

ESTRUS INDUCTION, FERTILITY AND BIOCHEMICAL PROFILE IN TRUE ANESTRUS SURTI BUFFALO FOLLOWING DIFFERENT ESTRUS SYNCHRONIZATION PROTOCOLS

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ABSTRACT

Under field conditions, postpartum (>90d) true anestrus Surti buffalo treated with four different hormonal protocols (n=11 each), viz., Doublesynch, Estradoublesynch, Triu-B/PRID, PRID+PMSG and untreated control revealed 81.8-100% estrus induction response. The respective conception rates obtained following AI at induced estrus was 27.3, 27.3, 18.2 and 45.4%, with an overall conception rate of three cycles as 63.6, 54.5, 63.6 and 81.8%, which was much higher than control buffalo (18.2%). Plasma cholesterol between conceived and non-conceived buffalo was different (p<0.05) on day 12 post-AI in Doublesynch and on day of PG injection in PRID protocol. In brief, all four protocols can be used successfully to induce estrus and improve fertility in postpartum anestrus buffalo without altering the plasma protein or cholesterol profile.

Keywords: Buffalo, Estrus induction, Fertility, Plasma protein, Plasma cholesterol

INTRODUCTION

Use of fixed time artificial insemination (FTAI) hormonal protocols like Doublesynch, Estradoublesynch, PRID and PRID+PMSG synchronizes estrus, establishes cyclicity in acyclic buffalo and improves conception rate (Baruselli and Carvalho, 2005). Protein deficiency retards the development of reproductive organs with the ill effect on reproduction through pituitary and sex glands. Cholesterol is a precursor of steroid hormones and its level can indicate circulatory adequacy of hormones responsible for normal follicular or luteal phase (Ramkrishna, 1997). The present study was aimed to evaluate therapeutic efficacy of four estrus induction protocols by monitoring estrus induction response, conception rate and plasma protein and cholesterol in conceiving and not conceiving anestrus buffalo under field conditions.

MATERIALS AND METHODS

Fifty-five postpartum true anestrus buffalo that did not exhibit spontaneous estrus until day 90 postpartum constituted the experimental animals. All these animals were initially injected with ivermectin and multivitamins and were also supplemented with oral multi-minerals @ 1 bolus daily for 7 day. Anestrus buffalo were randomly and equally divided to receive four standard estrus induction/synchronization protocols followed by fixed time AI (Doublesynch, Estradoublesynch, PRID and PRID+PMSG, n=11 each), keeping 5th group as untreated control. The buffalo exhibiting estrus were inseminated and were followed for two more cycles. In non-return cases, pregnancy was confirmed per rectum 60 days after last AI.

The blood samples were collected from the jugular vein of buffaloes in heparinized vacutainers on day 0 - just before treatment, on day 6/9 - at the time of PGF_{2α} administration, on day 8/9/12 - induced estrus/FTAI and on day 12 post-AI. The blood samples were centrifuged at 4500 rpm for 15 minutes, and plasma was

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stored deep frozen at -20°C with a drop of merthiolate (0.1%). Plasma total protein and cholesterol were estimated by using commercially available assay kits (Coral Clinical System, Goa) on biochemistry analyser. The estrus induction response and conception rates of animals of different groups were compared by using Chi-square test. The data generated on plasma biochemical profile were analyzed statistically using ANOVA and t-test for comparison within and between groups, and between conceived and non-conceived subgroups under various treatment protocols.

RESULTS AND DISCUSSION

The behavioural estrus response in anestrus buffalo treated with Doublesynch, Estradoublesynch, PRID and PRID+PMSG was 81.8, 90.9, 100.0 and

90.9%, respectively. In an earlier study, the estrus induction rate with Doublesynch protocol in acyclic Murrah buffalo was hardly 27.3% (Mirmahmoudi and Prakash, 2012). Our result with PRID protocol was in agreement with previous findings in anestrus buffaloes using CIDR (Nakrani *et al.*, 2014). The conception rate obtained at induced estrus and overall of three cycles in anestrus buffalo under Doublesynch protocol was 27.3 and 63.6%, respectively. The corresponding values with Estradoublesynch were 27.3 and 54.5%; with PRID protocol 18.2 and 63.6%, and were highest with PRID+PMSG protocol 45.4 and 81.8%, respectively.

