

LIVER ABSCESSSES IN FEEDLOT CATTLE

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Story in Brief

Feedlot performance from a total of 2774 feedlot steers and heifers fed in OSU research trials over the past 12 years were compiled to determine the relationship between liver abscess severity and feedlot performance and carcass characteristics. Severity scores were no abscesses, one small abscess (minor or 1), several abscesses or one moderately-sized abscess (moderate or 2) and many small or large severe abscesses (severe or 3). Eighteen percent of the total cattle had liver abscesses but only 9.7 percent had moderate and severe abscesses. Cattle with moderate and severe abscesses had rates of weight gain 2.5 and 3.7% less than those with no abscesses. They also had lower final live and carcass weights than cattle with no or only minor abscesses. The only carcass characteristic consistently altered by moderate and severe abscesses was rib eye area which was slightly reduced (by .14 to .26 square inches). Our results suggest that severity of a liver abscess dictates its impact on performance; minor liver abscesses had little impact on cattle performance, but moderate and severe abscesses reduced rate of gain and rib eye areas slightly.

(Key Words: Feedlot, Liver Abscesses, Abscess Severity.)

Introduction

Liver abscesses in feedlot cattle have been attributed to abrupt increases in intake of high-energy feeds (Brown et al., 1973). The bacteria, *Fusobacterium novotum*, a ruminal microorganism, frequently can be isolated from liver abscesses and is implicated as the causative organism. These bacteria enter the portal blood stream through lesions in the ruminal wall and imbed in the liver (Smith, 1944).

In a summary of over 42,000 cattle from the Great Plains, the liver abscess incidence was 32.9% (Montgomery, 1979). Feeding certain antibiotics can reduce the incidence of liver abscesses. The effects of abscesses on feedlot performance differs according to report, ranging from no effect (Bohman et al., 1979) to a depression in daily gain of over 5 percent (Foster and Woods, 1970). Abscess incidence may be less important than severity because abscesses vary both in number and in size. Severity can range from a single minor white spot to an open wound. Rust (1980) reported that severe abscesses reduced dressing percentage by 0.7% and increased cutability (by reducing fat cover) by 0.29%. Our report represents a compilation of data over the past 12 years to examine the effect of liver abscesses on performance and carcass characteristics of feedlot cattle relative to non-abscessed cattle fed simultaneously in the same study.

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Materials and Methods

Data from 15 feeding trials from 1975 to 1986, which included 2774 steers and heifers, were subjected to least squares analysis to determine the effects of liver abscesses on performance and carcass characteristics. Each diet was fed to 16 to 50 growing cattle. All diets were high in concentrate and generally were based on corn grain in the dry rolled, high moisture or steam flaked form. In many of the trials, tylosin was included to reduce the incidence of liver abscesses. At slaughter, each liver was examined visually and manually and scored according to the condition of liver abscess using a scoring described previously (Elanco, 1974). A score of 1 was given for one minor spot no larger than 1 inch in diameter, whereas several large or open liver wounds received a score of 3. Animal performance and carcass characteristics were compared only with cattle in the same trial fed the same ration to avoid the possibility that certain rations might increase both rate of gain and liver abscess incidence.

Results and Discussion

Least square means for animals with non-abscesses (0), a minor abscess (1), moderate abscess (2) or severe abscess (3) are presented in table 1. Averaged across all trials, the incidence of liver abscesses was 18 percent. The percentage of animals with abscess scores of 1, 2 and 3 was 8.3, 3.9 and 5.7 percent, respectively.

Averaged over the total data set, cattle with moderate abscesses had lower initial weights than the other three groups. In final live weight, the moderate and severe abscess groups weighed 10 to 30 lb less than the minor and the non-abscessed groups. On a carcass adjusted

Table 1. Least square means of performance and carcass characteristics for cattle with various degrees of liver abscesses.

	Liver Abscess Score			
	0	1	2	3
Number of cattle	2277	229	109	159
Percentage	82.1	8.3	3.9	5.7
Weight, lb				
Initial	681 ^a	684 ^a	668 ^b	682 ^a
Final, live	1106 ^a	1110 ^a	1080 ^b	1096 ^{ab}
Final, carcass/.62	1105 ^a	1111 ^a	1079 ^c	1092 ^{ab}
Carcass	685 ^a	689 ^a	669 ^b	677 ^{ab}
Daily gain				
Live basis	3.27 ^a	3.27 ^a	3.15 ^b	3.19 ^{ab}
Carcass final basis	3.26 ^a	3.28 ^a	3.14 ^b	3.15 ^b
Dressing percentage	61.97	62.08	61.91	61.79
Ribeye area, sq. in.	12.29 ^a	12.27 ^a	12.03 ^b	12.13 ^{ab}
Marbling score	13.30	13.17	13.07	13.38
KHP, %	2.45	2.43	2.41	2.41
Fat thickness, in.	.42	.42	.40	.41
Yield grade	2.78	2.74	2.68	2.72

abc Means in a row with different superscripts differ (P<.05).

