NADIS Sheep Disease Focus – Scald, Footrot and Foot Abscess

NADIS sheep disease reports for August were dominated by lameness, associated with wet and warm weather conditions. The list of problems encountered included scald, footrot, foot abscess, toe abscess, ovine digital dermatitis, white line separation, interdigital growths and toe granulomas. All of these are important differential diagnoses for foot-and-mouth.

LAMENESS IN SHEEP IS AN IMPORTANT PRODUCTION LIMITING PROBLEM

Many of these diseases have a common primary cause, the bacterium *Fusobacterium necophorum* which is normally present in ruminant faeces and is always present on grazed pasture. The occurrence and persistence of foot problems are related to those predisposing factors which enable infection of the interdigital space or white line. The most important are maceration of the interdigital skin due to constant exposure to moisture, and mechanical trauma.

SCALD (interdigital dermatitis)

Scald is the most common cause of lameness in sheep, which occurs on all farms, whenever conditions underfoot are wet. Typically many animals in the flock are lame in one or more foot. In extreme cases, 90% of the flock can be affected. Rubbing caused by long grass can exacerbate the problem and lameness can persist for several months if untreated. Scald can become problematic in housed sheep, where straw bedding becomes wet and warm.

Clinical signs

The diagnosis of scald is usually based on clinical examination of lame animals. In mild cases the interdigital skin is red and swollen and covered by a thin layer of white necrotic material. In more severe cases, the interdigital skin is eroded to expose deeper, sensitive subcutaneous tissue. Unlike cases of footrot, there is no under-running of the hoof wall or sole and no foul smell.

SCALD – INFLAMMATION OF THE INTERDIGITAL SPACE

Management and control

Uncomplicated cases of scald often recover spontaneously when sheep are moved to dry pasture, although this is seldom a practical management strategy. Pasture around feed troughs and gateways can become trampled, muddy and heavily contaminated with faeces. Regular movement of troughs and avoidance of these areas can significantly reduce the incidence of foot diseases.

Individual cases of scald can be treated topically using oxytetracyclin aerosol sprays. When several animals are affected, weekly walking of sheep through a 10% zinc sulphate solution or 5% formalin usually provides effective control. Afterwards sheep should be allowed to stand in a dry area so that the formalin or zinc sulphate can dry on the feet. Failure of this strategy to control the problem often indicates the presence of footrot, which requires more radical control. Scald cannot be controlled by the use of footrot vaccines. At concentrations greater than 5%, formalin can cause severe irritation of the interdigital space. The practice of regularly replenishing footbaths with a few splashes of concentrated solution should, therefore, be avoided.

FOOT BATHING – FORMALIN OR ZINC SULPHATE SOLUTION

Scald is also important because it is the first stage in the pathogenesis of footrot and suppurative infection of the distal interphalangeal joint (foot abscess).

FOOTROT

Footrot is an extremely painful production limiting disease of sheep of all ages. Affected animals are ill thrifty, show reduced wool quality and yield and poor

reproductive performance. Furthermore, the cost of treatment and control can be considerable in terms of both labour and veterinary medicines.

Footrot occurs as a sequel to scald under specific circumstances when the bacterium *Dichelobacter nodosus* is present. The severity of the disease depends partly on the strain of *D. nodosus* which is present. Mild strains result only in separation at the heels and back of the sole (benign footrot), while virulent strains can result in complete separation of the horn of the hoof wall and sole. Severely affected feet often become flystruck. Furthermore, affected sheep are prone to flystrike on their flanks, where the wool is soiled by foul smelling exudate from their feet when they lie down.

Clinical signs

The first sign of footrot is swelling and moistening of the interdigital skin. A break occurs at the skin horn junction from where infection spreads under the horn tissue so that the wall of the hoof becomes separated and the sole under-run. There is a characteristic foul smelling discharge. In longstanding cases, the hoof walls and toes become overgrown and misshapen, trapping dirt and inflammatory exudate between the inflamed, granulating soft tissues of the sole and overgrown horn. Animals with advanced footrot are extremely lame, remain recumbent for long periods and may carry the affected leg. When both forelimbs are affected, animals may walk on their knees.

