قسم الولادة والتلقيح الصناعي
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تأثير الاستخدام المبكر للهرمون الحاث على افراز الهرمون الحاث للمناسل في فترة ما بعد الولادة على الكفاءة التناسلية في الأبقار

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أجريت هذه الدراسة على عدد أربعين بقرة في اليوم العاشر حتى اليوم الثاني عشر بعد الولادة ، وقد قسمت هذه الابقار الى مجموعتين ، اشتملت المجموعة الأولى على أربعة وعشرين بقرة حقنت كل واحدة منها عضليا مرة واحدة بواسطة ١٠٠ ميكروجرام من الهرمون الحاث على افراز الهرمون الحاث للمناسل (سيستوريلين)٠ بينما استعملت المجموعة الثانية (١٦ بقرة) كضوابط لمقارنة النتائج ، كذلك تم قياس البروجيستيرون في بلازما الدم قبل وبعد العلاج ، وفحصت الحيوانات لظهور الشبق وتشخيص الحمل بعد تركها للتلقيح الطبيعي مع الطلائق ٠

وقد أوضحت النتائج أن ٧ر٩١٪ من الحيوانات المعالجة بالهرمون أظهرت المبايض فيها حدوث التبويض في اليوم ٨ر١٨ بعد الولادة بينما كان حدوث التبويض في المجموعة الضابطة بنسبة ٨ر٦٨٪ في اليوم ٩ر٢٨ بعد الولادة ، كما أظهرت النتائج أن المجموعة المعالجة التي كان فيها التبويض مبكرا حدث فيها الحمل بعد ٥ر٨٢ يوما بعد الولادة مقارنة بالمجموعة الضابطة التي حدث فيها الحمل بعد ٤٥ر١٠١ يوما بعد الولادة ٠

كما أوضحت نتائج قياس البروجيستيرون في بلازما الدم أن نسبته كانت أقل من ٠ر١ نانوجرام /مل قبل العلاج في كلتا المجموعتين ثم ارتفعت لتصبح ٣٤ر٠ ± ٤٥ر٣ نانوجرام /مل بعد عشرة أيام من العلاج في المجموعة المعالجة بالهرمون مقارنة بنظيرتها في المجموعة الضابطة (١٣ر٠ ± ٨١ر٠ نانوجرام /مل) ٠

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EFFECT OF ADMINISTRATION OF GONADOTROPIN-RELEASING HORMONE (Gn-RH) DURING EARLY POSTPARTUM PERIOD ON REPRODUCTIVE PERFORMANCE OF DAIRY COWS

(With 3 Tables)

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SUMMARY

This field trial was perofmed to investigate the effects of early pp treatment with Gn-RH on ovarian activity and subsequent reproductive parameters in dairy cows. The study was carried out on 40 dairy cows between day 10 and 12 postpartum. The cows were randomly assigned to two groups. The first group (24 cows) received I/M injection of 100 mcg Cystorelin (Gn-RH Abott laboratories, USA), while the second group (16 cows) received a placebo and served as control. Plasma progesterone levels were determined pre and post-treatment to monitor ovarian cyclicity and establishment of luteal function. The cows were checked for oestrus and allowed freely for natural service and finally examined for pregnancy.

In the group that received Gn-RH, 91.7% of the treated cows showed ovarian cyclicity and ovulation occurred at 18.81±1.37 days pp compared to 68.8% and 28.90±2.44 days pp. in the control group respectively. The cows in the Gn-RH treated group conceived ater 82.50±3.04 days pp. Vs. 101.45±6.20 days in the control group. The plasma progesterone of cows prior to treatment was less than 1.0 ng/ml. while ten days after Gn-RH or placebo treatment, the values were 0.81±0.13 ng/ml. and 3.45±0.34 ng/ml. in the control and Gn-RH group respectively.

INTRODUCTION

The influence of early post-partum (pp) breeding on the economic effeciency of dairy cattle has been extensively studied (BRITT, 1975). Maximum lifetime production of milk and offspring can be acheived if calving intervals are 12 months or less. In order to accomplish this, cows should conceive not later than 85 days pp (BRITT, 1975). Oftenly farmers are usually asked to breed dairy cattle early pp in order to reduce days open, as shorter calving intervals result in higher average milk production per day (BRITT, 1975). Many factors, however, prevent early rebreeding (CALLAHAN, ERB, SURVE and RANDEL, 1971). It has also been shown that the frequency of the occurrence of oestrus in the early pp period appears to be related to subsequent fertility (THATCHER and WILCOX, 1973). Various hormonal treatments have been tested in an attempt to induce early pp oestrus in both dairy and beef cattle (BRITT, KITTOK and HARRISON, 1974 and NASH, BALL and OLSON, 1980).

