

# Student Clinical Report

## Prophylactic Treatment of Feedlot Calves at Processing with a Long-Acting Oxytetracycline

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### Summary

Feedlot operators commonly face the highest morbidity and mortality in calves within the first few weeks of their arrival at their feedlots. The objectives of this investigation were to determine whether or not a single injection of sustained action oxytetracycline (oxytet LA) given to all calves at processing is economically beneficial, and second, whether or not this regimen would change the disease and/or death patterns in these animals. 1083 calves between 500 and 800 pounds arriving at a southern Alberta feedlot during November, 1985, were used in this trial. One half of the calves in each truckload (processing group) were given a single prophylactic intramuscular injection of 6 gms of oxytet LA; the other half were not medicated at this time and thus served as control animals.

Treatment rate for the medicated group was 58.7% versus 66.2% for the control group. A mortality of 2.2% was observed in the medicated group, and a significantly higher mortality of 6.0% in the control group. Morbidity occurred earlier and more frequently in the control group. There was a large reduction in average total health cost per head in the medicated group; the net benefit was \$16.30 (Can.) per head.

### Introduction

In the feedlot situation, morbidity and mortality reach the greatest levels in the first few weeks after calves arrive, and 75% of the disease is due to Bovine Respiratory Disease (BRD) (1).

**The objectives of this investigation were to determine if an injection of sustained action oxytetracycline at processing affects subsequent morbidity and mortality. Results of other investigations have been published in which unaffected animals in a pen were treated prophylactically when morbidity in that pen reached a certain level (1, 2).**

The use of prophylactic antimicrobials may be one way to reduce disease and/or death loss during this time period. Long-acting oxytetracycline has been shown to reduce morbidity and mortality in pens with high levels of respiratory disease (1, 2, 3). Sustained action oxytetracycline

(oxytet. LA) has been shown to be equally as effective against shipping fever as repeated doses of conventional oxytetracycline preparations (3, 4, 5). This drug is a preparation containing 200 mg/ml oxytetracycline in an aqueous 2-pyrrolidone solvent.<sup>1</sup> Minimum inhibitory concentrations in the blood are sustained for 3-4 days after a single dose of 20 mg/kg due to controlled precipitation at the intramuscular injection site. The drug is also reported to be effective against other diseases such as mastitis, actinobacillus, footrot, and leg and joint infections (6).

### Materials and Methods

Data was collected from a southern Alberta feedlot on 1083 calves. The calves were between 500 and 800 pounds and entered the feedlot during November of 1985 in truckload groups. These groups became the processing groups. During processing, each calf received a vitamin A D injection, warble treatment, IBR, PI<sub>3</sub>, haemophilus and clostridial vaccinations, an ear tag, and a brand. In addition, the first half of each processing group was medicated with 20 mg/kg of oxytet LA, with the other half acting as unmedicated controls. Several processing groups were combined into each pen ensuring complete contact between medicated and control animals. Four pens were studied in the trial: three of approximately 300 animals each, and one of approximately 150 animals.

Morbidity was measured by the number of sick animals pulled at the discretion of feedlot personnel that had a temperature greater than 105° F. All animals that died were necropsied. All treatments, deaths, and post-mortem results were entered into a computer data base. The costs involved in this trial were calculated as follows: a) The cost of death loss was determined as the product of the buying price (cost per pound) and the weight of the animals at death.

b) The cost of drugs used to treat sick animals from either group was calculated by multiplying the per treatment cost of each drug by the number of treatments.

c) The cost of one prophylactic treatment of 30 ml of oxytet LA (200 mg/ml) at processing was the wholesale price of \$3.50 (Can.).

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<sup>1</sup>Liquamycin LA, Rogar STB, 200 mg/ml oxytetracline.

The following parameters were compared between the two groups:

- a) Morbidity
- b) Mortality
- c) Average total health costs per head.
- d) Average death costs per head.
- e) Average drug cost per head.
- f) Average days from processing to treatment.
- g) Case fatality risk.
- h) Average days of treatment per head pulled.

Cumulative morbidity and mortality curves were constructed to examine the patterns of disease and death in the two groups. Also, the economic benefit resulting from the use of oxytet LA was calculated. The results from parameters (a), (b), (f), (h) were analyzed statistically by using the z test. Parameter (g) was analyzed with the Chi-square test.

