EFFECT OF OVARIAN AUTOGRAFT ON FEEDLOT HEIFER PERFORMANCE

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Story in Brief

Forty-five yearling Hereford heifers were (1) left intact and implanted with Synovex-H (2) spayed through the flank and autografted without implant or (3) spayed through the flank and autografted, and implanted with a Compudose implant. Eight Hereford and Hereford cross steers were implanted with Compudose. Animals were fasted for approximately 12 hours after arrival at the Hitch feedlot. Animals received normal feedyard processing. Animals from the four treatments were placed on feed in a single pen following processing and moved through the standard step up program to the final 64 Mcal (NEg) ration.

Carcass adjusted average daily gain favored, respectively, Steers (2.96); Normal implanted heifers (2.81); Implanted autograft heifers (2.47) and Non-implanted autograft heifers (2.14). Average daily gain was depressed 31.3% by autografting heifers but this was reduced to 13.8% by implanting. Rib eye area, fat thickness, kidney heart and pelvic fat, and quality grade was not affected by treatment. Minimal concentrations of estradiol in the plasma of non-implanted autografted heifers indicates that autografts did not have follicles producing significant quantities of estrogen.

(Key Words: Spay, Autograft, Average Daily Gain, Steer, Heifer)

Introduction

Spaying of heifers has been used by producers as a means of guaranteeing that animals are not pregnant and to possibly enhance animal performance as a result of elimination of estrous activity. Hastings (1984) reported a spayed heifer study employing the ovarian autograft procedure where a 1/8 inch square portion of ovarian tissue was implanted subserosally in the rumen wall. Auto and heterovarian transplants were reported by Griffin and Randel (1978) and Acosta et al. (1982). These procedures involved transplants to either the uterus or parotid regions and resulted in estrogenic production. The procedure of transplanting ovarian tissue onto the rumen wall should produce estrogenic activity into the portal circulation thereby eliminating the side effects of the autograft (Hastings, 1984). The North Dakota data indicate that spayed females, spay/autografted females and steers were processed according to treatment, implanted with Ralgro and run on grass for approximately 180 days, then subsequently placed in commercial feedlot, sorted into the respective treatments, implanted with Compudose and fed for 155 days. Daily gain results favored the implanted autografted heifers by 2.5% over steers and 13.6% over spay/implanted heifers (Hastings, 1984). These data indicate a significant improvement in profitability.

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Materials and Methods

Forty-five yearling Hereford heifers and eight Hereford and Hereford cross steers were purchased at the Guymon sale barn and trucked 10 miles to the Hitch Feedlot on January 16, 1985. All animals were fasted for 12 hours after arrival at the feedlot. The animals received routine feedlot vaccinations and were ear tagged in both ears. The heifers were pregnancy checked prior to assignment to treatment. The cattle were randomly allotted at the processing chute to the following treatments: (1) Spay/Autograft/No Implant, (2) Spay/Autograft/Compudose, and (3) Intact/Synovex-H. The steers were processed as they passed through the chute.

The heifers to be spayed and autografted were prepared for surgery prior to entry into the handling chute. Preparation involved clipping the hair and scrubbing with Novasan. Local anesthetic was administered with a multiple dose syringe. Biopsy instruments were kept in a sterile isotonic solution with gentamycin. An incision was made through the flank and the ovariectomy performed with scissors. The 1/8 square inch of ovarian tissue was then prepared for the implant. The ovarian tissue was slipped subserosally in the rumen wall two inches with alligator forceps. The incision was closed with a Cruciate suture.

Animals were individually weighed after processing and these weights were computed back to purchase weight. Initial weights by treatment are shown in Table 1. Following weighing, all treatments were placed in a common pen. Individual animal weights were again taken on day 14 to measure the effects of surgery on animal performance and each subsequent 28 days interval to slaughter. Blood samples were taken from animals at the final weighing by venous puncture and placed in heparinized tubes. Sample tubes were immediately cooled in ice. The samples were centrifuged and supernatant decanted for estrogen assay.

