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Short Communication

Studies on the effect of gonadotrophin releasing hormone administration on conception rate following artificial insemination in cattle maintained under sub-temperate climate

AMIT SHARMA[1], MADHUMEET SINGH[2] AND N.K. VASISHTA[3]

Himachal Pradesh Agricultural University, Palampur 176062 INDIA

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ABSTRACT

In all, 346 animals comprising of 167 Jersey and 179 Jersey X Red Sindhi crossbred cows were inseminated artificially at livestock farm of Himachal Pradesh Krishi Vishvavidyalya, Palampur. Buserelin acetate and Gonadorelin were injected through intra muscular route for the treatment as GnRH analogues. Depending upon the groups, either single or double inseminations were performed in these cows. In double insemination group, the cows were reinseminated 24 hours after the first AI. Among the Jersey cows 59.6 and 53.8% animals conceived, following GnRH administration and 40.0 and 45.0% conceived in control group (without GnRH) following single or double insemination, respectively. Similarly, among crossbred cows, 58.2 and 55.5% animals conceived when inseminated along with GnRH and 45.0 and 60.0% conceived in control groups following single and double insemination, respectively.

Key words: AI, buserelin acetate, crossbred, GnRH, gonadorelin

In Himachal Pradesh, prolonged oestrus syndrome appears to play a key role in the conception failure, especially in crossbred cows. In this region, crossbred cows have extended oestrus period ranging from 36 to 72 hours (Singh, 1997). Together with improper timing of insemination in relation to follicle rupture, this factor has emerged as possible cause for poor CR following artificial insemination (AI). To achieve satisfactory results, optimal correlation between the time of deposition of semen and moment of ovulation is of utmost importance.Various hormones such as GnRH and LH have been recommended to increase CR by bringing the LH surge earlier and thus affecting ovulation. Gonadotropin releasing hormone (GnRH) analogues and human chorionic gonadotropin (hCG) have been used to improve fertility (Lee *et al.*, 1981; Nakao *et al.*, 1983; Valks, 1996; Rayos *et al.*, 1999).Keeping in view the earlier recommendations and observations, the present study was planned to observe the effect of different preparations of GnRH analogues administration on conception rate in dairy cows reared under sub temperate zone of Himachal Pradesh

The work was conducted at the livestock farm of Himachal Pradesh Krishi Vishvavidyalya, Palampur. Total 346 animals comprising of Jersey (n=167) and crossbred (Jersey X Red Sindhi, n=179) cows were inseminated from September 2001 to March 2003. All the animals had normal genitalia and no apparent clinical abnormalities based upon history records and/or rectal examinations. The animals were observed for signs of oestrus based on behavioral symptoms and were inseminated at standing heat with good quality frozen thawed semen procured from bulls maintained in ILIP Semen Processing Laboratory and Regional Bull Centre, Palampur. Buserelin acetate (Receptal, Intervet India Ltd.), at the dose rate of 0.0105 mg (2.5 ml) and Gonadorelin (Fertagyl, Intervet India Ltd.), at the dose rate of 0.25 mg (2.5 ml) were used for the treatment as GnRH analogues in 126 (61 Jersey and 65 crossbred) and 140 (66 Jersey and 74 crossbred) cows, respectively. These hormones were injected simultaneously to first

[1] Veterinary officer, Veterinary Hospital Himgiri, Distt. Chamba (H.P.), [2] Associate Professor, [3] Associate Professor and Head, Department of Animal Reproduction, Gynaecology and Obstetrics, College of Veterinary and Animal Sciences, Palampur, Himachal Pradesh

insemination, through intra muscular (I/M) route. Eighty cows (40 each Jersey and crossbred) acted as control. Either single or double inseminations were performed in these cows. In double insemination group, the cows were reinseminated 24 hours after the first one with the semen of same bull. Pregnancy diagnosis was carried out 60 days post AI by rectal palpation in cows not returning to oestrus.

After the insemination of 29 and 32 Jersey cows in two Buserelin acetate (Receptal) treated groups, 19 and 18 animals conceived with a conception rate (CR) of 65.5% and 56.2% following single or double insemination, respectively. Similarly, following insemination of 33 Jersey cows in each of the two Gonadorelin (Fertagyl), treated groups, 18 and 17 animals conceived with CR of 54.5% and 51.5% following single and double insemination, respectively. From the pooled data of 62 and 65 Jersey cows inseminated following single and double insemination, irrespective of GnRH used, 37 (59.6%) and 35 (53.8%), conceived respectively. The difference was non significant. The CR was 40 (8/20) and 45 percent (9/20) following single or double insemination, respectively, in control group.Following insemination of 33 and 32 crossbred cows in two Buserelin acetate (Receptal) treated groups, 19 and 18 animals conceived with a CR of 57.5% and 56.2% following single or double insemination, respectively. Following the insemination of 34 and 40 crossbred cows in two Gonadorelin (Fertagyl), treated groups, 20 and 22 animals conceived with a CR of 58.8% and 55.0% with single or double insemination, respectively. In control group, after insemination of 20 animals each in single or double insemination group, 9 (45%) and 12 (60%) cows conceived, respectively. However, the difference between single (57.5%) or double (56.2%) insemination following Buserelin administration was not significant. Similarly, the difference between single (58.8%) or double (55.0%) insemination following Gonadorelin (Fertagyl) administration was also not significant. From the pooled data of 67 and 72 crossbred cows inseminated by single and double insemination irrespective of GnRH analogue used, 39 (58.2%) and 40 (55.5%) conceived, respectively. The difference was non significant.

In a similar study by Stevenson and associates (1990), it was suggested that injection of GnRH at the time of single insemination (16-18 hrs after onset of oestrus) consistently produced the highest pregnancy rate when compared to treated cows with double insemination. They further reported that double AI with or without GnRH administration confers no additional benefit over single AI along with GnRH. However, in present study double insemination without hormone in crossbred cows increased the conception. Our findings are in agreement with those of Fleischmann (1990) and Wilcox and Pfau (1958) who suggested that double insemination is better than single insemination, but should be performed only in those cases where signs of oestrus persists 24 hr after insemination.It can be concluded from this observation that if GnRH is being injected along with AI in normal animals, single insemination is sufficient and double insemination has no additional advantage. If no hormone has to be injected then double insemination at 24 hr interval should be preferred, particularly in crossbred animals.

The improvement in pregnancy rate after treatment with GnRH at AI may be related to insufficient GnRH release from the hypothalamus (Ryan *et al.*, 1991). The treatment with GnRH during oestrus may be affecting time of ovulation, fertilization rates, corpus luteum development, progesterone secretion and embryonic survival. The GnRH is acting possibly through its effects on release of follicle stimulating hormone (FSH) and luteinising hormone (LH), but its direct effect on the reproductive tract cannot be ignored, because GnRH like molecules (gonadocrinins) have been isolated from ovarian follicle (Ying *et al.*, 1981). If GnRH is acting through LH secretion, perhaps late ovulating repeat breeding cows (Dekruif, 1978) benefit from GnRH treatment by hastened ovulation and improved fertilization rates.

It can be concluded from present observation that if GnRH is injected along with AI in normal animals, single insemination is sufficient and double insemination has no additional advantage. If no hormone has to be injected then double insemination at 24 hr interval should be preferred, particularly in crossbred animals.

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