

PLASMA ESTRADIOL AFTER IMPLANTING CALVES WITH ESTRADIOL BENZOATE

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Story in Brief

Forty fall-born Hereford and Angus x Hereford calves were used to evaluate the effects of estradiol benzoate-progesterone implants (Synovex-C) on plasma estradiol concentrations, average daily gain and to determine the influence of pretreatment average daily gain on the response to implants. Calves were blocked by sex and breed, ranked by their preimplanting average daily gain and allotted to implant (100 mg of progesterone, 10 mg of estradiol benzoate) or control (no implant) groups. Calf weights and plasma samples were collected on days 28 and 108 following implanting. Calves receiving implants had greater plasma estradiol concentrations than did the control calves. Plasma estradiol and average daily gain following implanting were positively correlated. No significant differences in average daily gain (ADG) between implanted and control calves were detected, however, calves receiving implants had a positive correlation between their preimplanting average daily gain and their performance following implanting. We conclude that concentrations of estradiol in the plasma of calves are increased after implanting with estradiol benzoate and progesterone, and concentrations of estradiol are correlated with gain.

(Key Words: Calves, Estradiol, Implant, Plasma.)

Introduction

The use of anabolic steroids as growth promoters is a profitable management practice. The growth rate of fall-born suckling steer and heifer calves implanted with estradiol benzoate and progesterone was increased by 6 to 7% over nonimplanted calves (Gill et al., 1986). The objectives of this study were to determine the effects of implanting calves with estradiol benzoate and progesterone on plasma estradiol concentrations, and to evaluate the influence of pretreatment ADG on the response to implanting.

Materials and Methods

Forty fall-born Hereford and Angus x Hereford calves were used in this study. Calves were blocked by sex and breed and ranked according to their 84 day pretreatment ADG then equally assigned to either a non-implanted control or implanted group. Control calves had an average initial weight of 233 lbs and a pretreatment ADG of 0.84 lbs/day. Implanted calves weighed 232 lbs at the time of implanting with a pretreatment ADG of 0.88 lbs/day. Throughout the trial all calves remained with their dams, who were maintained on native range and protein supplement.

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Implanted calves were implanted once with Synovex-C containing 100 mg progesterone and 10 mg estradiol benzoate under the skin on the convex surface of the ear. Calf weights were recorded at the time of implanting and on days 28, 42, and 108 following treatment. Blood samples were taken from calves by venipuncture on days 28 and 108 following treatment. Oxalic acid was added to blood samples to prevent clotting and samples were immediately cooled in ice. Blood samples were centrifuged and the plasma was analyzed for estradiol concentrations by radioimmunoassay.

Results and Discussion

Plasma estradiol concentrations and average daily gains of the implanted and control calves are summarized in Table 1. Sex by treatment interactions were not detected, so data for heifer and steer calves were averaged. The implanted calves had a greater concentration of estradiol in plasma than control calves on day 28 following treatment ($P < .01$). This increase in plasma estradiol in implanted calves compared with control calves was also evident 108 days following treatment ($P < .09$). Concentrations of estradiol were correlated with ADG ($r = 0.40$, $P < .1$) during the first 42 days following treatment in calves receiving implants.

Table 1. Influence of implanting on ADG and plasma estradiol.

Treatment	ADG (lbs) ^e		Plasma Estradiol (ng/ml)	
	Pre-implanting (84 Days)	Post-implanting (42 Days)	Day 28 after implanting	Day 108 after implanting
Implant	0.88	0.61	14.06 ^a	8.26 ^c
Control	0.84	0.54	7.04 ^b	6.29 ^d

^{a, b}Means in the same column with different superscripts differ ($P < .01$).

^{c, d}Means in the same column with different superscripts differ ($P < .09$).

^eNo differences ($P < .05$) were noted in ADG.

Average daily gain was not significantly influenced by implanting, however, gain tended to be greater in implanted calves. The ADG of implanted calves during the 111 day pretreatment period was correlated positively with gain during the 108 days following implanting ($r = .53$, $P < .05$).

Calves were divided into two groups; those that gained more than or less than .85 lbs per day before implanting. The response to implanting was not influenced by preimplanting ADG. During the first six weeks after treatment, implanting improved ADG by .08 lbs per day in slow gaining calves and by .09 lbs per day in faster gaining calves.

We conclude that implanting calves with estradiol benzoate and progesterone increases plasma estradiol concentrations and growth rate is correlated with concentrations of estradiol in the plasma of implanted calves.

Literature Cited

Gill, D.R. et al. 1986. Response of fall-born calves to progesterone-estradiol benzoate implants and reimplants. J. Anim. Sci. 62:37.