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Research Article

Induction of oestrus in delayed pubertal cross-bred heifers

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ABSTRACT

Buserelin acetate (Gn RH analogue) alone or in combination wilh oestradiol valerate or sodium salt of 4 dimethyl amino 2 methyl phenyl phosphoric acid was administered parentrally in delayed pubertal crossbred heifers for induction of oestrus. Six treatment combination groups and two control groups comprised of total 48 heifers having six randomly allocated animals in each group. Efficacy of these drugs was judged on the basis of per cent heifers having induced oestrus, oestrus induction interval, oestrus intensity score and conception rate.

In five of the six treatment groups oestrus induction efficacy was 83.33% where as heifers receiving Buserelin acetate (80 µg) alone IVSM had 50 % oestrus induction. The oestrus induction interval ranged from 6-28 days having the least interval (10.00 ± 0.45 days) in oestradiol valerate primed and have received 200 µg buserelin acetate im had a comparable oestrus intensity (81.60 ± 0.98) to cyclic control (84.50 ± 1.57) group. Though the oestrus induction interval was slightly higher (16.60 ± 2.70 days) in phosphorus supplementation and 200 µg buserelin acetate im group. These animals had 100% conception rate.

Key words: Cross-breed heifers, delayed puberty, oestrus induction, GnRH

Delayed puberty defeats the objective of cross breeding to have more calf crop and life time milk production. It is due to failure in triggering pituitary function through endogenous hypothalamic releasing factors. Administration of GnRH. analogue mimic the sequence of events essential for oestrus manifestation (Dhoble & Gupta, 1986). However, the induced estrus are mostly silent and hence have a low conception rate.

The present study was envisaged to compare the efficacy of GnRH for induction of oestrus and to see that whether it is possible to have better oestrus intensity and conception rate, if it is used with adjuncts like oestradiol valerate or sodium salt of 4 dimethyl amino, 2 methyl phenyl phosphoric acid (Phosphorus supplementation).

MATERIALS AND METHODS

Forty two delayed pubertal crossbred heifers (Aged 24-36 months, weighing 210-238 kg) under standard managerial practices and had smooth ovarian physiological status on two consecutive rectal exploration 10 days apart with no apparent genital abnormality comprised the material for study. They were randomly allocated to seven groups (six treatment and one control). Further another six normal cyclic crossbred heifers were also included to compare oestrus intensity. Thus a total of 48 crossbred heifers were the subject of study. Following treatments were given in these groups.

G1 No treatment except rectal palpation twice, ten days apart in delayed pubertal heifers, (control 1)

G2 Cyclical crossbred heifers, (control 2)

G3 Buserelin acetate 200 µg im, single dose.

G4 Buserelin acetate 80 µg IVSM, single dose.

G5 Oestradiol valerate 10 mg im followed by 200 µg Buserelin acetate im 48 hr after O.V.

G6 Oestradiol valerate 10 µg im followed by 100 mg Buserelin acetate im 48 hr after O.V.

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G7 Sodium salt of 4 dimethyl amino, 2 methyl phenyl phosphoric acid 1gm im x 3 days, followed by 200 µg Buserelin acetate im 24 hr after the last dose of phosphorus supplementation.

G8 Sodium salt of 4 dimethyl amino, 2 methyl phenyl phosphoric acid 1 gm im x 3 days followed by 100 µg Buserelin acetate im 24 hr after the last dose of phosphorus supplementation.

Oestrus was detected by parading teaser bull twice daily and oestrus intensity was scored following score card device as described by Awasthi and Kharche (1989). Insemination was done in standing oestrus using frozen semen and pregnancy was confirmed by rectal palpation 60 days post insemination. Animals failed to exhibit oestrus 30 days post treatment were considered non-responsive to the therapeutic regimen. Statistical analysis was done as per method described by Snedecor & Cochran (1994).

RESULTS AND DISCUSSION

Response to remedial measures for induction of oestrus in delayed pubertal anoestrus crossbred heifers in terms of oestrus induction efficacy (per cent), oestrus induction interval (days), intensity of induced oestrus, overall oestrus intensity score and conception rate is depicted in table I and interpreted as under.

***Control Group* 1**: None of the heifers could express oestrus in stipulated period.

Control Group 2: Cyclical heifers had an overall oestrus intensity score of 84.50 ± 1.57. All the heifers conceived.

Treatment Group 3: Five of the six crossbreed heifers responded to treatment between 10-17 days. Of the five heifers having induced oestrus three had intense and two moderate oestrus. The overall mean oestrus intensity score was 77.4 ± 4.01. Two of the animals having induced oestrus eventually conceived. Nautiyal *et al.* (1997) also reported induced oestrus using 100 ug buserelin acetate, in 71,42 % buffalo heifers at an oestrus induction interval of 62.4 ± 17,2 hr with 80 % conception rate.

