

EFFICACY COMPARISON AMONG DIFFERENT MEDICAMENTS ON ANOESTROUS GIR HEIFERS

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Abstract: The study was aimed to determine the effects of hormonal and non-hormonal drugs on induction of cyclicity followed by conception in forty anoestrous Gir heifers. The animals were assigned into four equal groups and treated with intramuscular injection of 5ml Receptal (Group-I; n=10), three doses of i.m. injection of Tonoricin and Vitamin AD₃E @ 5 days interval with heat inducer drug Bolus Heat Plus given orally on 3rd injection of tonovitamin treatment (Group-II; n=10), diluted 0.25% lugol's iodine-10ml spray on os cervix (Group-III; n=10) and untreated control (Group-IV; n=10). The cows came in oestrus were inseminated with good quality frozen-thawed semen by a single technician at least for two cycles post-treatment if not settled. The pregnancy diagnosis was performed at 60 days post insemination in non-return cases. The overall mean time interval between treatment to heat response was 18.44 ± 0.33 , 27.10 ± 0.71 and 8.33 ± 4.18 days in Group-I,II and III, respectively. The highest oestrus induction response (90%) and conception rate (88.88%) was observed for Group-I followed by Group-II, III and control group. In conclusion, the pregnancy rates could be improved by treatment with GnRH in true anoestrous Gir heifers.

Keywords: Gir heifers, True anoestrous, Estrous induction response, Conception rate.

Introduction

Reproductive efficiency is a major determinant of profitability in both dairy and beef production and is one of the most costly problems facing the dairy industry today (Sarker *et al.*, 2015). The optimum production from dairy animals is dependent upon efficient reproduction and is often measured by number of offspring per breeding animal per unit of time (Bora *et al.*, 2014). A major reason for this is inadequate nutrient intake and the resultant anoestrus. Indeed, reduced energy intake delays puberty and increases the interval from calving to conception. Nutritional imbalance compounded with other factors is mainly responsible for its occurrence. Lack of minerals especially calcium, phosphorus and vitamin A (Sane, 1994) upsets the proper functioning of reproductive organs, poor follicular development and postpartum anoestrous in cows. Anoestrus is a period of sexual quietude in which the animal fails to exhibit normal oestrus cycles and no manifestation of heat. Extensive efforts, world-wide, have been put into research to limit the occurrence of

anoestrus. However, despite all these efforts, infertility is still a significant problem in dairy herds. Nonetheless, few advances have been made in reducing the condition through proper nutrition, hormonal therapy and application of other non hormonal remedies including physical massage of the reproductive system. Efficient and profitable reproductive performance of a dairy herd requires routine but conscientious heat detection and proper timing of artificial insemination. Failure to detect oestrus (heat) is a major factor contributing to low fertility.

During the last few years, several studies have been attempted to treat the true anoestrus in cows by using hormonal treatments such as gonadotropin releasing hormone (GnRH), estrogen, prostaglandin (PGF₂α) and progesterone (Singh, 2003) and non-hormonal substances such as lugol's iodine, ovarian and uterine massage (Edwell *et al.*, 2004). Keeping in view the high incidence, economic importance, multiple etiology and complexity of the problem, the present study was planned to determine the effects of administration of GnRH analogue, vitamin AD₃E and tono-vitamin on induction of cyclicity and conception in anoestrus Gir heifers. Treatment strategy was mainly directed as stimulating the ovary through application of hormonal and non-hormonal remedies.

Materials and Methods

Animals, ration and experimental design:

The present study was conducted on forty anoestrous Gir heifers selected from the herd maintained at the Cattle Breeding Farm, JAU, Junagadh. Forty Gir heifers aged more than 3 years old weighing 250-300 kg average body weight were used in the present study. All animals were fed green fodder, hay, compounded concentrate and mineral mixture as per the standard feeding schedule on the farm. Throughout the study period, heifers were maintained under similar feeding and management practices in a semi-covered shed. All the animals were in healthy condition and kept under strict control measures for internal and external parasitism, as they undergo a periodical deworming and prophylactic vaccination against the endemic diseases. A full case history of each animal was recorded. All the heifers in the present study were subjected to rectal examinations of genitalia and heifers revealed normal genital tract with smooth and small ovaries, uterine horns found to be atonic (true anoestrous) were assigned into four equal groups.

Ten anoestrous heifers (Group-I) treated with single injection of GnRH, 5ml through intramuscular route (Buserelin acetate 0.0042mg/ml equivalent to 0.004mg Buserelin/ml 'Receptal', Intervet International GmbH, Germany), Another ten anoestrous heifers (Group-

II) received intramuscular injections of Tonoricin-10ml (Sodium salt of 4-dimethyl amino-2-methylphenyl phosphonic acid 0.2gm/ml, Samrudh Pharmaceuticals) and Vitamin AD₃E-5ml (Vit.A-2.5lac IU, Vit.D3-25000 IU, Vit.E-100IU/ml, Zydus Animal Health limited) @ 5 days interval. In this protocol, indigenous preparations bolus Heat Plus (Yogi pharma- Rajkot) given orally on 3rd injection of tonovitamin treatment. In case of no estrous signs, repeat bolus Heat Plus after 11-12 days. In Group-III, ten anoestrous heifers were treated with diluted 0.25% lugol's iodine-10ml spray on os cervix, while 10 anoestrous heifers did not receive any treatment and served as control (Group-IV).

