

# The Control and Management of Calf Diarrhoea in Beef Herds

Supporting the  
land-based industries  
for over a century



Technical Note

TN574

ISSN 0142 7695  
ISBN 1 85482 827 4  
September 2005

## SUMMARY

- **Calf diarrhoea or calf scour can cause significant losses in the beef herd.**
- **The major causes of infectious calf scour are commonly found in herds whether or not calf scour is a problem.**
- **The occurrence of disease is influenced by environmental and management factors.**
- **Therefore much can be done to control calf scour through management.**
- **Within a herd health plan there should be protocols for the early recognition and treatment of calf scour.**
- **A risk assessment may be carried out for your herd to determine whether vaccination would be beneficial in the prevention of scour due to rotavirus, coronavirus or *E coli* K99.**

## Introduction

Calf diarrhoea is one of the costliest diseases to affect suckled calf production. SAC work in the Inverness area in the mid 90s identified the average losses to be in the order of £33 per calf at risk. For a 100 cow herd this translates as the losses associated with calf scour including treatments, labour and calf losses to total £3300. However in the extreme cases, where several calves die, then costs can be up to five times that. It is therefore essential for herd managers to keep the preventive programme for calf scour within their herd under review. This can be done through a review with the unit's vet and modifying the unit's health plan as appropriate.

## The clinical picture

Scour is the passing of abnormally high amounts of fluid in the faeces. This may be due to excessive passing of fluid into the intestine from the body or the failure to absorb a sufficient quantity of fluid from the contents of the intestine during the digestion process. As a result the nature of the faeces can vary from a pasty texture to pure liquid. Depending on the severity of disease, blood and the products of



*Oral rehydration fluids administered to a calf that has scoured*

inflammation resembling the lining of the gut can be passed in the faeces.

If the calf is able to drink an equivalent volume of fluid to that being lost in the faeces it is likely to remain bright and alert. If the calf is not able to do this it will suffer a net loss of fluid from the body and become dehydrated. This can be noted clinically as slightly 'sunken eyes' and if severe can lead to collapse, circulatory failure and death. In addition in some cases a metabolic upset known as acidosis

# The Control and Management of Calf Diarrhoea in Beef Herds

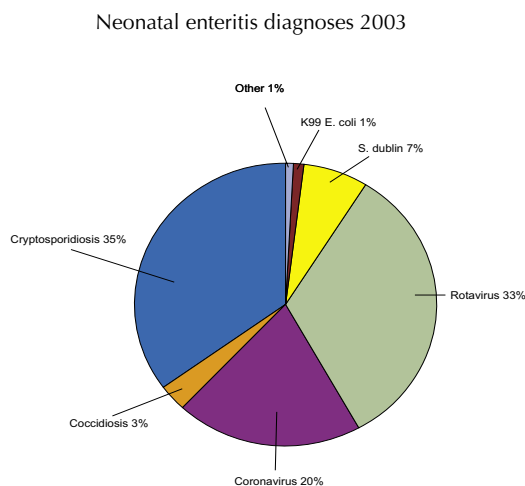
may occur more rapidly than dehydration. In such cases the calf may be unable to stand and be severely depressed before severe signs of diarrhoea are seen. Failure to recognise this state and seek veterinary attention will result in the death of the calf.

There are numerous infectious and non-infectious causes of scour and as the clinical signs are general, it is not possible to identify or predict a specific cause from the clinical signs seen.

## The causes of scour

Surveillance studies in Scotland (figure 1) indicate cryptosporidia to be the most common cause of scour, followed closely by rotavirus, coronavirus, *Salmonella enterica* subspecies *enterica* serotype Dublin (S Dublin) and coccidia species.

**Figure1: Neonatal enteritis outbreaks in Scotland 2003.**



Mixed infections with more than one of these agents are common. All the recognised infectious causes of scour are commonly found within the cattle rearing environment and cryptosporidia and rotavirus are thought to be present in all herds. It is not possible to eradicate these infections from farms and therefore the risk of infection is always present.

Infectious organisms are usually passed in the faeces with infection picked up by the oral route. The likelihood of disease resulting from this infection depends on the balance between infectious dose of

the organism and specific and generalised immune protection within the individual calf.

## Rotavirus and Coronavirus

These viruses target the cells lining the small intestine causing damage, which results in a failure of digestion and absorption of nutrients. This generally causes scour from 4 days to three weeks of age with faecal contamination from adult cows or infected scouring calves being the common sources of infection. Recovery from the condition usually takes five to seven days.

