Lameness in Feedlot Cattle

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Take Home Message

Lameness is a clinical sign of many diseases. In the case of some of these diseases, such as mucosal disease, lead poisoning or hemophilus septicemia, lameness is only a coincidental sign. Although these signs may be uncommon, they should not be ignored when investigating a lameness outbreak in a feedlot.

The majority of lameness in feedlot cattle is caused by painful conditions affecting the feet. Pain is an important and debilitating stressor that reduces feed intake, causes loss of body condition and may reduce the animal's resistance to infectious diseases. The economic importance of lameness is usually underestimated. Apart from the cost of medication, there are labour costs, reduced performance and salvage slaughter of chronically lame animals. The inability of a sick animal to compete can have numerous unforeseen outcomes, such as bullying or accidental trauma caused when the animal is recumbent.

Introduction

Accurate estimates of the national incidence of lameness are not available for feedlot cattle. Anecdotally, it is known that in some feedlots there is an extremely high incidence of lameness, while in other operations, lameness is of little importance. Two major disease problems must be considered, laminitis and foot rot.

Laminitis

Clinical Signs

Laminitis occurs in varying degrees of severity. In the most acute or painful form, the animal may behave in a peculiar manner, such as crawl around on its knees or cross its legs. The pain can cause the animal to sweat, breath heavily and spend a great deal of time lying down.

The more common, less severe (subacute) form of laminitis often goes undetected in well-bedded yards. The affected animals may walk 'carefully', but will appear lame when forced to walk on concrete.

Cause

Laminitis or founder is believed to be caused by poisons which form in the second stomach (rumen). Following rapid changes in the diet, the environment in the rumen becomes very acidic and this causes some of the organisms normally present in the rumen to die. The disintegration of the organisms releases poisons into the blood stream. As a result, the blood vessels in the claws swell, causing pain and damage to the tissues that produce the horny shoe. These same changes also occur in other organs, such as the liver and kidneys. While these changes in other parts of the body do not in themselves cause disease, they do reduce performance and increase the animal's susceptibility to other diseases. The cause of laminitis is not quite as simple as described above because a number of different 'risk factors' are involved.

Energy (Total Digestible Nutrients: TDN). It is probable that animals between 8 to 12 months of age are more susceptible to high levels of energy intake than are animals from 12 to 16 months of age. TDN fed at levels over 72% should be considered as a potential risk factor. The form in which energy is fed is also important. Highly digestible carbohydrate, such as barley, can cause problems to animals if it is introduced suddenly into the feed of animals that have been backgrounded on forage. Gradual increments of the barley component of the ration and very careful bunk management are recommended. Finely ground corn or corn with a high moisture content are potential risk factors.

*Forage***.** The amount and quality of forage fed are as important as the energy component. The risk of laminitis increases as the percentage of forage in the ration decreases. The acid detergent fibre (ADF) component of the forage acts as a buffering agent which counteracts the acidity generated in the rumen by highly digestible carbohydrates. Usually hay and straw have good-to-reasonable buffering qualities. Some silages may be deficient in buffering capabilities if they were harvested during fast-growing stages.

*Protein***.** Generally protein does not play a major role in the onset of laminitis in feedlot cattle. When levels exceed 16% crude protein (CP) in the ration, the excess may be converted to amino acids in the rumen and then metabolized as energy

by the liver. CP in excess of 21% may be encountered in fast-growing forage crops. When this is the case, the condition of the animals should be monitored carefully as conditions analogous to 'grass founder' in horses can occur.

*Particle Size***.** The theoretical length of cut (TLC) should provide at least 25% of the particles greater than 5 cm long. Small particle size reduces the effectiveness of the fibre in the ration.

*Buffers***.** The addition of buffers at 0.75% of the total dry matter may be useful with some forages. Alfalfa is generally more forgiving with regard to ruminal acidosis. The pH of alfalfa silage may be 4.5-5.0 as compared to corn or grass silage, which may be 3.5-4.0. When offered at levels higher than 1.0%, buffers tend to affect the appetite.

*Nitrate***.** High levels of nitrate may be found in drinking water or in silage that has been harvested from heavily manured or fertilized land. Nitrate is highest in fast- growing crops. Nitrate is converted to the toxic nitrite in the rumen. Although nitrite toxicity is uncommon, it does occur occasionally and can exacerbate the other factors that may contribute to laminitis.

Acclimatization. When first introduced to the feedlot, cattle are subjected to a number of stresses, such as nutritional stress. In any situation, dominant animals will seek a greater share of the available feed. This may be a factor if some animals are older than others or if light-framed breeds are mixed with those of a heavier body type. It probably takes 28 days for the ruminal environment to adapt to a feedlot ration. Ad lib feeding within this period should be considered as a potential risk factor. During the acclimatization period, it is prudent to increase the TDN content of the feed gradually.

Treatment

If laminitis is present occasionally in feedlot animals, the associated loss may be acceptable. Treating individual feedlot animals affected by laminitis is not cost effective. If the condition is severe, salvage slaughter is recommended.

