


Calf Rearing Fact Sheet: Calf health

Salmonella

Key Points

1. Salmonella is caused by a gram negative bacteria that causes acute intestine infections in the calf and humans.
2. The bacteria can survive in the calf shed environment for long periods of time.
3. Predisposing factors for calves are stress and poor immunity in intensive rearing units.
4. Prevention ensures calves get colostrum, minimising stress and maintaining good hygiene and spraying regimes within the shed.
5. Salmonella can appear in calves from 2-12 weeks of age. Younger calves are much more vulnerable than those older than 12 weeks.
6. Speed of treatment is critical to survival of the individual calf and to stop the spread of the disease through the shed.
7. Treatment of clinical cases involves antibiotics and aggressive electrolyte replacement.

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General

- Salmonella is a gram negative, non spore forming bacteria that causes acute intestinal infection in both humans and animals. In extreme cases, calf rearing facilities can experience high levels of morbidity (sickness) and death rates as high as 100%. Because it can spread to humans, care needs to be taken when handling sick animals.
- The Salmonella bacteria is capable of surviving in the environment, and can remain infectious for many months in semi-dried faecal material that frequently gets left behind when calf sheds are not cleaned out properly. However, Salmonella are susceptible to drying and sunlight.
- The main varieties are S. *typhimurium* and *S. brandenburg*. *S. brandenburg* was identified in New Zealand in 1999 and is a particularly aggressive variant which is infective at much smaller doses and spreads more rapidly than *S typhimurium*.
- Salmonellosis is increasing in New Zealand, largely as a result of intensification. The disease is usually endemic with sporadic outbreaks. Stress on the calf and low levels of maternal antibodies (inadequate colostrum) are factors that lead to outbreaks of the disease.
- Diagnosis of the disease is by laboratory analysis of faecal samples (from at least 5-6 calves) and is important in establishing an effective treatment and management plan.

How is it spread and why does it kill the calf ?

- Salmonella usually affects calves from 2-12 weeks old and is mainly spread when infected calves ingest bacteria present in the environment, or in feed or water. After ingesting the bacteria, incubation time is typically 1-5 days.
- The Salmonella bacteria produce enterotoxins that are very invasive and damaging to the gut lining. This damage causes severe loss of fluids and electrolytes into the gut lumen resulting in dehydration and death.
- The enterotoxins create inflammatory changes which also result in the bacteria entering the bloodstream and circulating through the body. This results in septicaemia which allows bacteria to lodge in other organs of the body like the brain, bone, lungs and liver causing blood poisoning and death.
- Scouring causes fluid and electrolyte loss and severe dehydration resulting in death. Initially Salmonella will need to be confirmed with a lab diagnosis to determine the treatment plan with your veterinarian. The key to managing an outbreak is early identification of infected calves so that they can be treated promptly with parenteral antibiotics and supportive fluid replacement.The disease is aggressive and calves die from dehydration. Mortality rates are high and intensive care and treatment is needed to prevent losses.

What are the signs of the disease?

- During each feed it is important to cast an eye over each calf to identify any potential signs of illness. These may include-
    - Hanging back from the feeder/reluctance to come in and feed,
    - Reluctance to drink, fussing with teat, coming off teat,
    - Drinking slower than normal,
    - Wet tail,
    - Pale yellow scour – can sometimes be watery and bloody.
- Septicaemia can occur in newborn calves that are >1 week of age. The illness can be very sudden in onset and calves are often found dead in the pen. Calves have a marked depression in appetite— a lack of enthusiasm to suckle is often one of the first symptoms. Calves can have a high temperature (40.5-41.5°C) with death occurring in 24-48 hours. The faeces may range from profuse to moderate diarrhoea. Central nervous signs, ocular lesions and polyarthritis may be seen and these animals may also suffer from pneumonia. Mortality rates may reach 100%.
- Acute enteritis is the most common form of the disease in older calves (2-6 weeks of age). Initially there is a fever (40.4 - 41.5°C), followed by a brown pasty scour that leads to a severe watery diarrhoea. The temperature often returns to normal at the onset of diarrhoea and can be subnormal at the time of checking. The calf is anorexic and depressed. The faeces have a putrid, foul odour and may contain shreds of mucous membrane and clots of blood. The calf may be hunched with abdominal pain and straining. Affected calves rapidly become dehydrated, quickly lose condition and become weak and emaciated. Calves that die do so within 2-5 days, become more and more dehydrated.
- In less severe cases or chronic enteritis, the faeces may merely become a pasty consistency, yellowish-grey in colour but with little evidence of the dramatic changes that accompany the acute form of the disease. These animals commonly grow slowly and potentially become carriers by shedding the bacteria in the faeces.

What are post-mortem findings?

- Post-mortem examination can be important in diagnosing Salmonella. Most animals exhibit marked haemorrhagic enteritis, often accompanied by severe necrosis of the ileum and large intestine. Gut contents are smelly, watery and contain mucous or blood. There is often a pseudo-membrane in the lumen of the intestine. The lymph nodes around the mesentery are congested, enlarged and may be haemorrhagic.

What is the prognosis and treatment?

- Definitive diagnosis is by demonstrating the presence of salmonella in a bacterial culture of the faeces. However in calves, excretion of the bacteria is often intermittent, even in those animals that show symptons. This means it is advisable to sample the faeces from 5-6 animals to obtain a good diagnosis.
- The key to managing an outbreak is early identification of infected calves so that they can be treated promptly with antibiotics and electrolytes. Delays result in irreversible damage to the gut and the animal becoming severely dehydrated— at this stage death can occur even with appropriate antibiotic and fluid therapy. Antibiotic treatment is usually sufficient provided it is initiated at an early stage.
- Salmonellosis is aggressive and mortality rates can be high if antibiotic treatment is not initiated early. Intensive care and feeding with quality electrolytes are needed to prevent losses.

How do we prevent it?

- Ensure the shed is thoroughly cleaned out at the end of each season and sprayed regularly with a disinfectant.
- Maintain a high standard of hygiene in the shed and thoroughly clean and disinfect equipment such as feeders, especially equipment used in the sick pen.
- Minimise all stress on the calves especially during transport.
- Avoid overcrowding—during transport and in calf sheds.
- Ensure calves have received adequate colostrum at birth.
- Vaccination of cows, 8 and 3 weeks before calving will help protect the calves via their mothers' colostrum.