HORMONAL EFFECTS ON THE DEVELOPMENT OF UDDER AND TEATS IN INTACT NONPREGNANT BUFFALO HEIFERS

BY

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ABSTRACT

The present study was carried out at the experimental farm, Department of Animal Production, Faculty of Agriculture, University of Tanta. Six intact nonpregnant buffalo heifers were used in this study. All heifers were injected subcutaneously with oestradiol-17 β (0.1 mg/kg body weight per day) and progesterone (0.25 mg/kg body weight per day) on days (1-7), where day 1 was the 1st day of injection. There was little change in the udder and teats during the 7 days of the hormonal injection. Udder and teats measurements of treated heifers at first milking were significantly ($P < 0.01$) higher than those before oestradiol-progesterone injection. Colostrum secretion was started as dripping from the teats of the treated heifers after 15.8 days of the experimental period. The mean number of experimental day to first milking was 19.2. Estrous behavior in the form of standing heat was generally detected in all treated heifers particularly on the 3rd day of the hormonal injection.

INTRODUCTION

The udder is considered one of the most important physiological and conformational characteristics of the female animal.

Lactation cycles are controlled by estrogen and progesterone (Anderson, 1974; Sud et al., 1968 and Tucker, 1974). The changes in each are synchronized for mammary development, completion of pregnancy, and lactation. Estrogen alone stimulates duct proliferation, but normal lobule-alveoler development requir5 synergistic effects of estrogen and progesterone (Anderson, 1974). In the intact nonpregnant ruminant, the ovarian steroids can be used to induce mammary growth and milk secretion (Cowie and Tindal, 1971; Erb, 1976 a,b and Flukerson, 1978). Smith and Schanbacher (1973) and Smith et al.(1971) have reported that injection of 17β-oestradiol (0.1 mg/kg body weight per day) and progesterone (0.25 mg/kg body weight per day) for 7 days can cause formation of colostrum in nonlactating and nonpregnant cows and heifers.

The primary purpose of this research is to study the hormonal effects on the development of udder and teats in intact nonpregnant buffalo heifers.

MATERIAL AND METHODS

Six intact nonpregnant buffalo heifers were chosen from the herd of Kafr El-Sheikh Agricultural Experimental Station. The average age

and weight of the heifers at the beginning of the experiment were 2.3 years and 410 kg, respectively. Heifers were free of disease and they had healthy appearance. The animals were housed in a barn with a yard. Berseem (Trifolium alexandrinum) was offered ad libitum during winter and spring while wheat straw was offered ad libitum plus 5 kg of commercial 16% C.P. concentrate mixture per head per day in autumn and summer. The six heifers were daily injected subcutaneously with 17β-oestradiol and progesterone (0.1 and 0.25 mg/kg body weight, respectively) for seven days. A stock solution for injection contained 20 mg 17β-oestradiol and 50mg progesterone per ml of absolute ethanol was prepared just prior to each series of injections and it was stored at room temperature devoid of light according to Smith and Schanbacher (1973) and Peel et al.(1978). One-half of each daily dose of oestradiol and progesterone was injected at 8oo a.m. and the remainder at 4oo p.m. for seven days. Circumference of the udder, depth of fore and hind udder quarters as well as length and diameter of fore and rear teats were measured at injection day and at day of first induced milking using a flexible metal tape. The experimental days to the initiation of colostrum and first milking were recorded (day one was represented by the first day of injection). Statistical analysis were carried out after Snedecor and Cochran (1967).

RESULTS AND DISCUSSION

There were little biometrical change in the udder and teats during the seven days of hormonal treatment. Data regarding the udder and teats measurements before injection with hormones and at day of first milking in buffalo heifers are shown in table (1).