Control

When this disease does appear, it may indicate that the feedlot ration is not optimally efficient. This may be a clue to poor bunk management (and poor feed conversion) such as a rapid increase in high-energy diets or a mix-up in the rations

being fed. Laminitis in breeding stock is serious because the tissues of the feet are permanently damaged. Long term damage is of no importance to animals that will be slaughtered in the short term. However, the presence of pain affects weight gain.

Prevention is better than a cure. The operator must learn to monitor the risk factors and to adjust nutritional management when clinical signs appear.

Foot Rot

Clinical Signs

The foot swells very rapidly, producing considerable pain and acute lameness. Sometimes the body temperature rises and the animal goes off feed and loses body condition. The skin between the claws rots and a typical foul smell is produced. The toe joint may become infected through an open wound between the claws. In such a case, it is usually prudent to slaughter a feedlot animal. Cows and calves can often be salvaged by amputation of the affected claw. In recent years 'super foul' has been reported. The foot swells up extremely rapidly without any damage being observed between the claws.

Cause

Foot rot is caused by bacteria (*Fusobacterium necrophorum and Bacteroides melaninogenicus*) that enter abrasions between the claws. These bacteria are discharged into the environment from the rotting tissue between the claws. In addition, the causal organisms can live and possibly multiply in the gut. The environment is further contaminated when animals pass manure.

Treatment

Foot rot responds well to label doses of antibiotics (cephalosporins, tetracycline, ampicillin, etc.) and sulfa drugs. If an animal has not improved clinically within twenty-four hours after treatment, there are three possible explanations. Either the animal does not have foot rot, the choice of antibiotic was poor, or the infection has moved into the joint. It must be remembered that increased dosage also implies increased withdrawal times.

According to Bartle and Preston, footrot, even though it was successfully treated, was found to initially reduce steer gains. Steers then compensated and, if the initial gain reduction was less than 10%, no differences in overall average daily weight gain (ADG) were found between steers treated for footrot and those without footrot.

Control

A vaccine (Volar) is available, but has not yet been proven to be cost effective in feedlot animals. Medication for feed can be prescribed by veterinarians, but its efficacy and cost effectiveness are questionable.

The hygienic condition of pens should be reviewed. Some pens may be more problematic than others. Drainage, particularly in front of feed bunks, should be evaluated. Elevated, well-strawed areas help to keep animals away from bacterial infection. Summer cleaning of pens followed by spraying with 10% industrial formalin, where its use is permitted, is believed to reduce the level of contamination. Formalin is, however, extremely irritant and cattle should not be exposed to spray areas unless the yard has been rested for two weeks and the sprayed area has been thickly covered with bedding.

If it is possible to isolate the first affected animals in a pen, it may be possible to avoid the pen from becoming contaminated. However, this process tends to be labour intensive.

Conclusion

Lameness in feedlot cattle can cause considerable economic losses. Laminitis is a disease that can be avoided if the causative risk factors are understood and appropriate control measures are instituted.

Photographs

Photo 1. A case of foot rot that has progressed to septic infection of the toe joint. The lump between the claws is proud flesh that marks the site at which infection entered the joint. Care should always be taken to protect the space between the claws if a tissue damage is excessive.

Photo 2. Veins lying just beneath the skin of the limbs swell when an animal has acute laminitis.

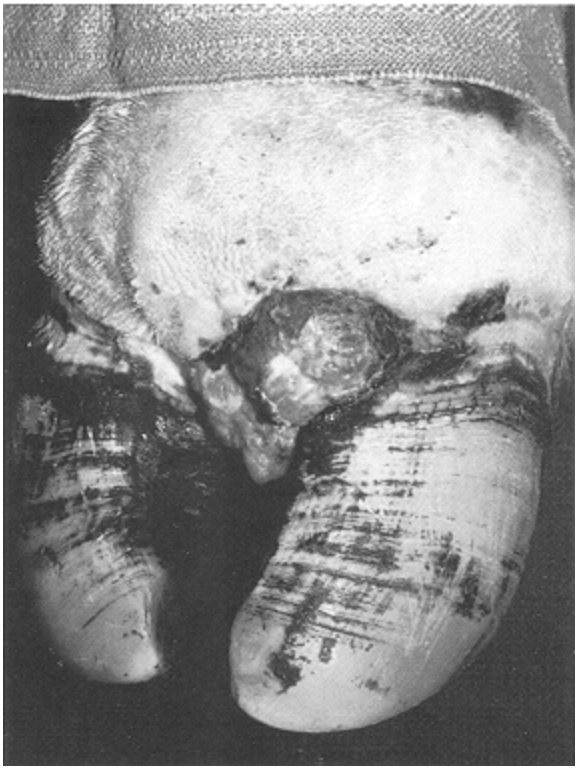
Photo 3. An animal with pain (in the case an abscess) in the outside hind claw will swing its leg away from the midline.

Photo 4. Animal with pain on its inside claw may cross its leg. This is typical of laminitis.

Photo 5. Sudden introduction to concentrate feeding will cause congestion in the toe region. In this case the tip of the toe bone is starting to press down into the sole. This is a very painful stage of subacute laminitis.

