moory of Tandojam. The buffaloes were identified and complete history of each animal was recorded. The animals were divided in four equal groups, A, B, C and D, each group comprising of ten animals. Each animal was given a local name for identification. The local name, group name and treatment of each group were written with non washed ink on steel plate. The steel plate hanged in small chain was put on to the neck for identification of each animal. Experimental protocol is given in the Table 1.

Treatment regimn: The animals in group A (n=10) were injected the synthetic analogue of prostaglandin F2α, 2 ml Dalmazin (Cloprostenol 0.150 mg/ 2 ml) on day 1st and 2nd dose of the same quantity of Dalmazin on day 11. Fixed time AI (72 hours) was conducted to all the animals by using fresh semen collected from the Kundhi Sire on the same day with 60% motility. Group B animals (n=10) were given the same treatment of prostaglandin F2α as in group A. In addition, GnRH (gonodotrophin releasing hormone) at the time of insemination, 2 ml Dalmarelin (lecerilin acetate) was injected to each animal, one hour prior to fixed time (72 hours) artificial insemination. For group C animals. The same protocol was followed as in group A but in addition 2 ml licerilin acetate was injected simultaneously on day 11 with the injection of PGF2α and fixed time (72 hours) artificial insemination. Group D animals (n=10) were kept as control, injected only 2 ml normal saline solution on day-1 and day 11 and fixed time AI (72 hours) was conducted as in group A. The conception rate was recorded on 21 days non return basis and was also confirmed after 45 to 60 days of AI through rectal palpation of each animal in each group and the conception rate of each group was calculated as percentage.

RESULTS AND DISCUSSION

Conception rate of Kundhi buffalo on the basis of 21st day non return is presented in Table-02. The date indicated no definite pattern of conception rate in all the groups. Non return rate of treated groups varied from 70-90% whereas of the control/animals came in heat between first and second treatments. Palpation is presented in Table-3. Out of 40 anestrus Kundhi buffalo treated with various hormonal treatments or without treatment, 9 animals (22.5%) conceived during the study period. The conception rate in hormone treated groups A, B & C was 20, 30 and 30% respectively and of control (Group-D) was 10%. The mean conception rate of treated group A, B & C was higher (26.6%) than the control (10%). It was found that 16.6% increase was achieved through hormonal therapy in field conditions in Kundhi buffalo during the study period. The conception rate in hormone treated groups A, B & C was 20%, 30% and 30% respectively and in control group D was 10%. The mean conception rate of treated group A, B & C was higher (26.6%) than the control (10%). It was found that 16.6% increase was achieved through hormonal therapy in field conditions in Kundhi buffalo in the current study.

The conception rate on 21 days non return basis in the study confirmed that there is not a reliable parameter to be used for pregnancy confirmation in Kundhi buffalo. The animals that did not return were either out of range of hormonal treatment or there was early embryonic death (*Ullah et al.1996*).

Treatment regime containing prostaglandin and gonadotrophin releasing hormone after 11 days of the first treatment or at the time of A.I. was found to be superior to control and other treatment groups i.e. prostaglandin only. The FSH (Follicle Stimulating Hormone) and LH (Luteinizing Hormone) which are released under the influence of GnRH resulted maximum ovulation after synchronization and maximum conception was achieved after fixed time artificial insemination (72 hours). Similar observations have also been reported (Baruselli *et al.*2005).

This study helped in evaluating the effectiveness of PGF2α to that of GnRH to improve conception rate in Kundhi buffaloes following timed insemination (72 hours) after treatment with luteolytic dose of PGF2α and to develop a year round management scheme to improve the conception rate of anestrus Kundhi buffaloes. Furthermore this scheme would involve the use of PGF2α to induce Luteolysis and the concurrent use of GnRH and timed insemination without estrus detection.