Treatment Group 4: IVSM administration of 80 µg buserelin acetate could induce oestrus in three of the six crossbred heifers in a mean oestrus induction interval of 15.00 ± 2.51 days with an overall oestrus intensity score 67,3 ± 6.77 and only 33.33 % conception rate.

The present findings indicate low dose administration of GnRH had a poor oestrus induction efficacy and conception rate. Similar observations have been reported by Thakur and Bhatt (1999).

Treatment group 5: Administration of 10 mg estradiol valerate, followed by 200 ug buserelin acetate im 48 hr later could induce oestrus with a mean post treatment interval of 10.0 ± 0.45 days in five of the six crossbred heifers with 80 % conception rate. The overall oestrus intensity score was 81.6 ± 0.98; similar observations have been reported by Fateh Mohammed *et al.*, 1999.

Oestrogen rises in circulation causes increased pituitary gland responsiveness to LHRH. This steroid also alters the threshold of excitability with the pre-optico-tuberal unit and may be responsible, in part, for the initial release of LHRH, which primes the pituitary gland (Hafez, 1993). The present finding of better induction response, oestrus intensity score and conception rate seems to follow the above principle; since oestradiol administration might have potentate the effectiveness of GnRH by positive feed back to pituitary and hypothalamus resulting in good results.

Treatment group 6: Parentral administration of 10 mg oestradiol valerate followed by 100 µg buserelin acetate 48 hr later, could induce oestrus in five of the six heifers in 11.60 ± 2.06 days with an overall oestrus intensity score of 76.60 ± 1.99. However only one heifer conceived.

These results indicate that though the treatment regimen had good oestrus induction efficacy but had poor conception rate. It might be for lower ovulatory response owing to low dose of GnRH. Rao (1997) also reported comparable oestrus induction efficacy in post partum anoestrus cows and buffaloes.

Treatment group 7: Parentral phosphorus

Table 1: Response to remedial measures in different treatment groups of Cross bred Heifers

S.No.	Group	Oestrus induction efficacy (%)	Oestrus induction interval (days)	Oestrus intensity score	Conception rate (%)
1	Control (delayed pubertal heifers) (no treatment)	-	-	-	-
2	Control (cyclical heifers)	-	-	84.50 ±1.57	100
3	Buserelin acetate 200 µg im	83.33	12.60 ±3.00	77.40 ±4.01	40
4	Buserlin acetate 80 µg IVSM	50	15.00 ±2.51	67.30 ±6.77	33.33
5	Buserelin acetate 200 pg primed with oestradiol valerate (10 mg) im	83.33	10.00 ±0.45	81.60 ±0.98	80
6	Buserelin acetate 100 µg primed with oestradiol valerate (10 mg) im	83.33	11.60 ±2.06	76.60 ±1.99	20
7	Buserelin acetate 200 µg primed with phosphorus supplement (1 g x 3 days) im acetate 200 ug Primed with phosphorus supplement (Ig x 3 days) IM	83.33	16.60 ±2.70	81.20 ±3.37	100
8	Buserelin acetate 100 µg Primed with phosphorus supplement (1 g x 3 days) im	83.33	18.00 ±3.34	81.20 ±2.93	60

supplementation (1 g x 3 days) followed by 200 µg buserelin acetate could induce oestrus in five of the six crossbred heifers in 16.60 ± 2.70 days with an overall oestrus intensity score of 81.20 ± 3.37. All the heifers having induced oestrus conceived.

Similar observations have been recorded by Shams *et al.* (1991) in post partum anoestrus crossbred cows but with a comparatively lower conception rate. While comparing phosphorus supplementation buserelin acetate combination with oestradiol valerate priming; it was found that the former combine seems to be better than later. Nema and Chouhan (1991) and Benjamin (1991) also mentioned that phosphorus deficiency leads to ovarian dysfunction and the present results affirm that this combination is capable of combating delayed puberty in crossbred heifers.

Treatment group 8 : Parentral phosphorus supplementation (1 g x 3 days) followed by 100 µg buserelin acetate could induce oestrus in five of the six animals in 18.00 ± 3.34 days with 81.20 ± 2.93 overall oestrus intensity score. Sixty per cent of the induced oestrus heifers conceived.

Response to remedial measure in this group indicate that phosphorus supplementation can induce the pituitary ovarian axis but lower dose of GnRH could not get better response in terms of conception rate. Pradhan (1994) mentioned that phosphorus supplementation help in conversion of carotene to vitamin 'A' which augments normal ovarian activity.

Comparing response to different remedial measures it could be noticed that though the oestrus induction interval was least in oestradiol valerate buserelin acetate combine, oestrus expression was comparable with phosphorus supplementation buserelin acetate combination; however, better conception rate could be met with phosphorus supplementation group. Further it can be emphasized that a full dose (200 µg) administration is essential for better results.

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