THE EFFECTS OF METHOD AND TIME OF CASTRATION ON FEEDER CALVES

by

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CHAPTER I

SUMMARY

Comparisons were made of a rapid ligation technique to control post castration hemorrhage with the conventional emasculator method. Time of castration after feedlot arrival was also studied. Castration in trial 1 was performed either on the day of arrival, delayed 1 week or delayed 2 weeks. Trial 2 was a comparison of castration methods only and all bulls were castrated on the day of arrival. Calves purchased as steers were considered to be the control group.

Steers gained faster than the castrates of either method in both trials ($P < .05$). However, castration on the day of arrival by the ligation method had comparable gains to those of the steers and significantly greater gains than other castrates ($P < .05$). Castration on the day of arrival using either method resulted in greater average daily gains (ADG). Calves castrated on the day of arrival had an average gain of 0.20 kg per day more than delayed castrates.

Calves purchased as steers had fewer health problems than castrated calves. There were fewer calves treated in the elastrator ligation groups than the emasculator treated groups. The greatest percent death loss occurred in the emasculator groups but no death losses were due to hemorrhage. However, there was significantly ($P < .01$) more post castration hemorrhage from calves castrated by the emasculators than those castrated by the ligation method.

CHAPTER II

INTRODUCTION

Hemorrhage following castration is common with conventional methods used on bulls arriving at feedlots. The widely used emasculator clamp which crimps the spermatic cord and vessels still allows bleeding. The need for a rapid, effective ligation technique is prevalent. Brown and Dickens (1971) reported such a technique. Staples were placed tightly on the spermatic vessels before removal of the testes. The staples are now being placed on the entire spermatic cord (Brown, 1976).

Prigge (1976) reported that when castration of feedlot bulls was delayed until they weighed 181 kg, average daily gain (ADG) was greater than when castration occurred (1) prior to shipment, (2) on arrival (115 kg), (3) delayed six weeks after arrival, (4) at 250 kg weight or (5) at 318 kg weight. Addis et al. (1973) studied time of processing in 3 trials. In trial 1, processing prior to shipment was better than on arrival or delayed processing. However, trials 2 and 3 indicated that processing on arrival was the most favorable for animal health and performance.

It has been shown that castration of feeder calves adversely affects ADG and animal health (Addis et al., 1973; Addis et al., 1974). Calves purchased as steers gained faster and had less health problems than bulls castrated after arrival.

The objectives of this study were to analyze the effects of methods and time of castration on newly arrived feedlot calves.

CHAPTER III

EXPERIMENTAL PROCEDURES

Trial 1

Two methods of castration were compared. Extirpation of the testes was accomplished in both techniques. The ligation process included exposure of the testes by removal of a large portion of the scrotum. An elastrator band was then placed on each spermatic cord as dorsal to the major convolutions of the spermatic artery as possible. The testes were removed by cutting the cord 1 to 1½ inches below each rubber ring. The emasculator method was performed by exposing the testes and removing each with the emasculator clamps.

Calves were purchased at local auctions, averaging 180.00 kg. Ninety seven steers served as controls and 104 bulls were randomly allotted to six treatment groups. Each method of castration had a subtreatment of (1) castration on arrival, (2) delayed 1 week or (3) delayed 2 weeks.

All calves were fed a 65% concentrate ration (table 1) throughout the 21 day period.

Processing, with the exception of castration, was carried out on all calves on the day of arrival in customary feedlot manner. The unhealthy individuals were treated immediately according to diagnosis. The number of days required for response was recorded.

The data were analyzed by the least-squares procedure (Harvey and Gaskins, 1972) and LSD multiple range test on the means (Steele and Torrie, 1960). Death loss, percent sickness and scrotal infection were analyzed by Chi-square tests.

TABLE 1. COMPOSITION OF DIET FED DURING
THE 21-DAY PERIOD

Ingredient	IRN	Percent composition of diet
Sorghum, milo, grnd	4-05-643	50.00
Cottonseed meal, 41%	. . .	12.00
Cotton, seed hulls, fresh	1-01-604	34.00
Texas Tech premix ^a	. . .	4.00

^a See Table 2 for composition of premix.

