

# Efficacy of Tulathromycin and Oxytetracycline on Reducing the Incidence of Otitis Media Caused by *Mycoplasma bovis* in Preweaned Holstein Dairy Calves

D.C. Sockett, DVM, MS, PhD, DACVIM<sup>1</sup>; S.A. Jicinsky, BS<sup>1</sup>; T.J. Earleywine, PhD<sup>2</sup>; B.L. Miller, PhD<sup>2</sup>; T.E. Johnson, BS<sup>2</sup>; J.D. Olson, DVM, MS, DACT<sup>3</sup>

<sup>1</sup>Wisconsin Veterinary Diagnostic Laboratory, University of Wisconsin, Madison, WI 53706

<sup>2</sup>Land O' Lakes Inc., Webster City, IA

<sup>3</sup>Pfizer Animal Health, New York, NY

## Introduction

The Land O' Lakes Research facility in Webster City, IA conducts trials on three- to five-day-old Holstein bull calves purchased from sales barns located in Wisconsin. Calves are sold to producers after completion of the research trials. During the past seven years, *Mycoplasma bovis* has reduced the value and number of saleable calves primarily due to otitis media and sub-clinical pneumonia. To better understand the transmission dynamics of *M. bovis* and the potential therapeutic benefit of prophylactic antimicrobial drugs, a study was initiated to evaluate calf growth, health, treatment costs and isolation rate of *M. bovis* from the pharynx of calves housed at the facility.

## Materials and Methods

Upon arrival, blood was drawn for serum immunoglobulin determination by the zinc sulfate turbidity method. One hundred and twelve calves with similar immunoglobulin levels (roughly 1,000-1,2000 mg/dl) were randomly selected from each row in the barn and sampled 1, 14 and 28 days after arrival using the deep pharyngeal swab technique. In addition, 27 calves that developed otitis media had the purulent exudate draining from the external ear canal sampled as well. Samples were placed in bacterial transport media and shipped over-night to the Wisconsin Veterinary Diagnostic Laboratory for *Mycoplasma* testing. Suspect *Mycoplasma* colonies were speciated by the colony immunoblot method. Calves were randomly assigned to one of four possible treatment groups which were: 1) no treatment (control); 2) long-acting oxytetracycline (OTC) at day 1 and 7; 3) tulathromycin (TUL1) at day 1 and day 7; and 4) tulathromycin (TUL2) at day 14 and 21 after arrival. The dosage of the antimicrobial drugs was per the manufacturer's recommendations. Calves were fed a commercial, medicated milk replacer. Total weight gain, calf starter and milk replacer intake, treatment costs, respiratory scores and the presence or absence of otitis media was recorded daily for all the calves participating in the study.

## Results

*Mycoplasma bovis* was isolated from the pharynx of 8 of 112 (7.1%) calves upon arrival at the facility, whereas *M. bovis* was found in 51 of 107 (47.7%) of the calves at 14 days and 77 of 107 (72.0%) calves at 28 days post-arrival. There was a significant increase in the isolation rate of *M. bovis* from the pharynx of calves ( $P < 0.001$ ) during the study. There was no relation between the isolation of *M. bovis* from the pharynx and prior treatment with antimicrobial drugs. *M. bovis* was isolated from the exudate of 21 of 27 (77.8%) calves with otitis media. Twenty-seven of 95 (28.4%) control calves developed clinical otitis media whereas 18 of 87 (20.7%) of OTC, 9 of 96 (9.4%) of TUL1 and 15 of 90 (16.7%) of TUL2 calves developed otitis media. There was a significant reduction in the incidence of otitis media for both the TUL1 ( $P < 0.01$ ) and the TUL2 ( $P < 0.04$ ) treatment, but not for OTC ( $P < 0.12$ ). The total weight gain for the first 4 weeks of the study was 21.34 lb (9.68 kg) for the control calves, 22.44 lb (10.18 kg) for the OTC calves, and 25.55 lb (11.59 kg) for the TUL1 calves and 25.15 lb (11.41 kg) for the TUL2 calves. Only the TUL1 ( $P < 0.01$ ) and TUL2 ( $P < 0.02$ ) calves had a significant increase in weight gain when compared to the control calves. Calves with clinical otitis media gained 38.69 lb (17.55 kg) during the 42 day feeding period whereas non-otitis media calves gained 49.01 lb (22.23 kg) ( $P < 0.01$ ).

## Significance

*Mycoplasma bovis* was rapidly and efficiently transmitted between calves at the calf raising facility. The first cases of otitis media were observed 20 days after arrival with the peak number of new cases occurring 27 days after arrival. While prior treatment with tulathromycin did not reduce the frequency of isolation of *M. bovis* from the calf's pharynx, it did reduce the incidence of otitis media and led to improved weight gain in the calves during the feeding period. It appears that early treatment with tulathromycin (at least 14 days in advance) is required to markedly reduce the incidence of otitis media caused by *M. bovis* in preweaned Holstein calves.