A clinical picture of a naturally occurring *Mycoplasma bovis* outbreak in dairy steers

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Introduction

Mycoplasma bovis (*M. bovis*) causes serious disease in cattle worldwide, characterized by pneumonia, conjunctivitis, arthritis and mastitis. Antemortem diagnostics may help guide management of calves with *M. bovis* pneumonia, but detailed results have not been described. This report described the clinical and diagnostic progression of a naturally occurring *M. bovis* outbreak.

Materials and methods

Twenty-three 2-month-old weaned single source Holstein steers were transported ~8 hours, given metaphylactic tulathromycin (2.5 mg/kg subcutaneously [SC]), group drylot housed, and fed 14% grower ration with ad lib hay. Unexpectedly, 1 month later the calves naturally acquired subclinical pneumonia identified by transthoracic ultrasound (TUS) and were subsequently enrolled in research to develop a novel respiratory diagnostic test. Examination occurred daily for pre-established signs of severe disease requiring treatment or euthanasia. Clinical signs (Wisconsin score, > 5 abnormal), complete blood counts (CBC), and TUS lesions were evaluated daily. Lung consolidation of ≥ 1 cm^2 was considered abnormal. On d1, d5, and d9, thoracic radiographs and endoscopic endotracheal aspirates (ETA) were performed. Day 1 ETA were cultured for aerobic bacteria and mycoplasma. On d14, all calves were treated based on a defined TUS lesion score; mildly affected calves received enrofloxacin once (12.5 mg/kg SC) and severely affected calves received florfenicol (40mg/kg SC q 96 h) until resolution of TUS lesions. Calves were weighed on arrival (d-35), d18 and d96.

Results

Two animals were treated for severe disease and excluded. In the remaining 21 calves, d1 physical exams indicated few signs of disease with one calf febrile (rectal temperature > 103 °F), and no Wisconsin scores > 5, there was evidence of subclinical pneumonia since 24% had leukocytosis (12-15 x 10^3 cells/µl, normal 4-12), 14% had radiographic abnormalities, and 29% had abnormal lung consolidation. Seventy-one percent of calves had a Wisconsin score of 5 or greater by d14. Lung radiographic changes revealed a worsening pneumonia affecting 13.6% on d1 and 62% on d9. Similarly, TUS scores worsened affecting 95% on d14. The elevated WBC counts observed on d1 were normal by d7. Day 1 ETA culture revealed the presence of *Mannheimia haemolytica* in 3 calves, *Pasteurella multocida* in 3 calves, and *M. bovis* in 6 calves. Other bacteria isolated included *Moraxella osloensis* in 6 calves, *Bibersteinia trehalosi* in 2 calves, and *Streptococcus suis* in 2 calves. Given relatively mild clinical signs with lung consolidation in most calves, *M. bovis* was considered the main causative agent. ETA cytology and *M. bovis* PCR results are pending. At d14, 13 calves were treated with a single dose of enrofloxacin, while 8 received florfenicol q 96 h. On the 14-day recheck, 2 florfenicol-treated calves and 4 enrofloxacin-treated calves had > 4 cm^2 lung consolidation. These calves were treated with florfenicol (40 mg/kg SC q 96 h) for 14 days, then all calves discontinued treatment and were turned out to pasture. On d96 re-check TUS revealed one calf with 1 cm^2 and another calf with 3 cm^2 lung lesions. From d-35 to d18, average daily gain (ADG, lbs/day) was 2.2, from d18 to d96 ADG was 2.7, and from d-35 to d96, ADG was 2.5. No calves died or were euthanized.

Significance

Unexpected naturally occurring disease allowed a detailed description of a pneumonia outbreak associated with *M. bovis* infection. The significance of isolation of *M. osloensis* from several calves is unknown. To our knowledge, no report has described CBC, TUS, radiographic and ETA findings collected over multiple days from several calves in a *M. bovis* outbreak. CBC findings did not represent the severity of TUS or radiographic lesions. TUS scores increased until treatment was initiated and resolved after treatment. Calves with severe TUS lesions recovered completely, but some required a long extralabel course of treatment which may not be cost-effective.

