

Mycoplasma bovis infection on a South Canterbury dairy farm

MERLYN HAY
Vetlife Oamaru

Introduction

On 22 July 2017 *Mycoplasma bovis* infection was diagnosed on a South Canterbury dairy farm. This was the first time *Mycoplasma bovis* has been diagnosed in New Zealand.

Previously surveillance was undertaken in 2009 (McDonald *et al.* 2009) consisting of a random cross-sectional survey of bulk tank milk from dairy herds in New Zealand based on regionally proportioned sampling, weighted towards herds with a high bulk tank milk somatic cell count (BTSCC). This was used to detect *M. bovis* at a between-herd prevalence of 2%, with 99% confidence. *Mycoplasma bovis* was not detected in any of the 244 bulk tank milk samples by either PCR or culture. This survey provided further evidence that at this stage *M. bovis* was not present in the dairy cattle population in New Zealand.

Mycoplasma bovis is endemic in the cattle population in most of the developed world. *Mycoplasma bovis* was first isolated from Australian cattle in the 1970s but wasn't recognised as causing significant disease until 2006, and although low numbers of farms have been infected some of those farms have incurred significant losses as a result of this disease. Although there is evidence that it has been successfully eradicated (Bicknell *et al.* 1983) from individual farms it has never been successfully eradicated from a country once infection has been established.

This disease is recognised as causing a range of symptoms. The most common clinical manifestations are listed as (Maunsell *et al.* 2011):

- **Mastitis** – One to four quarter mastitis that causes a drastic reduction in milk production, secretions vary from mildly abnormal to gritty or purulent. This mastitis does not respond to treatment and doesn't usually improve with time
- **Pneumonia** – Considered to be the most common presentation of the disease in Europe and the Americas. Can occur in any age cattle but is particularly associated with calves being artificially reared and beef cattle in a feed lot situation. Clinical signs are not specific and include fever, tachypnea, dyspnea and decreased appetite.
- **Otitis media** – Seen in calves and feedlot cattle. Ear pain is evidenced by head shaking and scratching or rubbing ears. Head tilt is the most common clinical sign seen but severely infected animals can exhibit nystagmus, circling and ataxia
- **Arthritis** – Cases tend to be sporadic and are often

concurrent with cases of pneumonia and mastitis. Clinical signs are typical of septic arthritis. Large rotator joints are commonly infected though other joints such as the fetlock can be involved. Poor response to treatment is a common feature.

- **Other less common clinical signs** associated with *Mycoplasma bovis* infections include keratoconjunctivitis, meningitis, decubital abscesses, cardiac disease and genital disorders.

Case background

The farm involved is a 1,000 cow milking farm in South Canterbury. Calving occurs on a quarterly basis with about 250-350 cows calving each quarter. The cows are milked in a 60 bale rotary shed and depending on the time of the year and stage of lactation they are predominantly housed near the shed in two large barns. Cows are dried off two months before the start of each calving date and they spend two months at the neighbouring run off on pasture before calving and returning to the barn. This is a high input system and cows are fed a total mixed ration with a base of whole crop silage. The farm does have a low level *Staphylococcus (Staph) aureus* mastitis problem which was currently well controlled with the bulk tank SCC sitting between 150,000 and 250,000. The management structure consists of lower order sharemilkers and the farm is part of a large corporate farming group that owns 16 other farms in the same area.

At the beginning of June 2017 the farm managers contacted their veterinarian to express concerns about an unusual forelimb lameness they were observing in some of the milkers in the barn at this stage there were six cows affected. On examination these cows were found to have swollen painful unilateral front fetlock. Cultures of synovial fluid were negative and x-rays and dissection of affected limbs yielded no further diagnosis. These cows didn't respond to rest or therapy and continued to be non-weight bearing lame over the following weeks. Further cases drifted in during these weeks, without exception all the cases had one fetlock joint infected. None of these cows had concurrent mastitis.

The unusual signs which were noted during this period were:

- A number of dry cows observed with an atypical four quarter mastitis when bought in for rotovect vaccination one month prior to calving. Cultures taken from five cows at this time were negative.
- Cows calving 2-3 weeks early with small premature looking calves that failed to thrive.