Photo 6. The tip of this claw appears to be normal and represents the preweaning period in the life of a steer. The region closest to the skin grew during the period that the animal was in the feedlot. The diet was barley and straw.

Photo 7. Steers with very acute laminitis will crawl around on their knees to relieve the pain in their feet. (Dr. Eugene Janzen)



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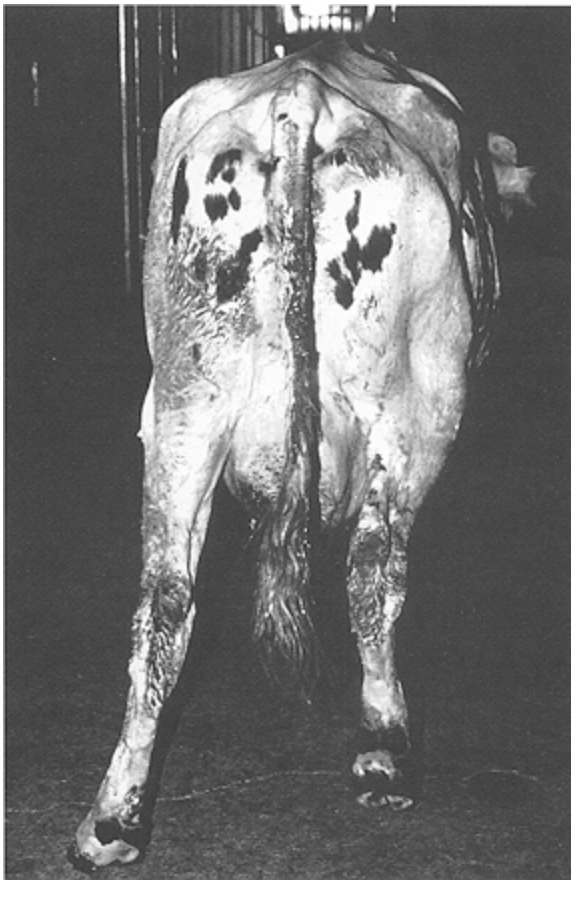

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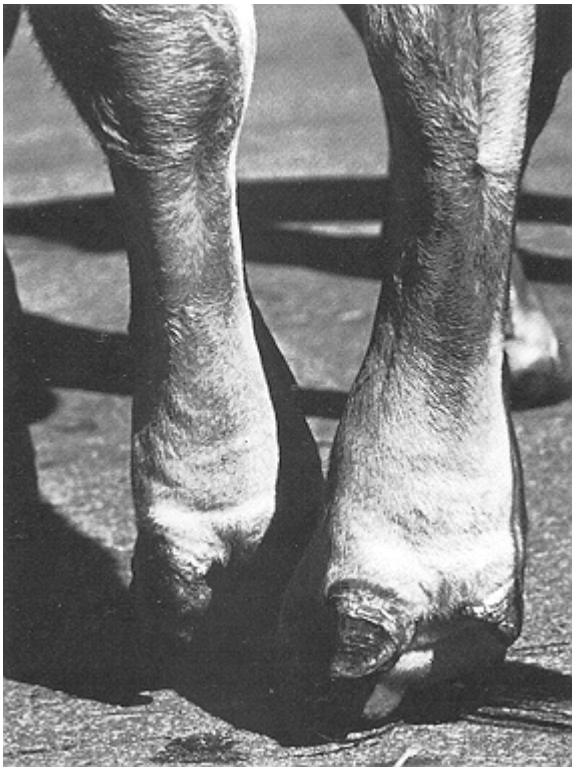

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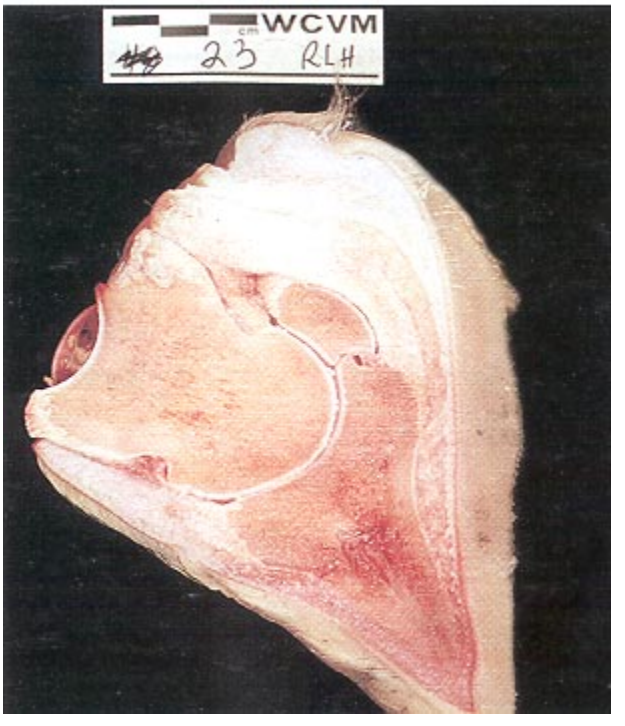

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