TABLE 2. TEXAS TECH PREMIX COMPOSITION

Ingredient	IRN	Percent composition of premix
Alfalfa, aerial part, dehy grnd, mn 17% protein	1-00-023	10.00
Sorghum, milo, grnd	4-05-643	39.53
Cotton, seeds w some hulls, mech-extd grnd, mn 41% protein mix 14% fiber mn 2% fat	5-01-617	27.00
Oysters, sheels, fine grnd, mn 33% calcium	6-03-481	5.10
Rock phosphate, grnd	6-03-945	3.80
Urea, mn 45% nitrogen	5-05-070	8.50
Salt	. . .	5.00
Trace mineral salt	. . .	0.05
Sulfur	. . .	0.05
Vitamin A, 30,000 IU/g	. . .	0.33
Chlortetracycline, 50 g/lb	. . .	0.14
Diethylstilbestrol, 2 g/lb	. . .	0.50

Trial 2

Trial 1 results indicated that ADG for arrival castrates was significantly ($P < .05$) greater than ADG of delayed castrates. Trial 2 was performed to further test the effects of castration methods, but only on the day of arrival. The emasculator method was compared to the ligation technique using elastrator bands. Trial 2 lasted 14 days.

Thirty eight steers and 85 bulls averaging 175.00 kg were used. Forty two and 43 bulls were randomly allotted to the emasculator and elastrator ligature methods respectively.

All cattle received 7 ml/kg body weight of oxytetracycline (50 mg/ml) each day for the first 3 days, as a precautionary measure. After the 3 days, only the sick cattle were treated.

A hemorrhage score utilizing visual appraisal was given each castrate. The scores were as follows: 1 = no amount from the spermatic arteries; 2 = very slight; 3 = slight; 4 = considerable loss of blood; 5 = severe loss of blood; 6 = very severe loss of blood, resulting in death.

The ration fed during trial 2 was the same as trial 1 except that ground alfalfa hay replaced the cottonseed hulls. The calves were fed twice daily, leaving feed in the bunks at all times.

The LSD procedure was used to compare means except for animal health data which were analyzed by Chi-square tests (Steele and Torrie, 1960).

CHAPTER IV

RESULTS AND DISCUSSION

Trial 1

For purposes of calculating ADG, cattle which died were considered to have an ADG of zero in all tables except those which indicate they include death loss, the death was considered as a total loss of the initial weight.

Steers gained significantly faster than all castrates ($P < .05$) with the exception of those castrated by the ligation method on the day of arrival (table 3). Other reports indicate that calves purchased as steers gain faster than those purchased as bulls and then castrated (Addis et al., 1973; Addis et al., 1974). Castrates of both methods delayed 2 weeks had slightly higher gains than those at 1 week, but these differences were not significant.

Disregarding time of castration, steers had a significantly higher ADG ($P < .05$) than either method of castration (table 4). Castration is a stress agent, as is all surgery, and results in reduced weight gains. This is in agreement with the data reported by Addis et al. (1973), Addis et al. (1974) and Prigge (1976).

On arrival castrates gained 1.10 kg per day as compared to 0.90 kg and 1.00 kg ADG for the delayed castration of 1 week and 2 weeks respectively (table 5). This was significant at the 5% level.

No death losses resulted from post castration hemorrhage. Even though there were no significant differences in death loss between treatments, it should be noted that the highest percent death loss occurred

TABLE 3. ANIMAL PERFORMANCE DURING THE
21-DAY PERIOD

Item	Steers	Emasculator			Elastrator		
		Arrival	1 wk	2 wk	Arrival	1 wk	2 wk
No. of head	97	18	17	17	17	18	17
Avg initial wt, kg	188.00	181.00	167.00	183.00	179.00	179.00	180.00
Avg daily gain, kg	1.30 ^a	1.00 ^b	0.90 ^c	1.00 ^{bc}	1.20 ^a	0.90 ^c	1.00 ^{bc}

a,b,c Means on the same line bearing different superscripts are different (P<.05).

TABLE 4. THE EFFECTS OF METHOD OF CASTRATION
ON ANIMAL PERFORMANCE

Item	Steers	Method	
		Emasculator	Elastrator
No. of head	97	52	52
Avg initial wt, kg	188.00	177.00	179.00
Avg daily gain, kg	1.30 ^a	1.00 ^b	1.00 ^b

a,b Means on the same line bearing different superscripts are different ($P < .05$).

TABLE 5. THE EFFECTS OF TIME OF CASTRATION
ON ANIMAL PERFORMANCE

Item	Steers	Time of Castration		
		Arrival	1 wk	2 wk
No. of head	97	35	35	34
Avg initial wt, kg	188.00	180.00	173.00	181.00
Avg daily gain, kg	1.30 ^a	1.10 ^a	0.90 ^b	1.00 ^b

a,b Means on the same line bearing different superscripts are different ($P < .05$).

in bulls castrated on the day of arrival (table 6). However, the increase in ADG of bulls castrated on the day of arrival did compensate for the death losses. Pneumonia and coccidiosis were the chief causes of death during this study.

