Journal of Animal Research: v.13 n.02, p. 269-272. April 2023

DOI: 10.30954/2277-940X.02.2023.15

Follicular Development in Post-partum Anoestrus Buffaloes during Breeding Season

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Received: 13 Dec., 2022 **Revised:** 10 Feb., 2023 **Accepted:** 18 Feb., 2023

ABSTRACT

The experiment was carried on 40 post partum anoestrus buffaloes during breeding season. The buffaloes were divided in four equal groups, Group I was treated with Ovsynch protocol + PRID which removed on 7th day and administration of GnRH @ 10 mcg i/m on day of AI. Group II treated with Progesterone impregnated intra-vaginal device which was removed on 7th day and GnRH @ 10 mcg i/m was administered on the day of AI. Group III was treated by using Ovsynch protocol alone and Group IV was kept as untreated control. Fixed time Artificial Insemination was performed in responded animals. Ovarian activity measurements studied on 0, 7th and 10th day of experimentation were found to be 3.94 ± 0.13, 9.84 ± 0.64 and 10.546 ± 0.18 mm during breeding season. Follicular developments were found significantly ($p<0.01$) greater on day 10th than day 0. However, overall follicular growth was observed significantly ($p<0.01$) greater on day 10th and the size of corpus luteum were recorded significantly greater ($p<0.01$) on day 7th. Follicular size improved (10.86 ± 0.71 and 8.84 ± 0.67 mm) with treatment of Ovsynch + PRID protocol as compared to PRID + GnRH (10.50 ± 0.59 and 7.13 ± 0.37 mm) and Ovsynch alone (10.25 ± 0.28 and 7.63 ± 0.63 mm) during breeding season in post partum anoestrus buffaloes. All the hormonal protocols have improved follicular size as well as size of corpus luteum in comparison with control group in post partum anoestrus buffaloes.

HIGHLIGHTS

- Ovsynch + PRID protocol can be effectively used for improving follicular size estrus induction in post partum anoestrus buffaloes.
- Recording of follicular size, CL diameters through ultrasonography is useful to interpret expected reproductive response expressed as number and quality of follicle for future fertility of buffaloes.

Keywords: Buffaloes, Follicular development, Post partum anoestrus

Buffalo is a multi-purpose species and contributes significantly to rural economy and dairy industry in many developing countries across the world and is most valuable livestock resource in Asian countries including India. Although buffaloes are well adapted to hot and humid climate, their reproductive performance is greatly influenced by heat stress (Marai and Haeeb, 2010). Postpartum anestrus in buffaloes is one of most common reproductive disorder and higher incidences are recorded during summer season, a profound reproductive seasonality, despite of its centuries old domestication, which should have ensured round the year cyclicity. Ovarian follicle is a key compartment to reproduction and plays major role in regulating estrous cycle. The knowledge of follicular growth, development pattern and ovulation

How to cite this article: Patil, A.D., Sahatpure, S.K. and Razzaque, W.A.A. (2023). Follicular Development in Post-partum Anoestrus Buffaloes during Breeding Season. *J. Anim. Res.,* **13**(02): 269-272.

Source of Support: None; **Conflict of Interest:** None

may be helpful to adopt preventive and therapeutic measures for improvement of reproductive efficiency and thus production of the dairy animals (Roche, 2004). After parturition resumption of normal cyclic activity is based on re-establishment of an extremely coordinated hypothalamic pituitary ovarian uterine axis. Now a day, it is possible to synchronize the ovulation for FTAI in buffaloes throughout the year with satisfactory results, helping to cope up the problem of glut and scarcity of milk in winters and summers, respectively even in countries where buffaloes evident reproductive seasonality. Ovsynch protocol may be used during autumn and winter (breeding season) in cycling buffaloes, and protocols with progesterone and other combination of hormones can be used during the spring and summer (off breeding season) in anestrous buffaloes. Hence, the present experiment was carried out to evaluate the follicular development in post partum anoestrus buffaloes during breeding season.

MATERIALS AND METHODS

The present work was carried out in the Department of Animal Reproduction, Gynaecology and Obstetrics, Nagpur Veterinary College, Nagpur and Cattle Breeding Farm, Nagpur Veterinary College. A total of 40 healthy non-cyclic buffaloes with a post-partum interval of more than 90 days and aged between 5-8 years were selected for the present study. The average body condition score of animals was 3.5 (1 = thin, 5 = fat) with parity 1-3. The selected animals were administered antehelmentics as per standard dosage and mineral mixture @ 50 gm/day/animal. Buffaloes were gynaeco-clinically examined for confirmation of anestrous, by two per-rectal examinations 7 days apart. The selected buffaloes were assigned to four groups each group comprising of 10 buffaloes. Buffaloes indentified as anoestrus were screened by ultrasonographic evaluations by using rectal probe (ALOKA SSD-500) on day 0, 7 and 10. A real time, B-mode portable ultrasonography with 5 MHz transrectal linear transducer was used for scanning the genitalia of selected animals. Follicle was identified as a non-echogenic structure and its development / regression was monitored with sequential ultrasonography. The USG confirmation was useful to indentify availability of small size follicles. Buffaloes carrying small sized follicles were confirmed for non exhibition of estrus from breeding records and also it was confirmed by rectal observations. After confirmatory ovarian activity diagnosis, animals were selected and included in the study for undertaking hormonal protocols for induction of estrus.

