

Strategic Use of Aureomycin® in Treating Bovine Respiratory Disease

Introduction

Aureomycin (chlortetracycline) in the feed has been utilized to control bovine respiratory disease (BRD) for many years. Previously, the approved dosage for controlling bacterial pneumonia was 350 mg/head/day. On February 16, 1996, as a result of the Drug Efficacy Study Implementation (DESI) program, Aureomycin received a new approved indication for use in calves, beef and non-lactating dairy cattle: 10 mg/lb body weight for not more than 5 days for treatment of bacterial enteritis caused by *Escherichia coli* and bacterial pneumonia caused by *Pasteurella multocida* organisms susceptible to chlortetracycline. As a result of this new claim, Aureomycin can be utilized at strategic times to treat BRD.

Bovine respiratory disease accounts for 65-79% of the morbidity¹ and 44-72% of the mortality^{1,2} of feedlot cattle. While fatality rates represent significant economic loss, diminished returns due to decreased performance (ADG and FE) associated with BRD may well exceed those due to mortality. Wittum, et al.³ found that lung lesions detected at slaughter of finished cattle were associated with a reduced ADG of 0.167 lb (0.076 kg) during the feeding period. Thus, any management practice that decreases BRD at the feedlot represents a large financial gain.

Impractical to Depend on Immunization Alone

Most feedlot cattle are processed on arrival, but many still experience BRD before receiving adequate time to respond to respiratory vaccines. Consequently, control of BRD at the feedlot must begin with management practices conducted prior to arrival. The most cost effective approach would be to wean calves and administer respiratory vaccines at the ranch, allowing development of immunity before exposure to pathogens at the feedlot.

Unfortunately, the majority of calves arriving at feedlots have not received the immunizations needed for BRD control. In a cow/calf audit of Southeastern US and overall U.S. on-farm management procedures conducted by USDA:APHIS:VS: National Animal Health Monitoring Service (NAHMS), less than 23% of all Southeastern calves compared to less than 36% of all U.S. calves were immunized on-farm for IBR, BVD, *H. somnus*, PI₃, and BRSV.⁴ *Pasteurella*, a pathogen that accounts for most respiratory deaths in feedlots, received even less attention, with less than 16% of all U.S. calves receiving a *Pasteurella* vaccine prior to shipment to a feedlot or other operation (Table 1).

TABLE 1. Comparison of Southeast and overall US on-farm management practices: percent of calves up to weaning vaccinated for various respiratory disease agents.⁴

Agent	Southeast	All
IBR (%)	22.1	35.3
BVD (%)	19.8	32.7
<i>H. somnus</i>	20.4	30.3
PI ₃	21.5	32.2
BRSV	15.1	28.2
<i>Pasteurella</i>	11.7	15.2

Data Shows Efficacy of Aureomycin vs BRD

Administering antibiotics prior to shipment to the feedlot has also been utilized in an effort to reduce BRD. Texas A&M, through the Ranch-to-Rail program, conducted studies over two years to determine the impact Aureomycin might have on feedlot BRD when administered on the ranch prior to shipment.⁵ Five days before shipment, the

TABLE 2. 1996-1997 and 1997-1998 Ranch-to-Rail north: pretransit Aureomycin feeding.⁵

	1996 / 1997		1997 / 1998	
	Aureomycin at ranch	Aureomycin at feedlot	Aureomycin at ranch	Aureomycin at feedlot
	Control	Results Aureomycin	Control	Results Aureomycin
Control cattle	-	+	-	-
Aureomycin cattle	+	+	+	-
No. of steers	114	116	80	82
Initial weight (lb)	646	639	601	602
Final weight - deads out (lb)	1166	1169	1118	1127
Head treated in feedlot	27	15	32	20
Head dead	1	1	1	1
Treatments/head treated ^a	3.3	2.5	4.6	3.6
Hospital costs/head treated (\$)	26.35	20.83	26.44	19.91
Medical costs/head in (\$)	8.24 ^b	6.69 ^b	10.58 ^c	6.86 ^c
USDA yield grade	2.40	2.40	2.40	2.42
Marbling score	257	267	355	365

^aFirst line treatment duration = 48 hr/dose; therefore, 2 treatments = single pull for disease
^bIncludes approximately \$2.00/head for Aureomycin group at ranch, and approximately \$2.00/head for both control and Aureomycin groups at the feedlot
^cIncludes approximately \$2.00/head for Aureomycin group at ranch and no additional Aureomycin costs to either group at the feedlot
⁵Unpublished data. Personal communication, Ted McCollum III, PhD, PAS. Texas A&M University: Texas Agricultural Extension Service, Amarillo, TX.

calves on each ranch were gate cut into two groups of approximately equal size. One group of calves remained on the normal feeding program for the ranch. The other group of calves was fed a supplemental feed containing Aureomycin. The feed was also fortified with vitamins, A and E, potassium, copper, zinc, and selenium. Daily feeding rate provided Aureomycin at 1 g/100 lb body weight.

