Salmonellosis in Feedlot Cattle

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Take Home Message

✓ Salmonellosis in feedlot cattle is an important but uncommon disease. The disease has been recognized only recently as a significant feedlot problem in Alberta.

✓ Salmonellosis in feedlot cattle is most often caused by Salmonella typhimurium DT104, and this bacteria is often resistant to multiple antibiotics. This disease is infectious to humans.

✓ Once introduced, control and prevention of this disease can be costly and difficult. The disease is usually spread by carrier animals and it is seen most frequently during times of stress.

✓ Salmonellosis is a provincially reportable disease in Alberta. Suspect cases must be reported to the Alberta Provincial Veterinarian in the Alberta Department of Agriculture Food and Rural Development. Testing for salmonellosis is carried out free of charge by the Alberta Food Safety Division Laboratory.

Introduction

The Salmonella species of bacteria can cause illness in most animals, including cattle, poultry, swine, sheep, and humans. Contact with infected animals or the consumption of contaminated foodstuffs, including beef, poultry, pork, and milk products, have been identified as the source of many human outbreaks of Salmonella infections in various parts of the world (1). The presence of Salmonella spp. in the intestinal tract and manure of slaughtered animals poses a risk of contamination of animal carcasses and products in packing plants.

In recent years, it appears the number of Salmonella infections, and particularly Salmonella typhimurium DT104 infections, are increasing in both humans and animals. In the United States, the overall isolation of Salmonella typhimurium from human cases has substantially increased from 1990 to 1996 (2). In addition, the percentage of human Salmonella typhimurium DT104 isolates in the US has increased from 7% in 1990 to 32% by 1996 (3). Of greatest concern to public and animal health
agencies is the dramatic increase in the number of *Salmonella typhimurium* DT104 isolates from both human and animal cases that are commonly resistant to at least five antimicrobials, including ampicillin, chloramphenicol, streptomycin, sulfonamides, and tetracyclines (3, 4). In the United Kingdom, this increase of *Salmonella typhimurium* DT104 was seen, but recently it appears to be on the decline. Some phage types do appear and disappear over time.

Salmonellosis in feedlot cattle was recognized as a distinct and significant disease in Alberta in 1996 (7).

### Causes and Spread

Salmonella bacteria survive well in the environment, particularly in the presence of organic matter (e.g. manure). It will survive in a moist shady place for very long periods (4). Heat, sunlight, and most disinfectants will kill the Salmonella bacteria with direct contact once all the manure is cleared away.

The source of the infection is usually difficult to determine, although carrier animals introduced into the herd are considered the most common source. Contaminated feed, water or objects, other animals (domestic or wild), birds, rodents, and flies are also possible sources (6).

Direct animal-to-animal spread occurs by the exposure to and consumption of even small amounts of contaminated manure. Indirect spread can also occur with contaminated feed or water supplies.

It should be stressed that infection with Salmonella alone does not always cause disease, and cattle may be carriers of Salmonella without any noticeable problems. Usually poor sanitation or stress is needed to trigger an outbreak. Other diseases or temperature fluctuations may also be important factors in an outbreak.

### Clinical Forms of Disease

All ages of cattle can be infected with *Salmonella typhimurium* DT104. Diagnosis can only be confirmed with the culturing of the bacteria from manure or affected tissues. Affected feedlot animals are commonly in thin condition (photo 1) or are sudden deaths. Animals have elevated temperatures and are often very dull. Many cases of feedlot Salmonellosis have an unusual form of chronic suppurative bronchopneumonia with abscesses (photo 2) present. Kidney infarcts (photo 3), liver necrosis or abscesses, enteritis with diarrhea (photo 4) are also seen (7).
As mentioned before, a carrier state can exist in feedlot cattle where the animal will not have any sign of disease. This is not Salmonellosis. Salmonellosis implies that the animal is clinically ill.

Treatment and Control

Some Salmonellae are resistant to many antibiotics (2). Treatment and control of Salmonellosis in a feedlot should be supervised directly by your veterinarian. Recovery may be slow and mortality rates are difficult to predict. Cattle are often culled due to unthriftiness and poor condition (6).

Proven control measures include (6):
• avoid the use of hospital pens for processing of newly arrived animals;
• pay careful attention to the cleanliness of feed and water sources;
• restrict the movement of cattle and personnel handling cattle so as to prevent the spread of the disease;
· isolate sick animals as much as possible because they are shedding large numbers of bacteria that quickly contaminate the environment;
· dispose of carcasses by burning or burying in a timely manner to prevent further spread of disease by wild and domestic animals or water run off.

Since Salmonellosis can be carried and transmitted by wild rodents and birds and because subclinical carriers may be in a herd, it is often very difficult to completely clear this condition once it has established itself in a herd or facility.

Prevention

Effective preventative measures include (5):
· regular removal of manure in areas where animals congregate (around feed bunks and water sources);
· regular cleaning of all facilities in the processing area and the hospital pens;
· feed and water sources should be kept off the ground to avoid manure contamination;
· avoid mixing of newly arrived cattle with animals on feed;
· access to feed storage areas by possible carrier animals, such as wild birds and mice, as well as dogs and cats, should be prevented;
· pets, such as dogs and cats, should have restricted contact with livestock and animal facilities;
· prevention of salmonella using vaccines has shown mixed results and cannot be universally recommended at present.

Provincial Reportable Requirements

Salmonellosis in any species is reportable in the province of Alberta (8). This is because Salmonellosis can affect humans. The newly emerging multiple drug resistant forms of Salmonella typhimurium are a serious threat to human health.

If you suspect Salmonellosis in your cattle you are required to report this disease to the Provincial Veterinarian. This is best done through your Feedlot Veterinarian.

Diagnostic testing for Salmonella will be carried out by the provincial government at no charge for bonafide suspect cases. All follow-up testing deemed necessary by the provincial government will be provided at no charge. Any other testing will be subject to established laboratory fees.

Once confirmed, a government veterinarian will contact both the producer and herd veterinarian to warn of the risks to human health, to advise on how to prevent the spread to other animals, and to notify the owner of their legal responsibilities.
Under Alberta law, animals that are known to be infected with Salmonella may not be sold without first informing the purchaser of the infection (8).

If cattle are known to be infected with Salmonella and are to be shipped for slaughter, they must be shipped directly to the plant and the packing plant should be notified beforehand. This is required on all animals known to be positive for Salmonella, even if they are not showing signs of Salmonellosis.

References


8. Designated Communicable Diseases Regulation - Section 11 of the Livestock Diseases Act (LDA) and the Alberta Regulation 94/82

All photos are courtesy of Dr. Mejid Ayroud of the Airdrie Animal Health Lab.