

A NOTE ON THREE-DAY STEROID THERAPY FOR INDUCTION OF LACTATION IN INFERTILE HEIFERS¹

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Summary

Estradiol -17 β and progesterone at the rate of 0.1 and 0.25 mg respectively, per kg body weight per day were administered s/c to each of the five infertile heifers for 3 consecutive days i.e. days 1 to 3, and 2 mg of reserpine were followed twice daily on days 8 to 11. Results indicated that three of the treated heifers were successfully induced into lactation. Progesterone concentrations in the blood plasma and defatted milk exhibited considerable variations.

(Key Words: Cow, Induced Lactation, Estradiol, Progesterone, Reserpine)

Introduction

In general, the administration of relatively high doses of estradiol -17 β and progesterone for 7 days would induce lactation in non-pregnant, non-lactating dairy cows. That was described first by Smith and Schanbacher (1973) and has since yielded favourable results. Nevertheless approximately 20% of the treated animals failed to lactate and those animals which responded to the treatment had widely variable milk yields (Coller et al., 1975; Atheya and Sud, 1985). Lembowicz et al. (1982) reported that a much shorter (5.5 or 3.5 days) period of hormonal treatment did not significantly reduce milk yield; rather some additional advantages were observed, particularly that of the reduction in estrus-like excitement which usually is seen after long-term hormonal treatment.

The objective of this preliminary investigation was an attempt to further shorten the treatment period as much possible as could be done. It was also of interest to find whether the animals which had failed to lactate following hormonal therapy could be provoked into lactation following an

appropriate period of rest.

Materials and Methods

Five heifers, (2 Holstein-Friesian crosses, 2 Jersey crosses and 1 Sahiwal) aged between 34 to 72 months with histories of breeding problems were selected from the local farmer's dairy herd. Two of the heifers had received 7-day steroid hormones treatment for induction of lactation 70 days prior to the beginning of this study, but they had both failed to lactate. However, these two heifers were given rest of 60 days before they were subjected to the present attempt. All heifers were injected for 3 consecutive days with estradiol -17 β and progesterone at the rate of 0.1 and 0.25 mg per kg body weight per day, respectively. On days 8 to 11 they received 2 mg reserpine (s/c) twice daily. All animals were hand-milked twice daily from day 5 after the initial treatment. In 2 heifers blood samples from the jugular veins on days 0, 1, 2, 3 and 4 and milk samples on days 6, 8, 10, 12, 19, 22 and 24 were collected and used for the radioimmuno-assay of progesterone in the blood and the defatted milk as described by Kamonpatana et al. (1983) and Suli et al. (1983), respectively.

Results and Discussion

Three heifers were successfully induced into lactation while the other 2 failed to lactate. The latter were the same animals which had failed to lactate in the previous attempt as well as (table 1).

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TABLE 1. BREEDING HISTORY OF HEIFERS USED FOR INDUCTION OF LACTATION

Breed	Age (months)	Reproductive complain	Induced (+) or not (-)	Remarks
Holstein-Friesian	72	Repeat breeder	+	
- do -	56	- do -	+	
Jersey cross	40	Anestrus	-	2nd attempt of induction
do -	34	- do -	+	
Sahiwal	65	Repeat breeder	-	2nd attempt of induction

One of these heifers (failure group) yielded more than one kg milk per day from days 13 to 20 but dried off thereafter with no apparent reasons. It appears that certain so called "resistant" animals may require a different hormonal regimen for induction of lactation and this aspect needs further studies. The remaining 3 heifers produced 7.5, 6.3 and 5.0 kg milk per day on day 24 of the experiment. Success rate in this study was comparable to those reported earlier by Joseph and Pavithran (1979), Lembowicz et al. (1982) and Atheya (1984).

The blood plasma progesterone concentration before the administration of steroid hormones averaged at 1.6 ng/ml, however, it increased to about 7.4 ng/ml on day 4. The concentration of milk progesterone was high (2.4 ng/ml) on the first day of milking. This level steadily decreased to one half (1.2 ng/ml) by day 19 of the experiment and became undetectable by day 22 of milking.

Some earlier studies (Erb et al., 1976; 1977) indicate that there were considerable variations in hormone concentrations in blood, milk, urine and