During the first five days at the feedyard in 1996-97, all cattle received Aureomycin in the feed (intended dosage 1g/100 lb body weight). In 1997-98, the feedlot ration was not medicated with Aureomycin. In these studies, cattle receiving Aureomycin prior to shipment experienced fewer BRD pulls, fewer treatments per head treated, and lower hospital costs per head than the control group (Table 2).

Previous Ranch-to-Rail data suggests that sick cattle receive a lower USDA quality grade than those never

treated. The lowered marbling score is in agreement with these findings. Hospital costs per head treated included only the invoiced cost of therapy and supportive treatment. Carcass values were determined assuming a 730-lb carcass with a Choice/Select spread of \$5-10/cwt and Choice/Standard spread of \$8-13/cwt. The veterinary medical costs and carcass values resulted in an advantage for the Aureomycin cattle pre-shipment in both years of \$5.13 /head and \$2.96 /head in for the 96-97 and 97-98 studies, respectively.

Assigning a "labor cost" to pull, treat, and return sick cattle to the home pen has been estimated to range from \$10 to \$40 per head or more. A \$10 per head "labor cost" would result in an additional advantage for the cattle receiving pre-shipment Aureomycin of \$1.32 /head in based upon the results of these two studies. A \$40 "labor cost" would be \$5.27 /head in Aureomycin advantage.

Those cattle considered medium to high risk for BRD on arrival may receive mass medication with injectable antibiotics. While this management practice has been shown to reduce BRD morbidity, aspects such as antibiotic cost, increased labor, stress on calves, and negative impacts on quality assurance make its use less attractive. A 56-day study on 400 lb sale barn calves conducted by Kansas State University compared the use of Micotil® 300 (tilmicosin phosphate) injection on arrival to Aureomycin administered for the first 5 days after arrival, as well as processing on arrival (day 1) to delayed processing (day 21).⁶ In this study, Micotil (day 1 processing) and Aureomycin (day 1 processing) reduced BRD morbidity similarly compared to controls (no mass medication, day 1 processing). Cattle fed Aureomycin responded to BRD treatment as well as cattle in the Micotil and control groups. With respect to feed efficiency and average daily gain, cattle that received Micotil and processed on day 1

were similar to cattle fed Aureomycin and processed on day 1. The total cost of Aureomycin for the 5 days should approximate \$1.30 per calf, while the cost of Micotil in this study was \$7.50 per calf (Table 3).

Conclusions

Most bovine respiratory disease occurs during the initial phases of feeding, but can occur following any period of stress. The work of Wittum³ suggests that cattle can suffer from pneumonia without exhibiting clinical signs, and that determining which cattle are suffering from BRD can be difficult. Stressors, including weather changes, sorting, and processing may induce subclinical pneumonia to become clinical. Mass medication with Aureomycin at 10 mg/lb BW during times of stress effectively treats those afflicted with clinical and subclinical pneumonia, thereby reducing BRD and the subsequent performance losses.

Bovine respiratory disease can affect calves at various times, and the strategic application of Aureomycin at 10 mg/lb BW for 5 days can be an effective management tool in reducing its effects.

TABLE 3. Influence of delayed processing and mass medication with either Aureomycin or Micotil on health and growth of highly stressed calves (day 1 processing only).⁶

	Micotil	Controls	Aureo.	Contrast Micotil vs Aureo.
No. pens	8	8	8	
No. cattle	86	85	87	
Performance				
Initial wt (lb)	424	417	421	0.31
Final wt (lb)	561	545	561	0.98
Feed intake (lb/d)	13.31	12.85	12.76	0.07
Daily gain (lb)	2.46	2.3	2.51	0.58
Feed/gain (lb)	5.48	5.71	5.23	0.21
No. dead	0	1	2	0.3
Initial Sickness				
Sick (%)	59.4	79.2	61.2	0.84
Rectal temp (°F)	104.2	104.3	104.5	0.23
Subjective score	1.33	1.44	1.6	0.01
No. treatments	1.21	1.26	1.31	0.44
Day of sickness	13.4	5.3	6.2	0.01
Repeat Sickness				
Sick (%)	27.5	30.7	29.8	0.83
Rectal temp (°F)	103.7	103.9	103.9	0.7
Subjective score	1.49	1.49	1.45	0.9
No. treatments	1.15	1.48	1.29	0.55
Day of sickness	16.9	15.8	17.1	0.95

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