## Cryptosporidia

This is a protozoan parasite which causes scour in many domestic species including man. The parasite generally affects calves between 4 days and three weeks of age. The damage caused by this infection is similar to that caused by rotavirus. The source of the parasite is thought to be either adult cows (which act as carriers without showing signs of the disease) or infected scouring calves passing the parasite in their faeces. The infectious dose of the organism is very low and therefore hygiene is very important for disease control (see below). The disease process is slightly more protracted than for the viral infections and recovery therefore takes a few days longer and can be expected to be complete by 10 days.

## Coccidia species

These organisms are protozoan parasites, which cause scour between 3 weeks and 6 months of age. They are increasingly recognised as causes of scour in young calves and infection can produce a range of symptoms from ill-thrift, chronic scour, to severe bloody scour with straining to pass faeces. As with cryptosporidia, recovery will normally be seen by ten days after scouring started, but in some severe cases recovery will be prolonged beyond this.

## *E coli* K99

All calves become infected within a few hours of birth with many varied strains of *Escherichia coli* (*E coli*). This constantly changing population of

# The Control and Management of Calf Diarrhoea in Beef Herds

organisms inhabits the calves' intestines for life and is entirely normal and healthy. Some strains of *E coli* however have the ability to adhere to the intestinal wall and produce toxins that cause scour. An example of this is *E coli* K99, which is referred to as an enterotoxigenic *E coli* (ETEC). This strain is only capable of causing disease in calves in the first four days of life. The duration of clinical disease is limited to a few days. The organism causes little in the way of damage to the intestine, but leads to rapid fluid loss. While other strains of *E coli* have very occasionally been shown to cause disease they are considered extremely unusual causes of calf scour. Diagnostic laboratories do not routinely attempt to identify such strains.

## Salmonella species

There are a whole range of salmonella organisms, which can potentially cause scour in both calves and humans. Currently the most common in UK cattle is *Salmonella enterica* subspecies enterica serotype Dublin (known as S Dublin), however there have been years when *Salmonella enterica* subspecies enterica serotype Typhimurium (S Typhimurium) has been the most prevalent serotype. The importance of the different types of *Salmonellae* and the presence of disease vary between regions of the UK, with the seasons and from year to year. Disease caused by S Dublin is seen most commonly in the autumn, peaking in November and December. S Dublin can infect the gut causing scour and also cross the gut wall, to enter the blood stream causing systemic infections such as pneumonia, septicaemia and joint ill.

## Identifying the causes of scour: is it necessary and how to do it?

Diagnostic testing is only worthwhile if it is going to influence treatment, prevention and control strategies. Treatment and control through vaccination does vary for the different pathogens outlined above and investigation is warranted, particularly if groups of calves are scouring. Therefore it is important to collect faecal samples (15g approx.) from at least three, and preferably six, untreated scouring calves

in the early stages of disease to be tested for all potential scour pathogens.

## Generalised control measures

Many husbandry measures will reduce the risk of scour and such measures carry little in the way of additional costs. Control focuses on reducing exposure to the infectious agents and optimising the calves' resistance to them.

The aim is for calves to be born in a clean dry area and be moved to a clean dry area with minimal contamination. Where suckler herds are calving inside and calves are remaining inside for any significant length of time then their environment may be improved by providing a creep area that is kept well bedded and is draught free at calf level. If despite adequate provision of good straw the bedding is still too wet then the drainage of the building and down pipes from the roof drainage should be assessed and corrective action taken as required.

While the environment outside would usually be expected to be better for young calves, conditions that favour scour can still occur. This is particularly the case where the dams are being fed and cows and calves may spend a lot of time in one heavily contaminated area. Moving feeding areas and even providing creep areas at grass may be necessary.

The goal of suckler herd systems is to have a tight two-month calving pattern with the bulk of the herd calving in the first month. This is an effective scour control system as the worst scour problems occur where the tail end calves arrive into a group where there may be a wide range in calf ages and as a result the environment is heavily contaminated with such agents as rotavirus and cryptosporidia. Where the herd has a spread out calving pattern effort should be made to split the groups by calf age to reduce the risk of infectious scour.

For beef systems rearing dairy bred calves the ideal is an all in all out policy for the calf rearing stage. A minimum standard is to ensure that calves enter a pen that has been cleaned, disinfected and

# The Control and Management of Calf Diarrhoea in Beef Herds

ideally rested. If calves have to be reared in groups then there should be no mixing of calves between groups and ideally all calves in a group should be of similar age.

Cleaning and disinfecting calf-rearing accommodation between calves is an essential means of disease control. For most circumstances general farm disinfectants will be satisfactory. However, cryptosporidium oocysts are highly resistant and persist in the environment for long periods of time. Ammonia based disinfectants such as Oocide® (Antec), are the only effective agents, but because of the irritant fumes produced they can only be used after a building has been de-stocked.