VIRULENT FOOTROT – UNDER-RUNNING OF THE HOOF WALL AND SOLE

Footrot control

The traditional approach to the control of footrot is to pare carefully and extensively affected feet before walking through a footbath of 5% formalin or standing for up to one hour in 10% zinc sulphate solution. The standing time in zinc sulphate footbaths can be reduced by the addition of the penetrating agent, sodium lauryl sulphate. Sheep should be allowed to stand in a dry area for at least an hour after footbathing to allow the chemical to dry on the feet. Footbathing may need to be repeated at fortnightly intervals during warm and wet high-risk periods. Before footbathing, sheep should be run over coarse stones or slats to remove as much mud and faeces as possible. (Excessive formalin footbathing in concentrations exceeding 5% can result in foot damage and should be avoided, but zinc sulphate is less effective if formalin has been used within the previous two months.) When weather conditions are dry such treatment may achieve an 80 – 100% cure rate, but under wet conditions the cure rate may be less than 70%. Persistently affected sheep should be culled.

Reasonable cure rates have been achieved following the injection of affected sheep with high doses of penicillin, although it is important that they are kept in a dry environment for at least 24 hours after treatment.

Vaccination can be a useful adjunct for the treatment and control of footrot. An initial course of two injections 4 – 6 weeks apart is usually recommended, followed by booster doses in advance of high-risk periods in spring and autumn. Vaccination provides protection against infection for about 4 - 6 months and there is some evidence that it may also enable already affected feet to heal more quickly. In some cases a single dose of vaccine administered in the face of an outbreak can be used to reduce the severity of the disease. The net effect of vaccination is to reduce both the prevalence and severity of footrot in the flock. However, whole flock vaccination alone does not eradicate footrot and can prove expensive. In many flocks, vaccination is targeted at specific high-risk groups of animals, such as rams before mating. Some local tissue reaction can occur at the vaccination site.

Footrot eradication

Unlike *F. necrophorum*, which is always present in the environment**,** *D. nodosus* only survives in diseased feet. Eradication of footrot is possible through a combination of regular examination and paring of feet, separation of affected from non-affected animals, footbathing and/or antibiotic treatment of affected animals and strict culling of persistently affected sheep. There are several pitfalls and attempts to eradicate the disease are frequently unsuccessful. Eradication should only be attempted during dry weather conditions when transmission of *D. nodosus* is slow and sheep are unlikely to be in the early stages of the infection, which could be missed. Replacement animals should be quarantined, inspected and treated to ensure that they do not reintroduce the disease to the flock. Stray sheep from neighbouring flocks are another common cause of re-infection. The cost of eradication can be considerable, and should be balanced against the cost of endemic footrot in the flock.

D. nodosus can also be carried in the feet of cattle and goats, although cattle strains are usually benign for sheep. However some goat strains of *D. nodosus* are particularly virulent for sheep, so goats should be included where eradication of the disease is attempted.

FOOT ABSCESS (Suppurative infection of the distal interphalangeal joint)

Scald can also predispose to foot abscessation by enabling deeper invasion by other pyogenic bacteria. Foot abscesses involve infection of the distal interphalangeal joint and are characterised by heat, swelling and discharging sinuses at the coronary band and interdigital space, usually involving only one foot. The affected digit often appears to be splayed outwards from its normal axis. The disease is seldom seen in more than 1% of the flock, but is important because it is extremely painful and results in rapid weight loss. In pregnant ewes the disease predisposes to pregnancy toxaemia, while in rams it can result in poor reproductive performance.

FOOT ABSCESS – SEVERE INFECTION OF THE DISTAL INTERPHALANGEAL JOINT (BLUE ARROW) AND DISPLACEMENT OF THE PEDAL BONE (RED ARROW)

The distal interphalangeal joint capsule lies extremely close the interdigital skin, so is vulnerable to trauma and infection. Sometimes infection of the distal interphalangeal joint occurs as a sequel to toe abscessation. Outbreaks of the disease have been associated with excessive use of concentrated formalin footbaths

FOOT ABSCESS – SWELLING AND DISCHARGING SINUS AT THE CORONARY BAND

Antibiotic treatment and flushing of the affected joint is generally unsuccessful. Untreated cases remain lame for several months. Overseas reports would suggest that most cases eventually heal if left alone, although this does not appear to be the case in UK flocks. The options of humane destruction or surgical removal of the affected digit should be considered. Surgical amputation of the digit is a relatively straightforward and cheap procedure, following which most sheep walk normally within a few weeks.

Prevention of foot abscessation depends on the control of scald.

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The Meat and Livestock Commission is a sponsor of NADIS (National Animal Disease Information Service), which is a network of 40 veterinary practices and 6 veterinary colleges monitoring diseases in cattle, sheep and pigs in the UK