The most important aspect of the study was, the estrus behavior was not detected when the various protocols of treatment were followed for each group. The latest technique of Ovysynch/TAI was followed while conducting this experiment. The overall low conception rate (22.5%) resulted in this experiment may be due to

the prevailing stressful environmental temperatures, poor body condition score and nutritional status, prolonged postpartum anestrus, post parturient acquired abnormalities, age and parity of the female buffaloes and the regular hormonal malpractices like daily use of oxytocin twice a day for milk let-down in the lactating buffaloes.

Table 1. Layout of the Experiment

	Treatment		Artificial insemination
	Day 1	**Day 11**	**Fixed time**
A	PGF2 α	PGF2 α	72 hrs
B	PGF2 α	PGF2 α	GnRH-72 hrs
C	PGF2 α	PGF2 α + GnRH	72 hrs
D (Control)	Saline	Saline	72 hrs

Table-02: Conception rate (%) of Kundhi buffaloes on 21 days non-return basis

Group	Treatment		Fixed time AI	Return with 21 day	Don't return with in 21day	21day non return rate (%)
A	Day1st PGF2 α =2 ml dalmazine	Day11 PGF2 α =2 ml dalmazine	72 hrs AI	03	07	70
B	Day1st PGF2 α =2 ml dalmazine	Day11 PGF2α =2 ml dalmazine	GnRH+AI=2 ml licerilin acetate	01	09	90
C	Day1st PGF2 α =2 ml dalmazine	Day11 PGF2 α +GnRH=2 ml dalmazine+2 ml licerilin acetate	72 hrs AI	03	07	70
D	Day1st Normal saline=2 ml	Day11 Normal saline=2 ml	After72 hrs AI	00	10	100
			Mean 82.5			

PG= Prostaglandin; GnRH= Gonadotrophin releasing hormone; TAI= Timed artificial insemination

Table-03: Conception rate (%) of kundhi buffaloes after pregnancy was diagnosed through rectal palpation (45-60 days)

Group	Treatment		Fixed time AI	Repeated to fix time insemination	Pregnant to fix time insemination	Conception rate to fix time insemination (%)
A	Day1st PGF2 α =2 ml dalmazine	Day11 PGF2 α =2 ml dalmazine	72 hrs AI	08	02	20
B	Day1st PGF2 α =2 ml dalmazine	Day11 PGF2 α =2 ml dalmazine	GnRH+AI=2 ml licerilin acetate	07	03	30
C	Day1st PGF2 α =2 ml dalmazine	Day11 PGF2 α +GnRH= 2 ml dalmazine+2 ml licerilin acetate	72 hrs AI	07	03	30
D	Day1st Normal saline=2 ml	Day11 Normal saline=2 ml	After 72 hrs AI	09	01	10
			Mean 22.5			

Basically buffalo is seasonal breeder. Their natural breeding season start from September to March with maximum breeding in November and December. The months of May, June and July are considered off breeding season for buffalo, therefore, low conception rate can be expected in such season even with exogenous treatment of PGF2α and GnRH in anestrus buffalo (Khattab *et al*. 1996; Comelo *et al*. 2002; Vivek Kung 2002; Yamada K., 2005). The present experiment was conducted in extreme hot season of the year (Summar season) with temperature range from 39^0C up to 42^0C; therefore low conception resulted in treated as well as in control group.

It was concluded from the present study that conception rat increased by 16.6% through hormonal therapy followed by fixed time AI in Kundhi buffalo under field conditions.

REFERENCES

GOP, (2006). Pakistan Economic Survey 2005-06. Economic Advisors Wing, Finance Division, Government of Pakistan, Islamabad.

Anonymous, (2006). Agricultural Statistics of Pakistan 2004-05. Government of Pakistan, Ministry of Food, Agriculture and Livestock Division (Economic Wing), Islamabad

Ahmed M., Samad, H. A., Munir T., Lodhi L. A. and Awan, F., (2004). Health and reproduction management in dairy production. Proceedings, University of Veterinary and Animal Sciences, Lahore. Part II. 98.