Recently, methods aimed at initiating early pp ovarian activity have centered on the use of Gn-RH (BOSU, 1982). In the early pp dairy cow, several reports have documented luteinizing hormone (LH) release following Gn-RH administration (Schallenberger, Schams and ZOTTMEIER, 1978 and AZZAZI, KROUSE and GARVERICK, 1980). The LH release in response to Gn-RH treatment is not normally restored until seven to ten days pp (FERNANDS, THATCHER, WILCOX and CALL, 1978 and FOSTER, LAMMING and PETERS, 1980). However, Gn-RH-induced ovulation is significantly affected by follicle size and by plasma estradiol 17-beta level at the time of treatment (Kesler, GARVERICK, YOUNGGUIST, ELMORE and BIERSCHWAL, 1978 and ZAIED, GARVERICK, BIERSCHWAL, ELMORE, YOUNGGUIST and SHARP, 1980). A follicle must be greater than 10mm in diameter in order to ovulate in response to Gn-RH (GARVERICK, ELMORE, VALLAINCOURT and SHARP, 1980). It has been revealed that the pituitary gland of milked cows secretes reduced amount of LH (WEBB, LAMMING, HYAYNES, HAFS and MANNS, 1977) but not FSH (SCHALLENBERGER, et al. 1978) during the first 10 days pp. This pituitary refractoriness is overcome by time or can be overridden in dairy cows (RILEY, PETERS and LAMMING, 1981) by intermittent low dose injections of Gn-RH. This indicates that the pituitary gland when given appropirate stimuli is able to resume activity even during early pp.

This study was performed to investigate the effects of early pp treatment with Gn-RH on ovarian activity and subsequent reproductive parameters in dairy cows without puerperal complications. Plasma progesterone levels were also determined pre and post-treatment with Gn-RH to monitor ovarian cyclicity and establishment of luteal function.

MATERIAL and METHODS

This field trial was carried out between April 1986 and March 1987. Ten to 12 days pp, 40 dairy cows (Friesian cows and their crosses) belonging to a private farm at Sharkia Province were randomly assigned to two groups. Twenty four of these cows (Group A) received a single I/M injection of 100 mcg Cystorelin (Gonadorelin, Abott Laboratories, N. Chicago, Il., USA) between day 10 and day 12 pp inclusive. The remaining 16 (Group B) received a placebo and served as controls. The cows averaged 5 years of age and only cows which had experienced normal parturition were used in this investigation. All cows were milked twice daily. The internal genitalia of all cows in both groups were examined at 10 to 12 days pp by rectal palpation and heparinized blood samples were collected just before injection of Gn-RH. Following treatment the animals were examined rectally every other day to monitor ovarian cyclicity and detect ovulation. Ten days after treatment, genitalia were again evaluated by rectal palpation and blood samples were also taken. All blood samples were centrifuged as soon as possible after collection and the plasma was stored frozen at -20°C until analysed for plasma progesterone concentration by using commercial progesterone kits (Kallestad Laboratories Incorporated RIA, USA) according to ABRAHAM (1977).

The animals were checked for oestrus twice daily and two months after parturition they were allowed freely for natural service by fertile bull (20 cows/bull). Fourty five days after natural mating, the animals were checked for pregnancy.

Statistical analysis was done according to SNEDECOR and COCHRAN (1967).

RESULTS

Significant statistical differences were noticed between the two groups for all the reproductive parameters evaluated except in days from calving to first observed oestrus (table 1 & 2).

In the group received Gn-RH, 22 (91.7%) out of 24 cows exhibited cyclicity, whereas, in the control group only 11 (68.8%) out of 16 cows showed oestrus. Moreover, in the Gn-RH treated group 13 animals (54.2%) showed ovulations on the second day after treatment (13.70±0.60 days pp) and the other 9 cows (37.5%) ovulated 26.11±0.42 days pp with an overall mean of 18.81±1.37, VS. 28.90±2.44 days in the control group. Meanwhile, the cows showed earlier ovulation with Gn-RH treated group conceived after 82.50±3.04 day pp. and this was significantly less than 101.45±6.20 days in the control group. On the other hand, cows treated with Gn-RH and showed ovulation after 26.11±0.42 (9 cows), had 100.44±7.12 days period from calving to conception which is significantly more than those had earlier ovulation in the same group and nearly simulate that of control group. The overall mean of the service period of the Gn-RH treated group was 89.81±3.74 days, which is 12 days less than that of the control group, but this difference lacks statistical significance.