The conception rate achieved at overall of three cycles under Doublesynch protocol (63.6%) was comparatively higher than earlier reports of 43.0%

Table 1: Plasma total protein and total cholesterol in anestrus buffalo on different days of estrus induction protocols and on d 12 post-AI with respect to successful conception (C) or failure to conceive (NC)

Estrus induction protocol	C/ NC	n	Plasma protein, g/dl / Plasma cholesterol, mg/dl			
			d0	d6/9	d8/9/12 (FTAI)	d12 post-AI
Plasma protein						
Double synch	C	3	7.02±0.53	7.16±0.30	7.06±0.28	7.09±0.46
	NC	7	6.63±0.30	6.83±0.43	7.17±0.26	7.52±0.29
Estradoublesynch	C	3	6.59±0.61	6.57±0.58	7.80±0.35	7.43±0.28
	NC	7	6.37±0.22	6.64±0.29	7.88±0.29	8.09±0.22
PRID	C	2	6.95±0.25	6.98±0.11	7.15±0.25	8.00±0.80
	NC	8	6.29±0.21	6.61±0.21	7.68±0.25	8.12±0.21
PRID+PMSG	C	5	6.36±0.41	7.34±0.31	7.62±0.44	7.56±0.41
	NC	5	6.81±0.49	7.25±0.43	7.94±0.56	8.12±0.50
Plasma cholesterol						
Double synch	C	3	75.4±6.4	82.9±9.9	85.1±6.8	87.4±1.5 ^x
	NC	7	81.2±2.9	92.6±2.9	93.3±4.3	95.7±3.0 ^y
Estradoublesynch	C	3	89.1±5.4	79.9±4.5	97.9±6.3	100.1±9.1
	NC	7	86.5±3.4	85.7±6.9	92.3±3.4	94.7±5.3
PRID	C	2	84.5±4.1	99.4±2.9 ^y	98.1±12.1	99.3±10.6
	NC	8	70.8±3.9	76.0±5.3 ^x	73.3±4.6	78.3±5.8
PRID+PMSG	C	5	72.1±2.7	77.1±3.1	95.8±5.8	91.2±7.1
	NC	5	80.9±7.2	85.4±8.4	94.6±9.6	92.9±8.4

^{xvsy}p<0.05; d0 - Start of protocol, d6 - day of PG inj. for PRID and PRID+PMSG protocol, d9 - day of PG inj. for Doublesynch and Estradoublesynch protocol, d8/9 - FTAI for PRID and PRID+PMSG protocol, d12 - FTAI for Doublesynch and Estradoublesynch

(Ozturk *et al.*, 2010) and 58.0% (Dhindsa *et al.*, 2016). However, the conception rate of 54.5% recorded with Estradoublesynch protocol was comparatively lower than 64.0% documented in a study (Mirmahmoudi and Prakash, 2014). The conception rate of 18.2% obtained at induced oestrus with Triu-B protocol in anestrus buffalo was in close agreement (Mungad *et al.*, 2016) or higher than 8.33% found in another study (Singh *et al.*, 1983). The conception rate obtained at induced oestrus in PRID+PMSG group (45.4%) was comparatively lower than 90.0% reported with PMSG alone (Singh *et al.*, 1988). Overall three cycle CR of 81.8% achieved in PRID+PMSG protocol was comparatively higher than the 50.0% found in another study (Naseer *et al.*, 2013).

Plasma total protein and total cholesterol recorded on different days of treatment and on day 12 post-AI in buffalo under four treatment protocols were almost similar ($p>0.05$, Table 1). Also, in earlier studies (Nakrani *et al.*, 2014 and Mungad *et al.*, 2016), no variation was found in plasma total protein concentrations in buffaloes at different days of PRID protocol. Also, the protein profile was similar ($p>0.05$, Table 1) between conceived and non-conceived group at any of the days in any of the protocols. With regard to plasma cholesterol, in Estradoublesynch protocol, the value was highest on day 12 post-AI as compared to other sampling days ($p<0.05$, Table 1). The differences in plasma cholesterol values between conceived and non-conceived animals were present ($p<0.05$) on day 12 post-AI in Doublesynch and on day 6 in PRID protocol (Table 1). However, relatively much higher (Buhecha *et al.*, 2016) and lower (Parmar, 2013) plasma total cholesterol was found by others in anestrus buffalo under Triu-B/PRID protocol.

In brief, an appreciably higher estrus response and conception rate was obtained in treated buffaloes, particularly with PRID+PMSG protocol, as compared to control group, thus suggesting their beneficial impact in management of anestrus buffalo.

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