HORMONE TREATMENT FOR OVARIAN ACTIVITY AND ITS EFFECT ON CONCEPTION IN DAIRY COWS.

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SUMMARY

This study evaluated the efficacy of Gonadotrophin releasing hormone (GnRH) analogue in combination with Prostaglandin $F_{2\alpha}$ ($PGF_{2\alpha}$) in treating ovarian inactivity and its effect on conception in dairy cows. Fifty four cows diagnosed with ovarian inactivity were divided into two groups and treated as follows: Group 1 (n=30) was given a GnRH analogue, buserelin (Receptal®, Hoechst, Germany) on Day 1 (day of first treatment), $PGF_{2\alpha}$ analogue, cloprostenol (Estrumate ®ICI, England) on day 8 and bred by artificial insemination 72 and 96 hours after $PGF_{2\alpha}$ treatment. Group 2 (n=24), was left to recover spontaneously and inseminated upon observation of oestrus. Treatments were repeated up to three times in animals that did not respond. Pregnancy rates at day 60 post insemination were lower (P,0.05) in Group 1 when compared with Group 2, but calving to conception period was shorter in Group 1. Calving to conception periods (mean ± SD) were 128 ± 34 and 152 ± 28 days in Group 1 and 2, respectively. It was concluded that hormone therapy for ovarian inactivity is not of much value as long as factors causing the disorder continue to act on the animal.

INTRODUCTION

Ovarian inactivity is a common reproductive disorder of postpartum cows (Zemjanis, 1961). It is characterized by quiescence of ovaries without palpable ovarian structures, lack of oestrous cyclicity and persistently low plasma/milk progesterone values for more than 70 days after calving (Claus *et al.*, 1983; Roberts, 1986). The causes of ovarian inactivity are multiple but the main ones include inadequate nutrition, postparturient diseases, close confinement of animals, hereditary predisposition and various stressful factors (Markusfeld, 1986; Francos and Meyer, 1988). The condition is economically important because it delays conception and consequently prolongs the calving interval (Francos and Meyer, 1988; Mujuni, 1991).

Because of its economic importance, research into treatment and control methods for ovarian inactivity has been done in many countries (El Nagar, 1977; Bostedt, 1982; Sinha *et al.*, 1987; Elmore, 1989). Hormone treatment aimed at initiating oestrous cyclicity and, subsequently, breeding of the affected

animals through artificial insemination have been tried and variable success rates have been recorded (Elmore, 1989). The most promising treatment regime appear to be that involving administration of gonadotrophin releasing hormone (GnRH) on day 1 (day of first treatment), followed by Prostaglandin $F_{2\alpha}$ on day 8 and breeding upon observation oestrus or 72, and 96 hours after $PGF_{2\alpha}$ injection. This regime has not been evaluated for dairy cows raised in Tanzania.

Dairy cows raised in Tanzania are exposed to a variety of stress factors which include high ambient temperatures, nutritional deficiencies and prevalence of debilitating haemoparasitic diseases which cause ovarian inactivity (Mujuni *et al.*, 1990). Ovarian inactivity could be a way of "sparing" the bovine organism from the severity of these stress factors (Bauman and Curries 1980). The present study was undertaken to evaluate the efficacy of GnRH in combination with $PGF_{2\alpha}$ in treating ovarian inactivity and its effect on conception on dairy cows.

MATERIALS AND METHODS

Data for this study was obtained from a field trial which was conducted among small holder dairy cows kept within a radius of 20 kilometers of Morogoro township. Morogoro is situated at an altitude of about 500 to 600 meters above sea level. It receives about 800 mm of rain per annum. Rainfall is bimodal with long rains occurring between February and May and short rains between October and November. These two periods form the wet season, whereas the rest of the year forms the dry season. Haemoparasitic diseases, namely East Coast Fever, trypanosomiasis and anaplasmosis are endemic in this area.

Adult cows over five years of age used in the present study were crosses of Friesian and Ayrshire with Tanzania short Horn Zebu. All were kept in small units of less than 10 cows each. They were kept at pasture from 09.00 to 17.00 h for grazing. Pasture grazing was supplemented by green chop composed of *Hyperrhenia rufa*, Cynanodon spp, *Panicum maximum* and concentrates when available. Supplementary concentrates feeding was done during milking. Milking was done between 07.00 and 08.00 h and from 17.30 to 18.30 h.

A total of 54 pluriparous cows were available for this study. All the cows had not exhibited oestrous signs since last calving with more than 70 days postpartum and were therefore diagnosed as having ovarian inactivity. Diagnosis of ovarian inactivity was based on results of weekly gynecological examinations which involved rectal palpation of the cervix, uterus and ovaries. In addition progesterone determination in plasma from blood samples obtained at the time of examination was done. The animals had persistently been found with small ovaries and devoid of palpable ovarian structures (neither follicle nor corpus luteum detected). They also had exhibited low plasma progesterone values of less than 1 ng/ml plasma.