### Results

The morbidity for the oxytet LA medicated group was 58.7% as compared to 66.2% in the control group. The benefit was more pronounced in view of mortality of 2.2% in the medicated group, and a significantly higher mortality of 6.0% in the control group.

Results for the two treatment groups are tabulated in Table 1.

**There is a large reduction in average total health cost per head in the medicated group. This difference from the control group is mainly due to the decrease in the medicated group's average death cost per head. The medicated group's lower average drug cost also contributed to a lower average total health cost.**

TABLE 1. Various indices and values in Oxytetracycline LA and control groups.

| Index                                      | Oxytet LA Routine Routine Processing | Control: Routine Processing Only |
|--|--------------------------------------|----------------------------------|
| Number of Animals                          | 547                                  | 535                              |
| Mortality (%)**                            | 12 (2.2)                             | 32 (5.0)                         |
| Morbidity (%)*                             | 321 (58.7)                           | 355 (66.2)                       |
| Ave. Total Cost/Head                       | \$26.47                              | \$46.27                          |
| Ave. Death Cost/Head                       | \$11.23                              | \$28.71                          |
| Ave. Drug Cost/Head                        | \$15.24                              | \$17.56                          |
| Ave. Days Proc.-Treat**                    | 16.1                                 | 13.6                             |
| Ave. Days Proc.-Death**                    | 37.9                                 | 21.7                             |
| Case Fatality Risk**                       | 3.7                                  | 9.1                              |
| Ave. Days Tx Per Head Pulled <sup>ns</sup> | 5.9                                  | 6.1                              |

ns = no significant difference  
 \* = significant (P < 0.05)  
 \*\* = highly significant (P < 0.01)

The cumulative morbidity curves shown in Figure 1 and the histogram in Figure 2 demonstrate that in both groups the greatest number of treatments occurred in the first 2-3 weeks. This early pattern of BRD is described by others (7).

Figure 1: The number of days between processing at arrival and time of initial treatment for Bovine Respiratory Disease (BRD).

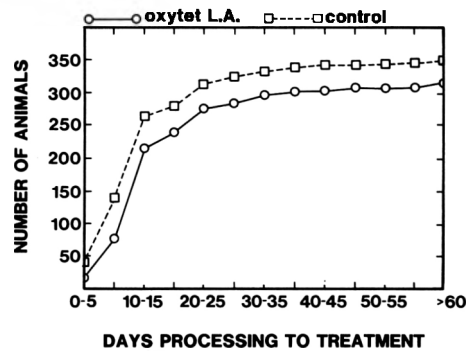
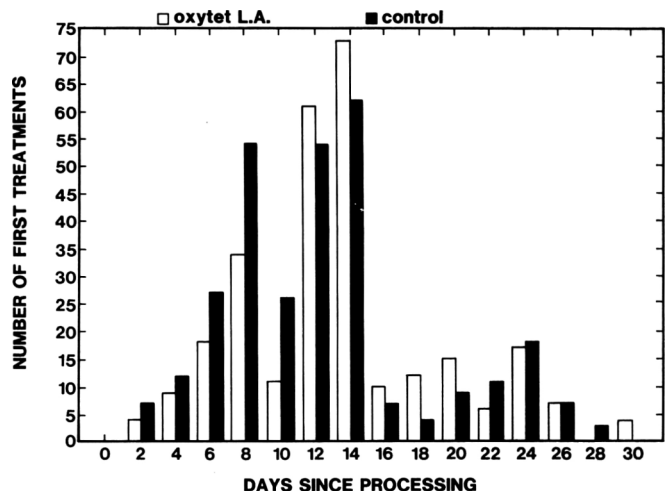


Figure 2: Initial treatment for Bovine Respiratory Disease compared to the number of days since arrival at the feedlot.



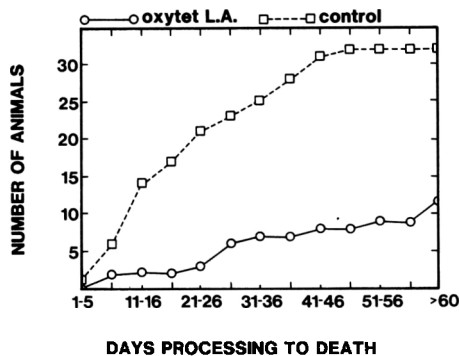
It is also apparent that disease occurred earlier and more frequently in the control group as compared to the medicated group. The fact that it took longer for disease to affect the medicated group is further emphasized by the significant increase in the average number of days from processing until treatment (Table 1).