- Initially all calving cows from this group presented with a four quarter mastitis. Again five cultures taken from these cows were negative.
- A spike in BTSCC and clinical mastitis cases from the milking cows in the barn. Samples from five of these cases cultured two staph aureus and three no growth.
- The mastitis was unresponsive to any treatment, while the udders were hard and painful the cows were clinically bright, not pyrexia and had good appetites.

A potential connection was made between the cases of non-responsive arthritis and the cases of non-responsive mastitis. Consequently the Ministry for Primary Industries (MPI) was contacted and a request for *Mycoplasma bovis* testing was made. Twelve mastitic milk samples, three bulk milk samples and two joint samples were obtained and sent for testing. All of these samples returned positive results for *Mycoplasma* using a PCR test and sequencing confirmed *Mycoplasma bovis* infection.

Clinical outcome

- Of the 380 dry cows due to start calving 27 July 2017 over 200 of them calved with four quarter mycoplasma mastitis.
- Thirty five cases of mycoplasma arthritis, without exception these were all from the lactating cow group in the barn. They all had one front fetlock affected and none of them had concurrent mastitis.
- Approximately 100 cases of mycoplasma mastitis from the lactating cows out of the barn. These cows generally had one or more quarters affected.
- The calves born to mycoplasma mastitis dams potentially exhibited two distinct syndromes. A neonatal development syndrome where the calves appeared small and premature. They were initially vigorous but after a few days seemed to fade and failed to respond to rearing or they appeared healthy and normal at birth but then after a about a week stopped feeding, spent time mock sucking and basically faded away, these signs were considered to be consistent with meningitis. Over 100 calves were euthanized for exhibiting what appeared to be a congenital mycoplasma infection.

Discussion

The clinical picture consisted of unilateral fetlock arthritis. Four quarter mastitis in dry or calving cows. One quarter plus non responsive mastitis in lactating cows and an apparent congenital infection in calves causing prematurity and meningitis. Throughout the entire case there was no pneumonia, no abortion and no otitis media seen in any class

of stock on the farm.

The calf situation was particularly interesting, while there is one reference to congenital mycoplasma infection in calves (Stipkovits *et al.* 1993) the clinical picture that it describes consists primarily of a severe polyarthritis. This is different to what was seen in this case. Six calves were born with carpal/fetlock arthritis or developed it within the first 24 hours of life. This was only a small part of the clinical picture where disease in calves consisted primarily of prematurity or a dummy calf type syndrome attributed to meningitis which started at about 5-7 days of age.

Conclusion

The virulence and rate of disease that *Mycoplasma bovis* caused on this farm was unprecedented and a similar outbreak hasn't been described in overseas literature. The cow loss as a result of *Mycoplasma bovis* infection on this farm was absolutely catastrophic.

The discovery of an exotic disease on this farm was very unexpected and it was the combination and severity of clinical signs initially seen that contributed to a timely diagnosis. The presence of this disease has resulted in an increased awareness in biosecurity protocols across the affected district. At the time of writing the disease appears to have been contained by the quarantine restrictions placed when diagnosis was confirmed. If this continues to be true then eradication of *Mycoplasma bovis* from New Zealand may be an achievable outcome.

References

- McDonald WL, Rawdon TG, Fitzmaurice J, Bolotsovski I, Voges H, Humphrey S, Fernando K, Canagasebey Y, Norton RN, McIntyre L.** Survey of bulk tank milk in New Zealand for *Mycoplasma bovis*, using species-specific nested PCR and culture. *New Zealand Veterinary Journal* 57(1): 44-49, 2009
- Bicknell SR, Gunning RF, Jackson G, Boughton E, Wilson CD.** Eradication of *Mycoplasma bovis* infection from a dairy herd in Great Britain. *The Veterinary Record* 112(13): 294-297, 1983
- Maunsell FP, Woolums AR, Francoz D, Rosenbusch RF, Step DL, Wilson DJ, Janzen ED.** *Mycoplasma bovis* Infections in Cattle. *Journal of Veterinary Internal Medicine* 25: 772-783, 2011
- Stipkovits L, Marietta RADY, Glavits R.** Mycoplasma Arthritis and Meningitis in Calves. *Acta Veterinaria Hungarica* 41(1-2): 73-88, 1993