Animal health was not directly related to the time or method of castration. The percentage of steers becoming sick, however, was considerably less than that of the castrates.† This is further indication that castration is a stress factor and castrates become more susceptible to infections because of this stress.

There were a great number of calves treated for scrotal infection in this study. This could possibly have been due to confinement or lack of sufficient sterilization of hands and equipment. However, table 4 shows no difference in the percent number of head treated for scrotal infections between methods of castration.

Since there were no significant differences in death losses between treatments, statistical analysis was not computed for the data found in table 9 (see appendix). It appears, however, that by including death loss, the differences would be between different treatments and also greater than those in previous tables. The elastrator castrates had an ADG of 0.50 kg greater than the emasculator castrates when death loss is included.

Trial 2

ADG for calves purchased as steers was significantly greater ($P < .05$) than the castrates (table 7). There was no significant difference between methods in ADG. However, the elastrator castrates did gain 0.20

TABLE 6. ANIMAL HEALTH AS AFFECTED BY METHOD
AND TIME OF CASTRATION

Item	Steers	Emasculator			Elastrator		
		Arrival	1 wk	2 wk	Arrival	1 wk	2 wk
No. of head	97	18	17	17	17	18	17
Treated for sickness, %	17.53	50.00	35.29	41.18	35.29	27.78	41.18
Treated for scrotal infection, %	...	22.22	29.41	17.65	23.53	22.22	23.53
Death loss, %	4.00	11.00	0.00	6.00	6.00	0.00	0.00

TABLE 7. ANIMAL PERFORMANCE DURING THE
14-DAY PERIOD, TRIAL 2

Item	Steers	Emasculator	Elastrator
No. of head	38	42	43
Avg initial wt, kg	182.00	172.00	173.00
Avg daily gain, kg	1.60 ^a	0.60 ^b	0.80 ^b

^{a,b} Means on the same line bearing different superscripts are different ($P < .05$).

kg per day faster than the emasculator castrates.

Although there were no significant differences between groups in number of unhealthy cattle, castration did cause a greater percentage of animals needing treatment. Only 1 steer was treated for sickness in this trial (table 8).

Both sickness and death loss were considerably less in this trial as opposed to trial 1. This was probably due to the administration of oxytetracycline to all cattle for the first 3 days post arrival. One calf, castrated by the emasculator method, was the only death loss in this trial. Cause of death was pneumonia.

There was no difference in the sterilization procedures in each trial. However, no scrotal infections occurred in this trial as opposed to the great number of infections in trial 1.

Post castration hemorrhage was significantly greater ($P < .01$) in the emasculator treated group than the elastrator group (table 8). The ligation by elastration was extremely effective in controlling bleeding.

Animal behavior was observed since several calves castrated by the ligation technique would lie sideways, get up and walk a few steps, then lie down again. There appeared to be pain from the tight fitting elastrator bands on the spermatic cords.

Several hundred bulls have been castrated by this method of ligation using the elastrator bands since these trials were conducted. It has still proved to be effective in the control of bleeding. However, there were 13 cases of tetanus in these animals and 5 of the 13 died. It is not known whether the cause of this disease is associated with the procedure. However, the 5 tetanus losses might warrant vaccination when

TABLE 8. ANIMAL HEALTH, TRIAL 2

Item	Steers	Emasculator	Elastrator
No. of head	38	42	43
Treated for sickness, %	2.63	14.29	11.63
Treated for scrotal infection, %	. . .	0.00	0.00
Hemorrhage score, avg	. . .	1.60 ^a	1.00 ^b
Death loss, %	0.00	2.38	0.00

^{a, b} Means on the same line bearing different superscripts are different ($P < .01$).

the elastrators are used.

✱ Under these conditions, castration by the elastrator method did reduce hemorrhage and stress in the feedlot arrivals. There was less total sickness in calves castrated by this method than those castrated by emasculation.

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APPENDIX

TABLE 9. ANIMAL PERFORMANCE INCLUDING DEATH
LOSS, TRIAL 1

Item	Steers	Emasculator			Elastrator		
		Arrival	1 wk	2 wk	Arrival	1 wk	2 wk
No. of head	97	18	17	17	17	18	17
Avg initial wt, kg	188.00	182.00	167.00	182.00	179.00	179.00	180.00
Avg daily gain, kg	1.10	0.10	0.90	0.30	0.70	0.90	1.00
Method of castration avg daily gain, kg	1.10		0.40			0.90	

TABLE 10. ANIMAL PERFORMANCE INCLUDING DEATH
LOSS, TRIAL 2

Item	Steers	Emasculator	Elastrator
No. of head	38	42	43
Avg initial wt, kg	181.00	172.00	173.00
Avg daily gain, kg	1.60	0.30	0.80