The cumulative mortality curves shown in Figure 3 and the histogram for a shorter time period in Figure 4 show the difference between mortality in the two treatment groups. Fewer animals died in the medicated group, and mortality was very low for the first three weeks. In comparison, over half of the deaths in the control group has occurred in this same time period. In analyzing the average number of days from processing, mortality occurred after a significantly longer period in the medicated animals (Table 1). As a result of the decrease in mortality in the medicated group, the reduction in the case fatality rate for this group was also highly significant (Table 1).

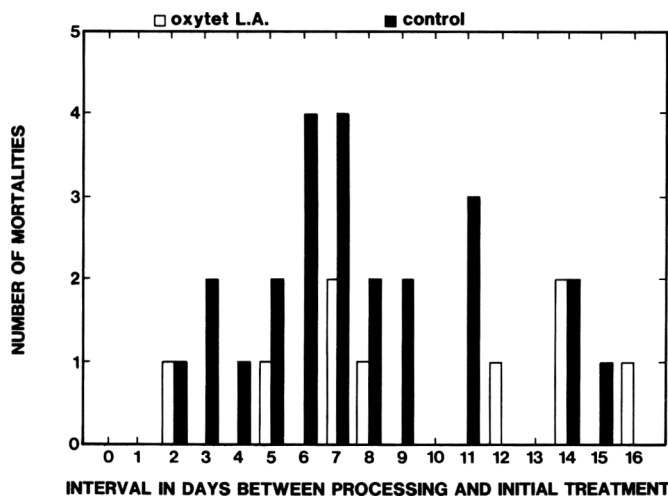
In comparing the total health costs between the two groups, the benefit of medicating the calves at processing with Oxytet LA was calculated to be \$19.80 (Can.) per head. If the cost of a single treatment of Oxytet LA is deducted

from this figure, there is an overall benefit of \$16.30 (Can.) per head.

**Figure 3: Interval between processing upon arrival and mortality.**



**Figure 4: The number of mortalities as compared to the day when first treatment was initiated.**



### Discussion

The main goal of this investigation was to determine whether or not this feedlot operator would gain economically by injecting oxytetracline LA in calves at processing. The economic advantage of using Prophylactic injection with sustained action oxytet in feedlot calves has been shown as beneficial in a previous investigation (2). However, the advantage shown in that study was primarily due to a 13% improvement in average daily gain in the medicated group as measured over a short period of time. As well, the prophylactic regime was not instituted until a 6-10% treatment was observed. The apparent increase in average daily gain in calves prophylactically treated with oxytetracycline LA has been reported in other studies as well (1, 3, 5, 8). However, other literature discounts these increases in average daily gain seen over the short term of the studies arguing that over the total period spent at the feedlot, compensatory gains seen in calves after recovery make up for the earlier losses (7).

The relevance of the economic advantage found in our

investigation when medicating calves with oxytetracycline LA at processing must be determined before making recommendations to the feedlot operator. In this investigation, several factors differed from those normally seen at this feedlot. Most importantly, two of the four pens studied had very high disease levels, thereby increasing the morbidity and mortality rates above normal values for this feedlot. The fact that the greatest advantage from the oxytet LA medication was seen in these high morbidity ("wreck") pens could mean that our results had a magnified beneficial effect.

Consequently, a recommendation to use oxytet LA prophylactically in all calves entering this feedlot, without regard to the time of year they enter; may not always be justified. Also, since factors such as morbidity, mortality, weather, and feed and management practices change from feedlot to feedlot, this recommendation may not apply to other feedlots either. However, since a definite economic advantage was revealed in this investigation, further studies should be conducted to evaluate this medication principle under more widespread feedlot conditions. It would also be useful if pens needing prophylactic medication could be accurately selected rather than routinely applying the medication to all.

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### Keywords:

prophylactic medication, BRD, Oxytetracycline LA, BRD treatment, antimicrobial, prophylaxis, economics, altered resistance, morbidity, mortality, case fatality, health cost, death cost, drug cost.

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