Group I was treated with Ovsynch protocol + PRID which removed on 7th day and GnRH @ 10 mcg i/m on day of AI. Group II was advised Progesterone impregnated intra-vaginal device which removed on 7th day and GnRH @ 10 mcg i/m on day of AI. Group III was administered Ovsynch protocol alone and Group IV was kept as untreated control. Fixed timed Artificial Insemination was performed in I, II and III group of buffaloes. Fixed time Artificial insemination was performed in all responded animals. Pregnancy diagnosis was made by use of USG on day 30 post FTAI. A positive diagnosis was made when embryo surrounded by non-echogenic fluid was detected in the gravid uterus.

Data generated was analysed using different statistical methods with the statistical software like Microsoft Excel Statistical package and online statistical software provided by ICAR GOVT. Institute WASP.

RESULTS AND DISCUSSION

During breeding season, USG scanning of animals was attempted to note availability of small size follicles on day 0, diameter of CL on the day 7 and size of the matured graffian follicle on day 10th i.e. estrus. The observations are presented in Table 1.

Table 1: Measurements in mm on day 0, 7 and 10 by ultrasound scanning

Days	Measurements in mm				CD
	Group I	Group II	Group III	Group IV	(5%/1%)
0	4.18 ± 0.36^{b}	3.74 ± 0.35^{c}	3.89 ± 0.64^{c}	3.33 ± 0.25^{b}	NS
7	$10.99^{A} \pm 0.54^{a}$	$8.77^{B} \pm 0.32^{b}$	$9.74^{AB} \pm 0.58^{b}$	$5.98^{C} \pm 0.37^{a}$	1.79
10	$10.86^{A} \pm 0.71^{a}$	$10.50^{A} \pm 0.59^{a}$	$10.25^{A} \pm 0.28^{a}$	$5.75^{B} \pm 0.53^{a}$	2.38
CD 5%/1%)	2.17	1.71	1.51/2.04	1.57	

Note: Superscripts small alphabets indicates significant between the days and Capital alphabets indicate significance between the groups.

In the present experiment, overall ovarian activity measurements in terms of follicular size on day 0 (small

sized follicles), diameter of CL on day 7 and size of the matured graffian follicle on day 10 of experiment were found to be 4.18 ± 0.36, 10.99 ± 0.54 and 10.86 ± 0.71 mm in Group I, 3.74 ± 0.35, 8.77 ± 0.32 and 10.50 ± 0.59 mm in Group II, 3.89 ± 0.64, 9.74 ± 0.58 and 10.25 ± 0.28 mm in Group III and 3.33 ± 0.25, 5.98 ± 0.37 and 5.75 ± 0.53 mm in Group IV respectively during breeding season.

On USG scanning size of follicles on day 0, non significantly differed in all four experimental groups. However, the size of CL on day 7 significantly ($p<0.01$) differed in the groups indicating variable development of structural CL due to treatment schedule. On day 10, follicular sizes were found to be increased significantly ($p<0.01$) than the day 0 in all treatment groups. This increase follicular size may be possibly due to resumption of cycle in buffaloes after treatment (Razzaque *et al.,* 2008) quantified follicular population and reported increased number of small, medium and large size follicles in cycling buffaloes as compared to non-cycling buffaloes. Mean diameter of largest follicle on day 0 (13.50 ± 0.50 mm) was earlier reported by (Singh *et al.,* 2009) whereas (Ghuman *et al.,* 2012) recorded largest follicle of ~10 mm diameter on day 0 in anoestrous buffaloes. Size of the dominant follicles recorded was 7.9 and 8.9 mm in two different groups (Frares *et al.,* 2013). Size of corpus luteum ranged from 10 × 7 mm to 18 × 13 mm when estrus induction programme was initiated (Visha *et al.,* 2014) and further recorded presence of a well developed mature graafian follicle of size ranging between 10 × 7 mm to 12 × 11 mm on induction of estrus whereas (Haider *et al.,* 2015) reported presence of preovulatory follicle with size of 13.74 ± 0.24 mm and 12.42 ± 0.21 mm in two different groups of buffaloes. Similarly, (Ahirwar *et al.,* 2016) recorded follicular sizes during winter season in buffaloes as Small <5 mm, Medium 5-8 mm and Large >8 mm. It is important to note that (Karuppanasamy *et al.,* 2017) inferred that no significant difference was found in the diameter of largest follicle between the ovulated and non-ovulated buffaloes in response to GnRH suggesting that follicle of ≥9.5 mm is necessary but not sufficient to induce ovulation in the anovulatory buffaloes.

CONCLUSION

It can be concluded that, the follicular size improved (10.86 ± 0.71 and 8.84 ± 0.67 mm) with treatment of Ovsynch + PRID protocol as compared to PRID + GnRH (10.50 ± 0.59 and 7.13 ± 0.37 mm) and Ovsynch alone (10.25 ± 0.28 and 7.63 ± 0.63 mm) during breeding season in post partum anoestrus buffaloes. All the hormonal protocols have improved follicular size as well as size of corpus luteum in comparison with control group in post partum anoestrous buffaloes. Recording of follicular size, CL diameters through ultrasonography in buffaloes is useful to interpret expected reproductive response expressed as number and quality of follicle for future fertility of buffaloes also ensuring synchronous ovulation, enabling the use of fixed time AI and achieving higher conception rate.

ACKNOWLEDGEMENTS

Authors are thankful to Associate Dean of College of Veterinary and Animal Sciences, Udgir for providing all facilities which is necessary to complete my research work. I feel privileged to express deepest gratitude to my guide Dr. A.D. Patil M.V.Sc., Ph.D., Assistant Professor and Head Department of Animal Reproduction, Gynaecology and Obstetrics, COVAS Udgir.

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