Table(1): The measurements of the udder and teats in buffalo heifers before oestradiol-progesterone injection & at experimental day of first milking

	Measurements ($\bar{x} \pm SE$) cm	
	before injection	at first day of induced milking
Udder:		
Depth, fore quarter	--	19.00 ± 0.89
depth, hind quarter	--	21.25 ± 0.99
Udder circumference	--	44.33 ± 1.23
Teats:		
Length of fore	2.75 ± 0.10	6.17 ± 0.13
Length of rear	2.60 ± 0.09	5.68 ± 0.08
Diameter of fore	3.13 ± 0.13	5.92 ± 0.07
Diameter of rear	2.68 ± 0.08	5.68 ± 0.06

From this table, it could be seen that all the parameters showed a general trend to be changed positively at day of first induced milking. The mean udder circumference and its depth of fore and hind quarters increased from nil before treatment to 44.33 ± 1.23; 19.0 ± 0.89 and

21.25 ± 0.99 cm.,respectively at the day of first induced milking. The corresponding values for the mean length of the fore and rear teats were 2.75 ± 0.1 to 6.17 ± 0.13 and 2.60 ± 0.09 to 5.68 ± 0.08 cm.,respectively and for the mean diameter of the fore and rear teats were 3.13 ± 0.13 to 5.92 ± 0.07 and 2.68 ± 0.08 to 5.68 ± 0.06 cm., respectively.

Udder and teats measurements under consideration at first induced milking were significantly ($P < 0.01$) higher than those before oestradiol-progesterone injection. These respective variations were due to estrogen and progesterone effect upon the udder and teats development. These findings are in agreement with those obtained in cows and heifers by Cowie and Tindal (1971) and Keller et al.(1977).

Colostrum secretion was dripping from the teats of the treated heifers after 15.8 days of the treatment on the average. At that time, the udder became distended with fluid and the teats were full and turgid. The mean experimental days to first milking was 19.2 (Table.2). The present results are in agreement with those obtained in cattle by Smith and Schanbacher (1973).

Estrous behavior was generally detected on the third day of hormones injection, however Smith and Schanbacher (1973) found that standing heat in cows and heifers was detected on the second day of a quite similar hormonal injection. This little difference may be due to species effect.

Table(2): Experimental animals and subsequent response to hormonal injection.

Heifer no.	Age (yr.)	Body weight (kg.)	Experimental day to (days) first colostrum	first milking
375	2.8	400	15.0	18.0
378	2.8	420	15.0	18.0
390	2.0	420	15.0	18.0
392	2.0	430	16.0	20.0
395	2.0	390	16.0	20.0
396	2.0	400	18.0	21.0
Overall mean	2.3	410	15.8	19.2

Mac Gregor (1941) has reported that in swamp buffaloes " desire seems to cease with daylight and mating usually occurs only at night". Many buffaloes do not exhibit pronounced signs of estrous, and the incidence of silent heat is more common in the buffalo. Thus, the procedure used in this study for onset of milk secretion following seven days treatment with 17β-oestradiol-progesterone combination may be used for salvaging well-breed female buffalo which have failed to exhibit well pronounced sign of estrous. However, this recommendation requires further investigations.

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التأثيرات الهرمونية على نمو الضرع والحلمات في عجلات الجاموس البكر والغير عشـــــر .

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أستخدم في هذا البحث ستة عجلات من الجاموس البكر والغير عشـــر وجميع هذه العجلات حقنتحت الجلد بمقدار ١ ميجم/ كجم من وزن الجسم من Oestradiol-17β ، ٢٥ ميجم/ كجم من وزن الجسم من هرمون الـ Progesterone وذلك يوميا ولمدة سبعة أيام على التوالـي. وقد وجـد ان التغيرات التي طرأت على كل من الضرع والحلمات خلال هذه الايام كانت تغيرات طفيفة . وعند بداية الحليب لهذة الحيوانات تلاحظ أن جميع المقاييس الخاصة بالضرع والحلمات كانت عالية المعنوية ($P<0.01$) عما كانت عليه قبل المعاملة بالهرمونات وقد وجـــد أن بداية الحصول على المسحوب من الحلمات من العجلات المعاملة كان عند اليوم ٨ و ١٥ يوم في المتوسط وذلك من بداية الحقن بالهرمونات وكان متوسط عدد الايام من بداية الحقن وحتى اعطاء اللبن الطبيعي من هذه العجلات هو ٢ و ١٩ يوم في المتوسط .

جميع العجلات المعاملة هرمونيا تلاحظ عليها علامات الشبق الواضحة في اليوم الثالث من بداية الحقن .