Regarding the plasma progesterone of cows under experimentation, it has been shown that prior to treatment (10-12 days pp) all cows had low circulating progesterone levels of 0.97±0.09 ng/ml and 0.94±0.06 ng/ml in the control and Gn-RH treated groups respectively. However, ten days after Gn-RH or placebo treatment, such values were 0.81±0.13 ng/ml and 3.45±0.34 ng/ml in the control and Gn-RH groups respectively. The latter values showed statistical difference (table 1).

Table 3, illustrates the intervals from parturition to conception in Gn-RH treated and control cows. It was evident that by day 95 pp, 18 out of 22 cows (81.8%) got conceived, while only 6 out of 11 cows (54.5%) were positively pregnant in the control one.

Table (1)
Reproductive parameters of control and Gn-RH treated cows on 10-12 days post-partum

Variable	Control	Gn-RH
No. of cows	16	24
No. of cycled cows	11	22
Interval (days)		
Calving to 1st ovulation	28.90±2.44[a]	18.81±1.37[b]
Calving to 1st oestrus	39.40±3.20	40.20±2.50
Calving to conception	101.45±6.20	89.81±3.74
Plasma progesterone (ng/ml)		
Pre-treatment	0.97±0.09	0.94±0.06
post-treatment	0.81±0.13[c]	3.45±0.39[d]

a and b sig. diff. from each other at 1% level.
c and d sig. diff. from each other at 1% level.
± Standard error.

Table (2)
Effect of earlier ovulation on the length of open days pp of Gn-RH treated cows

Parameters	Gn-RH treatment	
Calving to 1st ovulation (days)	13.70±0.6	26.11±0.42
No. of cows	13	9
Calving to conception (days)	82.50±3.04[a]	100.44±7.12[b]
No. of cows	13	9

a and b significantly different from each other at 5% level
± Standard error.

Table (3)
Interval from parturition to conception in control and Gn-RH treated cows

Interval	Control (n=16)		Gn-RH (n=24)	
	No.	%	No.	%
Less than 70 days	-	0	1	4.54
70 - 75 days	-	0	3	13.64
76 - 85 days	2	18.18	6	27.28
86 - 95 days	4	36.36	8	36.36
96 -105 days	1	9.09	1	4.54
106-125 days	3	27.28	1	4.54
126-150 days	1	9.09	2	9.10
Tatal	11	100	22	100

DISCUSSION

Prompt return to oestrus cyclicity following parturition has been recognized as a mojor factor involved in obtaining optimal reproductive effeciency. An increased number of oestrus cycles before the onset of the breeding season is related to a decrease in the number of services per conception during the breeding season (THATCHER and WILCOX, 1973). Therefore, administration of Gn-RH to pp dairy cows has been shown to stimulate the release of pituitary LH, resulting in ovulation and resumption of regular oestrus cycles (BRITT, et al. 1974 and ZOLMAN, CONVEY and BRITT, 1974).

The present preliminary results indicate that under the condition of this experiment, large single dose of Gn-RH (100 mcg) at 10-12 days pp did increase the number of cows ovulating at an average of 18.81±1.37 days following pp compared with 28.90±2.44 days

in control. Similar finding was observed by BOITI, BEGHELLI, SIMONTACCHI, OLIVIERI, CAGGIONI and MICALE (1980) and BOSTEDT, PECHE and STROBL (1980). Additionally, the interval to first oestrus in both groups of cow was closely similar. However progesterone values at 10 days post-treatment showed that Gn-RH had beneficial effect on luteal tissue induction on the ovaries of these postpartum cows, since the plasma progesterone levels markedly rose from 0.94±0.06 ng/ml to 3.45±0.34 ng/ml days following treatment with Gn-RH. These findings are parallel with observations of RICHARDSON, ARCHBALD, GALTON and GODKE (1983). Moreever, improvement in some other reproductive parameters also was noticed. The interval from parturition to conception was significantly less (82.5±3.04 days) in cows showed earlier ovulation in the Gn-RH treated group compared to control one (101.45± 6.20 days). These findings are consistent with results of BRITT, HARRISON and MORROW, (1977). BOSTEDT, et al. (1980) and NASH, et al. (1980). On the contrary, GUNZLER, SCHATZLE and SCHMIDTLINDER (1974) and KESLER, et al. (1978) have demonstrated no beneficial effects of Gn-RH administration in the early pp period.

It is evident from the previous disscussed data on the use of Gn-RH in early post partum period that the findings regarding reproductive performance are equivocal. Nevertheless, it can be deduced from the present study that Gn-RH treatment schedule might be considered economically rather beneficial and promising for future use of this drug in dairy cows as an agent enhancing pp ovarian cyclicity providing that early breeding should be applied.

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