

Rumenitis, Laminitis and Hepatitis in Feedlot Cattle

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Feedlot operators have shown an increasing preference for the high energy or all-concentrate method of finishing cattle. Among the factors that lead to this method of management are competitive cattle prices, high labor costs, high interest rates and a supply of relatively less expensive corn and other grains. A principal need of course is a ration that will supply the necessary nutrients for rapid gains but that can be handled entirely through a mill so as to avoid the labor needed to handle the traditional roughages.

While it would appear that such management practices are successful in many cases it seems also apparent that this type of approach to ruminant nutrition may also lead to an increase in incidence of certain types of lesions. Among these are rumenitis, liver abscesses and laminitis.

The association between liver abscess formation and ruminal lesions has been previously reported (3,6).

Likewise the relationships between the amount and quality of roughage in the ration and the development of rumen lesions has been reported (1,2,4,5).

The exact pathogenesis of the rumen lesions has not been elucidated but the generally accepted view seems to be that accumulation of, and changes in, relative quantities of fermentation end products cause an increase in hydrogen ion concentration and lead to inflammation of the rumen mucosa.

The sequence of events would appear to be: (1) inflammation of the rumen mucosa; (2) adherence of debris to the mucosa; (3) ulceration and infection of deeper layers in the rumen wall; and (4) focal abscess formation in the rumen wall.

The appearance of abscesses in the liver follows sequentially at a later date and it is our impression that laminitis is a still later sequel.

This last relationship is uncertain, however, and appears to be less well correlated with preceding events.

Other independent factors may be involved in the development of laminitis. The condition is frequently observed in cattle that have been on high-energy rations for 60-90 days and more, but one gains the impression that the incidence is higher among females and that it sometimes occurs in the absence of rumen and liver lesions.

Likewise it must be recognized that there is nothing specific about the lesions observed in the rumen or the liver and that either could arise from other causes as well.

Cattle do not necessarily become clinically ill during the early stages of rumenitis and liver abscess formation. In our studies feed consumption has been good and weight gains very acceptable for periods in excess of 100 days among animals on all concentrate rations.

It does appear that the addition of good quality hay or silage in quantities of from 10-20% of the ration will result in increased feed consumption and a resulting increase in average daily gain of approximately .5 lb. per day. (See Tables 1 and 4.)

Equally important would seem to be an improvement in quality of product through a substantial reduction in degree and incidence of rumen and liver lesions. (See Tables 2 and 3.)

TABLE 1
Treatment¹

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1. 2 lb. hay/head/day throughout test.
 2. 2 lb. hay/head/day from 0-56 days.
 3. 2 lb. hay/head/day from 0-84 days.
 4. 2 lb. hay/head/day from 0-112 days.
 5. No hay.
 6. 2 lb. hay/head/day once a week.
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¹Two liver abscess and no rumenitis cases were found among the 18 steers which were slaughtered at the beginning of the test.

TABLE 2
Liver Abscess

Treatment	56 Days ²	84 Days ²	112 Days ²	196 Days ²
	%	%	%	%
1.	<u>33.3</u>	<u>0</u>	<u>0</u>	<u>30.0</u>
2.	<u>16.7</u>	50.0	66.7	90.0
3.	<u>16.7</u>	<u>16.7</u>	50.0	100.0
4.	<u>0</u>	<u>16.7</u>	<u>33.3</u>	100.0
5.	0	50.0	83.3	80.0
6.	<u>16.7</u>	<u>50.0</u>	<u>83.3</u>	<u>91.7</u>

²Days on high energy feeding.
 roughage feeding period.

TABLE 3
Rumenitis

Treatment	Rumenitis Score ³ , Avg./Steer			
	56 Days ²	84 Days ²	112 Days ²	196 Days ²
1.	<u>.83</u>	<u>1.50</u>	<u>1.67</u>	<u>1.00</u>
2.	<u>.67</u>	3.00	3.17	3.73
3.	<u>.50</u>	<u>2.00</u>	3.67	3.89
4.	<u>.83</u>	<u>2.36</u>	<u>1.83</u>	3.90
5.	3.33	3.67	3.67	3.90
6.	<u>2.67</u>	<u>3.83</u>	<u>3.67</u>	<u>3.75</u>

²Days on high energy feeding

³0 - Normal

1 - Edema and clumping of papillae.

2 - Clumping, multiple focal erosions.

3 - Matting of papillae, diffuse erosions, abscessation, grossly thickened wall.

4 - Matting necrosis of papillae, diffuse ulceration, hair and debris adhering to mucosa, extensive thickening of wall and abscessation.

— roughage feeding period

TABLE 4
Effect of Length of Hay Feeding on the
Performance of Steers During the 0-196 Day Period

Treatment No.	Avg. Animal Wt. ¹ , Lb.		ADG lb./day
	Initial	Final	
1	479	1031	3.08
2	481	956	2.74
3	481	930	2.59
4	481	915	2.77
5	479	932	2.57
6	479	970	2.77

¹Initial Wt. is average of 30 steers per treatment and final Wt. is average of 12 steers per treatment

References

1. *Fell, B. F., Kay, M., Whitelaw, F. G. and Boyne, R.* Observations on the Development of Ruminal Lesions in Calves Fed on Barley. *Res. Vet. Sci.* 9, 1968, 458-466. — 2. *Harvey, R. W., Wise, M. B., Blumer, T. N. and Garrick, E. R.* Influence of Added Roughage and Chlorotetracycline to all Concentrate Rations for Fattening Steers. *J. Animal Sci.* 27, 1968, 1438-44. — 3. *Jensen, R., Deane, H. M., Cooper, J. L., Miller, V. A., and Graham, W. R.* The Rumenitis-Liver Abscess Complex in Beef Cattle, *Am. J. of Vet. Res.* 19, 1954, pp. 202-216. — 4. *Kay, M., Fell, B. F. and Boyne, R.* The Relationship Between the Acidity of the Rumen Contents and Rumenitis in Calves Fed on Barley. *Res. Vet. Sci.* 10, 1969, 181-187. — 5. *Rowland, A. C., Wieser, M. F., and Preston, T. R.* The Rumen Pathology of Intensively Managed Beef Cattle. *An. Prod.* 11, 1969, pp. 499-504. — 6. *Smith, H.* Ulcerative Lesion of Bovine Rumen and Their Possible Relation to Hepatic Abscesses. *Am. J. Vet. Res.* 5, 1944, pp. 234-242.