Beg, M. A., Sanwal P. C. and Yadav. M. C., (1997). Ovarian response and endocrine changes in buffalo, superovulated at mid luteal and late luteal stage of estrus cycle. Embryo transfer Lab. India V.R.I. Izatnagar, India. 47 (2): 423-427.

Dessouky, F. K. H. and Juma, (1973). Infertility problems among cows and buffaloes in Iraq. Indian J. Anim. Sci. 43. 187-192.

Rao, A. V. N. and O. Sreemannarayana, (1982). Clinical analysis of reproductive failure among female buffaloes [*Bubalus bubalis*] under village management in Andhra Pradesh. Theriogenology 18. Pp: 403-411.

Schels, H. F. and Mostafawi, D., (1978). The effect of GnRH on the pregnancy rate of artificially inseminated cows. Vet. Rec. 101: 31-32

Weaver, L. D., Daley C. A. and Goodger, W. J., (1988). Economic modeling of the use of gonadotrophin releasing hormone at insemination to improve fertility in dairy cows. J.A.V.M.A. 192: 1714-1719.

Stevenson, J. S., M. K. Schmidt, and E. P. Call, (1995). Gonadotrophin releasing hormone and conception of Holsteins. J. Dairy Sci. 67: 140-145.

Anderson G. A., and J. Malmo, (1995). Pregnancy rate of cows given synthetic gonadotrophin releasing hormone at the time of service. Aust. Vet. J. 62: 222-224.

Seguin, B. E. (1981). Use of prostaglandin in cows with unobserved estrus. Prostaglandin in Animal Reproduction. Uppsala, Sweden. Pp:343

Archbald**,** L. F., J. Tran, R. Massey and E. Klapstein, (1992). Conception rates in dairy cows after timed insemination and simultaneous treatment with gonadotrophin releasing hormone and/or prostaglandin F2 alpha. Theriogenology. 37: Pp: 723-731.

Foster, J. P., G. E. Lamming and A. R. Peters, (1980). Reproductive performance of nili-ravi buffaloes after a single injection of GnRH early postpartum. J. of reproduction and fertility. 59: 321-327.

Samo, M. U., R. A. Leghari, K. B. Mirbahar, H. K. Kunbhar, T. A. Qureshi and I. Kaka, (2005). Effects of Gonadotropin Releasing hormone on first Postpartum Estrus in Kundhi buffalo. Pak. J. Agri. Engg. Vet. Sci. 21(1): 49-51.

Ullah G., J. W. Fuquay, T. Keawkhong, B. L. Clark, D. E. Pogue and E. J. Murphey, (1996). Effect of gonadotropin releasing hormone at estrus on subsequent luteal function and fertility in lactating Holstein during heat stress. J. Dairy Sci. 79: 1950-1953.

Baruselli**,** P. S. and N. A. T. Carvalho, (2002). Reproductive management and artificial insemination in buffaloes. Proceedings of the 1st buffalo symposium of Americas, Belem, Para, Brazil, 1-4: 119-143.

Khatab, R. M., M. A. R. Ibrahim, M. K. Mohsen and I. S. El-Shama, (1996). Improving oestrous expression of Egyptian buffalo using different analogous of prostaglandin. Manual Agric Science, Moshtohor. 549-554.

Comelo, A. S. A., H. F. L. Ribeiro, A. O. A. Suilva, J. S. Souza and W. G. Vale (2002). Pregnancy rates in suckled female buffaloes submitted to estrus and ovulation synchronization with artificial insemination in fixed time. Proceedings of the 1st buffalo symposium of Americas, Belem, Para, Brazilo.1-4.

Vivek Kung, Singh A. P. C, and M. H. Akhtar, (2002). Incidence of postpartum anoestrus in buffaloes. Indian J. of Anim. Repro.175-176.

Yamada K., (2005). Development of ovulation synchronization and fixed time artificial insemination in dairy cows. Journal of Reproduction and Development. 51 (2): 177-186.