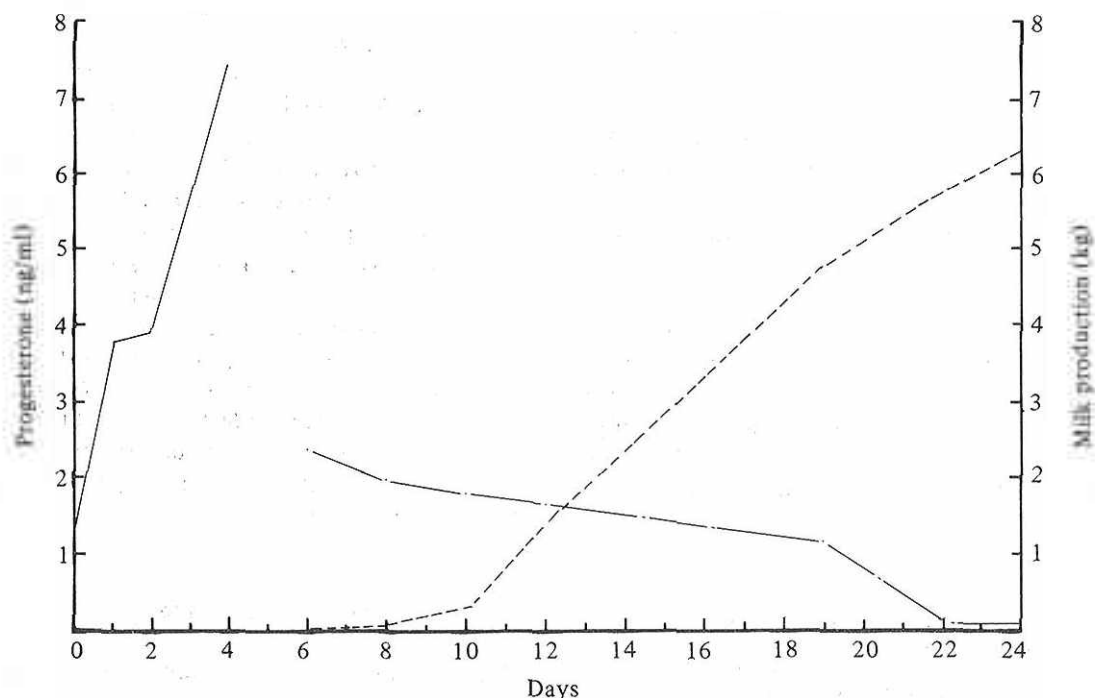


Figure 1. Mean blood plasma (————) and milk (---) progesterone and milk production (.....) in heifers induced into lactation using estrogen — progesterone.

INDUCTION OF LACTATION

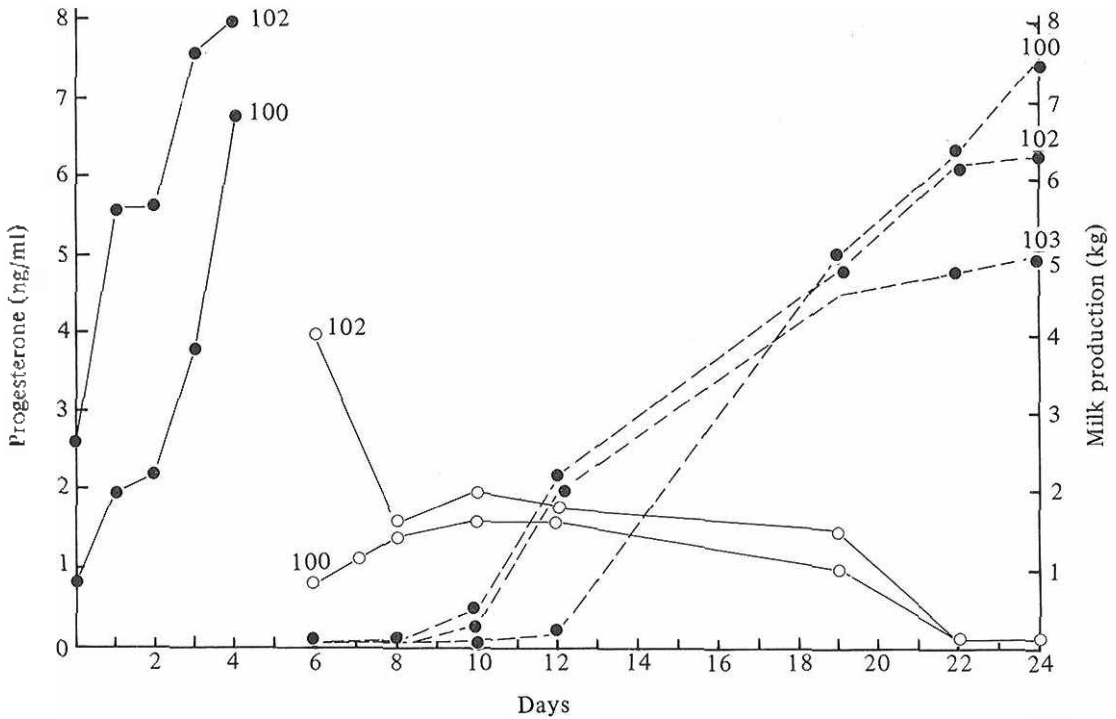


Figure 2. Blood plasma (●—●) and milk (○—○) progesterone and milk production (●---●) in individual heifers induced into lactation using estrogen-progesterone.

feces following steroid treatment for induction of lactation. In these studies levels of progesterone measured in the plasma, during days 2-7 of the hormonal treatment period, were mainly lying between 2 and 3 ng/ml. Moreover the administered steroids were found to be excreted mainly in the feces and urine, except only very small amounts were found in the mammary secretions. By the time that milking was started, about 21 days post-treatment concentrations of hormones in the milk were usually less than those normally present in pregnant cows. Harness et al. (1978) reported that the progesterone concentration in milk following the induced lactation was high and ranged between 10 and 20 ng/ml while the concentration of progesterone in milk following normal parturition was observed to be less than 1 ng/ml for the first two weeks and gradually climbed up to 6 ng/ml over the next 2 weeks. More data, thus, need to be generated particularly on milk progesterone during different stages of lactation especially from lactation induced animals.

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