Estrous evaluation and fertility traits

Response of different animals groups to various treatments was evaluated. Heifers were observed twice daily at a 12 hours interval by experienced herdsman for at least one hour for estrous signs, especially the mounting, bellowing, restless and sniffing of external genitalia. The day at which the female stands to be mounted was considered the day of estrous. Heifers in estrous were inseminated approximately 12 h after the standing heat using frozen thawed semen by a single technician. The heifers which returned to estrous were again inseminated and in non-return cases, pregnancy diagnosis was performed 60 days after the last insemination. Fertility measures including the number of animal responded, the mean time interval between initiation of treatment and onset of estrous and conception rate were recorded.

Statistical analysis

The data were expressed as mean \pm SE. Reproductive performance percentages were analysed statistically using chi-square test for drawing conclusions.

Results and Discussions

Anoestrous in cattle is the principal symptom of many conditions that affects the estrous cycle. It is the commonest single cause for infertility in cattle (Roberts, 1998). Results pertaining to efficacy comparison between different protocols on anoestrous Gir heifers have been presented in Table-1.

Treatment Group		I (GnRH Group)	II (Tono.-Vita. group)	III (Lugol's iodine)	IV (Control)
Observation					
No. of animals treated		10	10	10	10
Oestrus induction response	Total No.	9	6	6	2
	%	90	60	60	20
No. of animals conceived		8/9	4/6	3/6	1/2
I st service conception rate (%)		66.66% (6/9)	66.66% (4/6)	50.00% (3/6)	50.00% (1/2)
II nd service conception rate (%)		66.66% (2/3)	-	-	-
Overall conception rate (%)		88.88	66.66	50	50

Table-I: Oestrus induction response and fertility in true anoestrus Gir heifers treated with hormonal, non-hormonal drugs and untreated control group

The estrous induction response in heifers of GnRH treated Group-I was higher (90%) than that of tono-vitamin treated Group-II (60%) and lugol's iodine Group-III (60%) (Table-I). The corresponding figures for estrous induction interval were 18.44 ± 0.33 , 27.10 ± 0.71 and 8.33 ± 4.18 days, respectively. The overall conception rate was higher in Group-I (88.88%) followed by Group-II (66.66%) and Group-III (50%). Statistically difference is non-significant. However, apparently the treatment-I (GnRH) seems to be more effective than the other two treatments. This showed that the improved reproductive performance was observed in anoestrous heifers treated with GnRH followed by Tonoricin plus Vitamin AD₃E and lugol's iodine. Hence, GnRH treatment which is economical is recommended to the practicing veterinarians.

In the present study, GnRH analogue induced oestrus in higher proportion of heifers than that of tono-vitamin AD₃E and lugol's iodine. GnRH and its analogue has been used for induction of estrous and fertility in anoestrous bovines by various workers, who have reported 22 to 87% induction of oestrus with an average interval of 4 to 29 days, 75 to 100% ovulation and 9 to 66.7% of conception rate (Sirmour *et al.*, 2006 and Gupta *et al.*, 2012). Heifers with earlier episodic peaks of LH ovulate sooner than other heifers (Stevenson and Britt, 1979). In abnormal heifers, the LH peak could be delayed further. The GnRH evokes LH release which increases response to come into oestrus (Richardson *et al.*, 1983). Moreover, treatment with

GnRH may assist to first ovulation in heifers (Rick, 1982). This would explain the findings of a higher conception rate obtained in the present study.

Almost similar interval for induction of oestrus in postpartum anoestrous cows with the treatment combination of vitamin AD₃E and phosphorus was reported by Mathur *et al.*, (2005) in Sahiwal cows (21.00±6.43 days) and Bora *et al.*, (2014) (21.17±1.08 days) in crossbred cows. The present findings of intramuscular injections of vitamin AD₃E and phosphorus might have corrected true anoestrous condition by stimulating gonadal and genital activities and thus promoting the secretion of gonadotropic hormones through hypothalamo-pituitary-gonadal axis. The present findings gained support from the observations of Palmer *et al.*, (1941) who stated that ovarian functions are interfere with phosphorus deficiency through a decrease in secretion of FSH. Moreover, phosphorus and vitamin deficiency is known to be frequently associated with poor follicular development, atresia, anoestrous condition and impaired fertility in cows (Sane, 1994). Administration of Tonoricin and vitamin AD₃E also induced cyclicity and conception in higher proportion of anoestrus heifers compared to non-treated group. This means, other than hormone, Tonoricin and vitamin AD₃E can be used to induce cyclicity and conception in some proportion of anoestrus heifers. Because, it is more natural approach than administration of GnRH analogue.

Various workers have reported varied response with lugol's iodine (Pandey *et al.*, 2011, Ahmed and Elsheikh, 2013). The action of lugol's iodine in induction of oestrus is thought to be due to either stimulatory effect on the hypothalamus or by the release of uterine luteolytic factor acting via utero- ovarian and utero-pituitary ovarian pathway, and also by its irritating action on endometrium.

Summary

The findings of estrous induction response and conception rate clearly indicated that resumption of ovarian cyclicity with ovulatory estrous can be effectively induced with GnRH treatment in anoestrous Gir heifers, thereby achieving the goal of augmenting reproductive efficiency for better economic return.

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