basis (carcass weight/.62), final weights were from 13 to 32 lb lower in steers with moderate and severe abscesses. This calculates to a reduction for moderate and severe abscesses in live daily gains by 2.5 to 3.7%, and a reduction in carcass weight adjusted gains by 3.4 to 4.3% during the entire feeding period. Whether the abscess began early or late in the feeding period is not known though the greatest nutritional stress should be during the diet adaptation period which is the first 30 days on feed. Among the carcass characteristics, only ribeye area was decreased, being from 0.14 to 0.26 square inches less for steers which had moderate and severe abscesses. Carcass weights were 8 to 20 lb lower for steers with moderate and severe abscess scores. As all these cattle were fed in groups, no information about effects of liver abscesses on feed intake and efficiency is available. These results indicate that liver abscesses affect feedlot performance but have limited impact on carcass characteristics with minor abscesses having no detectable effect. The reduction in rate of gain by severe abscesses was considerably less than the 15% noted by Farlin et al. (1982).

The unadjusted raw means are presented in table 2. These are not adjusted to compare performance of abscessed cattle with contemporary cattle in the same experiment so statistical power is limited. Based on these raw means, an overall depression in performance also was found for animals with moderate and severe abscesses. The initial weight was 9 to 42 lb lower for moderate and severe abscess groups. Likewise, final live weight was 28 to 44 lb lower for moderate and severe abscess group than for the other two groups. On a carcass adjusted basis, final live weights were reduced by 26 to 37 lb which depressed daily gain by 4.0 to 7.3% for moderate and severe abscess groups as compared to the healthy and minor abscess groups. Adjusted daily gain was depressed significantly only for animals with severe abscesses.

Table 2. Unadjusted means of performance and carcass characteristics for cattle with various degrees of liver abscesses.

	Liver Abscess Score			
	0	1	2	3
Number of cattle	2277	229	109	159
Percentage	82.1	8.3	3.9	5.7
Weight, lb				
Initial	684 ^{ab}	687 ^a	645 ^c	675 ^b
Final, live	1116 ^a	1112 ^a	1072 ^b	1084 ^b
Final, carcass/.62	1118 ^a	1118 ^a	1081 ^b	1092 ^b
Carcass	693 ^a	693 ^a	670 ^b	677 ^b
Daily gain				
Live basis	3.31 ^a	3.26 ^a	3.13 ^b	3.07 ^b
Carcass final basis	3.33 ^a	3.30 ^a	3.34 ^a	3.20 ^b
Dressing percentage	62.13	62.34	62.49	62.46
Ribeye area, sq. in.	12.45 ^a	12.41 ^a	12.01 ^b	12.14 ^b
Marbling score	13.23 ^b	13.13 ^b	13.87 ^a	13.74 ^a
KHP, %	2.42	2.35	2.42	2.34
Fat thickness, in.	.43 ^a	.39 ^b	.37 ^c	.39 ^{bc}
Yield grade	2.70	2.62	2.60	2.63

^{abc}Means in a row with different superscripts differ (P<.05) by Duncan's Multiple Range Test.

Based on these non-adjusted means, liver abscess score slightly altered certain carcass measurements. Ribeye area was lower ($P<.05$) for those steers which had moderate and severe abscess scores. In contrast, marbling score was highest ($P<.05$) for steers with moderate and severe abscesses. Fat thickness was considerably lower ($P<.05$) for those three groups with liver abscesses compared with the non-abscessed group.

From these results, we concluded that severe liver abscesses can detectably depress performance and may reduce ribeye area and fat thickness. The slightly lower carcass weights and daily gains of moderately and severely abscessed steer may account for part of the reductions in ribeye area and fat thickness, though an increased marbling score was unexpected. When considering value versus the cost of liver abscess control, one must include as costs both the loss in value of the liver which is eventually passed from the packer back to the cattle producer, and effects of abscesses on cost of production. Differences in rate of gain from this summary were minor suggesting that abscesses should have only a minor impact on cost of production. If 10% of the cattle had abscesses which depressed gain by 6%, pen gain would be depressed by only .6% by liver abscesses.

Although effects on feed efficiency could not be monitored, it would be surprising if feed efficiency were markedly altered by abscesses with such minor changes in rate of gain. Only by inoculating animals with the abscessing organism can total costs be checked directly as antibiotics used for control may have other effects and cattle prone to abscesses are likely to be those animals with variable feed intakes and poor efficiencies. If abscesses rupture during evisceration or if they adhere to the carcass, trimming of the carcass can be excessive and costly. Though of greater direct concern to the packer than the producer, this cost, again, is eventually passed back to the producer through a discounted price for slaughter cattle.

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