Thirty cows out of 54 (Group 1) were treated with 20 μg of a highly potent (GnRH) analogue, buserelin (Receptal$^{(R)}$

Hoechst, Germany) on day 1 (day of first treatment). On day 8, the animals were given 500 μg of a $PGF_{2\alpha}$ analogue, cloprostenol (Estrumate® ICI, England) by intravulvo submucosal route, and inseminated upon observation of oestrus or 72 and 96 hours after $PGF_{2\alpha}$ treatment. Treatment was repeated up to three times in animals that did not respond.

Twenty four other cows (Group 2, control) out of 54 were not given any hormone treatment. They were artificially inseminated when spontaneous recovery from ovarian inactivity occurred and oestrous signs exhibited. Re-inseminations were done on animals returning to oestrus. Pregnancy diagnosis for both groups was by rectal palpation 60 days after last service. Pregnancy results of the two groups were compared in order to evaluate the efficacy of hormone therapy in treating ovarian inactivity.

In due course of the experiment, there occurred breakdown in tick control and chemoprophylaxis against trypanosomiasis. This was due to widespread shortage of drugs and acaricide in the country. All cows were, therefore, monitored for occurrence of these diseases for three more months after confirmation of pregnancy. The diseases included were trypanosomiasis, anaplasmosis and East Coast fever. Disease occurrence data in the above mentioned groups were compared using appropriate chi-square statistical analysis. For this purpose six cows in Group 1 that apparently did not respond to hormone treatment were excluded from the analysis. All data were analyzed according to Steed and Torrie (1980).

RESULTS

The effects of a GnRH analogue beserelin (Receptal®) and $PGF_{2\alpha}$ on conception results are shown in Table 1. Pregnancy rates resulting from hormone treatments were lower than those of untreated controls. The mean calving to conception period was shorter by 24 days in the treated group and the difference was significant ($p < 0.05$).

Haemoparasitic disease occurrence among study animals was as shown in Table 2. All animals that suffered from these diseases were lost through death or emergency slaughter. Because of the limited number of animals, statistical analysis could not be done for individual diseases. Diseases data were therefore pooled and subjected to a chi-square test (Table 2).

Table 1: Effect of buserelin and coloprostenol on conception of cows with ovarian inactivity.

Treatment Conception after	Treated (n=30)	Control (n=24)
1st treatment	9(30)	13(54)
2nd treatment	7(23)	9(37)
3rd treatment	8(27)	2(8)
No response*	6(20)	-
C-C period (days)	128±34	152±28

C-C period = calving to conception period (mean±SD); * Not included in analysis

Table 2: Occurrence of haemoparasitic diseases among study cows

Diseases	Treated (n=24)	Untreated (n=24)
Trypanosomiasis	3(13)	2(8)
Anaplasmosis	5(20)	2(8)
ECF	7(29)	3(13)
Total	15(62)	7(29)

In parentheses are percentage affected cows

Table 3: A 2 x 2 table showing the effect of hormone treatment on pregnancy in animals with haemoparasitic diseases.

	Disease +ve	Disease -ve	Total
Pregnant after			
(T)	15	9	24
(SR)	7	17	24
Total	22	26	48

X^2 (Yates corrected) = 4.11 significant ($p < 0.05$), T= after treatment, SR= after spontaneous recovery.

DISCUSSION

In this study a criterion for successful treatment of ovarian inactivity was, not only clinical cure but, a subsequent pregnancy. Based on this criterion, success rates in the treated group were lower than controls. Thirty percent of group 1 animals became pregnant after first treatment; whereas 54 percent did in group 2 and this was in agreement with findings from other workers (Kesler *et al.*, 1977; Jaeger *et al.*, 1987). Hormone treatments were less effective probably because hormone disturbances were not the primary cause but other factors causing ovarian inactivity continued to act on the affected animals. However, hormone treatment was able to reduce the calving to conception period by 24 days which was also observed by Archbald *et al.*, (1990).

The results of this study and those of Archbald *et al.* (1990) implied that hormone treatment was beneficial in reducing loss in breeding time, despite its inability to correct causative factors. The hormones used in this trial are very expensive and further studies would, therefore, be required to ascertain that the benefit accrued from reduced breeding time is not offset by the cost of treatment.

It can be concluded from the present findings that hormone therapy for ovarian inactivity is not of much value as long as factors causing the disorder continue to act on the animal.

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