After feeding for 117 days, the cattle were trucked for slaughter to Booker, Texas where an attempt was made to recover the implants. The following data were collected: hot carcass weight, rib eye area, KPH, fat thickness at the 12th rib and quality grade. Live performance and carcass characteristics were compared by least squares analysis (Steele & Torrie, 1960).

Table 1. Periodic weight changes of either intact or autografted females vs. steers.

	Treatments			
	Intact Synovex-H	Spay/Autograft No Implant	Spay/Autograft Compudose	Steers Compudose
Number Animals	15	15	15	8
Initial wt, lb	606	592	614	746
ADG, lb/hd/d:				
0-14 day	.98	.28	.16	2.22
0-52 day	2.32	1.78	2.30	3.13
14-52 day	2.82	2.44	3.28	3.46
0-80 day	2.50	2.10	2.50	2.40
52-80 day	2.72	2.52	2.50	2.94
0-Final	2.60	2.00	2.68	2.70
62% carcass adjusted ADG, lb/hd/d	2.81	2.14	2.47	2.96

Results and Discussion

The steers and intact females performed for the duration of the trial as expected of quality feedlot animals (Table 1). It is evident that surgery produced a significant depression of performance, although by day 52 recovery appeared complete and gain for the next period appeared to reflect compensatory gain, especially in the spay/autograft/compudose treatment. The 117 day final weights indicate that the implanted autografted heifers were performing similarly to steers and equal or slightly superior to the intact females. However, when gain is adjusted to a equal dressing percentage, the autografted animals with or without an implant were decidedly inferior to either the intact females or steers.

Carcass parameters favored steers (Table 2). Fat thickness over the 12th rib was slightly greater, but not significantly different than the heifers. Yield grade was slightly lower than all heifer groups, but still acceptable. Seven of eight steers had quality grades of choice, but there were no significant differences between quality grades.

Among heifers, all carcass parameters were either similar or favored the intact heifers. KPH appeared to be lower in the intacts, followed by implanted autografted and the non-implanted autografted heifers.

Estradiol concentrations in plasma of animals at the end of the feeding period were influenced by treatments. Intact heifers implanted with Synovex-H had greater ($P<.0001$) concentrations of estradiol than animals on the other three treatments. In addition, heifers that were spayed/autografted and implanted with Compudose had greater ($P<.09$) concentrations of estradiol than heifers that were spayed and auto-

Table 2. Performance and carcass characteristics of steers and intact heifers -vs- spayed and ovarian autografted females.

	Treatments			
	Intact Synovex-H	Spay/Autograft No Implant	Spay/Autograft Compudose	Steers Compudose
Initial wt, lb	606	592	614	746
62% carcass adj final wt	935	842	899	1092
ADG, lb	2.81	2.14	2.47	2.96
Hot carcass wt, lb	580	522	558	677
KPH, %	2.4	2.6	2.5	2.2
Fat thickness, inches	.38[a]	.35[b]	.30[ab]	.46
REA, sq in	11.90	11.04	11.48	13.00
Yield grade	2.32	2.34	2.19	2.50
Quality grade[1]	11.93	11.86	11.57	11.88
Estradiol in plasma, pg/ml	27.6	2.5	8.5	5.4

[1]Quality Grade: 12 = C-.
[ab]Means with different superscripts differ ($P<0.05$).

grafted but not implanted. The minimal concentrations of estradiol in the spayed/autografted heifers (equivalent to the amount of estradiol present during the luteal phase of the estrous cycle) indicate that the autografted heifers did not have follicles producing significant quantities of estradiol. Concentrations of estradiol in the plasma were not significantly correlated with any of the carcass traits.

Estradiol concentrations at the end of the feeding period in all heifers were correlated with average daily gain (r=.40). The major source of estradiol in the spayed-autografted heifers was the implant with possibly some estradiol secretion by the adrenal. The greater concentrations of estradiol in the intact implanted heifers could be from ovarian follicles as well as from the implant.

The spay/autograft technique used with a normal feeding period and feedlot processing procedure does not appear to be an economically viable alternative to feeding intact females or steers.

Literature Cited

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