## Colostrum management

Calves are born without any antibody against the common infectious organisms that cause scour and other diseases. They rely on receiving a supply from the dam through the colostrum. The calves are also born without reserves of vitamin A or E and also rely on colostrum to provide these vitamins. These vitamins are essential for the calf's ability to fight infection. The colostrum in the udder at the first milking after calving is richest in antibody and will provide the calf with an excellent supply of antibody that is absorbed in the first 12 hours after calving. After this the calf absorbs little or no antibody although antibodies can still work locally within the gut attaching to the infectious organisms such as rotavirus and coronavirus and inactivating them. This protection is enhanced if cows are vaccinated for rotavirus, coronavirus or *E coli* K99 see below. Colostral protection for cryptosporidia is thought to be less effective.

The goal in the suckler herd is to have all calves born strong enough to suck; all cows fit enough to suckle the calf and all cows to have adequate supplies of good quality colostrum that can be easily sucked by the calf. Therefore practical messages for scour control through colostrum management are as follows:

- Ensure calving problems are kept to a minimum by using bulls with the appropriate EBV for calving ease and gestation length and

by ensuring cows calve down in the target condition score (2.0 to 3.0).

- Where a calf is weak after calving or the udder or teat confirmation may prevent easy first sucking then milk the cow and provide the colostrum preferably through a bottle and teat. Give two litres immediately and two litres after six hours.
- Ensure spring calving cows have been supplemented adequately with an appropriate vitamin supplement. (Autumn calving cows should receive adequate vitamin E and A from pasture.)
- Ensure that cows do not fall below body condition score 2.0. Therefore in the last third of pregnancy separate and feed thin cows to prevent further deterioration in body condition.

## Specific control measures

Vaccination of the cow herd using one of the vaccines against rotavirus, coronavirus and *E coli* K99 is recommended in herds where calf scour is a recognised problem. The judgement as to whether this is required or not is best made on the basis of a risk assessment carried out by your vet. This takes into consideration the general risk factors discussed above and the degree to which they apply to your herd.

Where herds suffer salmonellosis vaccination may be used to offer some protection. This vaccine appears to work through reducing the numbers of infectious organisms the cow passes rather than through the colostrum. Vaccination of healthy calves is possible from 3 weeks of age however there is a delay in the development of immunity, which reduces the practicality of the vaccine for use in young calves. A recent vet practitioner survey on salmonellosis control carried out in South West Scotland suggested that the available vaccine worked well for the control of salmonella associated abortion and disease in adult cattle, but less well for disease control in calves.

# The Control and Management of Calf Diarrhoea in Beef Herds

It is recommended that where your herd does suffer an outbreak of salmonellosis that a herd specific control programme is drawn up by your own vet.

## Generalised treatments

These should be administered whatever the cause of scour and are aimed at correcting any dehydration and acidosis that may have occurred and minimising intestinal damage. Guidelines on the treatment of scour should be included in your health plan. Some guidelines are given below:

- If the calf is severely dehydrated (sunken eye), weak or collapsed with the absence of a suck reflex then veterinary attention should be sought and intra-venous fluids may be required.
- If the calf is mildly dehydrated, standing but scouring then oral rehydration fluids should be administered.
- It was previously advised that calves were kept off milk while being given oral fluids, this is no longer considered to be the case. It may be best to ensure a gap of two hours after fluids are offered before sucking is allowed.
- Certainly calves should not be maintained on oral rehydration fluids alone for longer than 2 days as they do not provide adequate nutrition for the calf.
- If the calf is scouring but not dehydrated and is bright and alert then no specific oral rehydration treatment is indicated.
- In general antibiotics have no value in the treatment of the common causes of calf scour.

## Specific treatments

As indicated above it is worthwhile seeking a specific diagnosis of the causes of calf scour on your farm as specific control measures do exist and can be administered in conjunction with your vet.

## Cryptosporidia

Halofuginone is now available as an aid to treatment and prevention of cryptosporidium infection in calves and can be prescribed by your vet. The drug reduces the severity of disease in individual calves and suppresses the output of oocysts reducing the risk of disease spread. On a group basis, the drug works best when used to prevent further scour cases due to cryptosporidium after the initial diagnosis has been made. As symptoms of halofuginone toxicity may occur at only twice the therapeutic dose, it is necessary to adhere strictly to the recommended dosage and not to treat severely dehydrated calves.

## Rotavirus and Coronavirus:

No specific therapy is available for these pathogens, as no anti-viral drugs are available. If the herd has an extended calving pattern, then it is suggested vaccination should be considered for cows greater than 1 month from calving. If necessary pregnancy diagnosis should be carried out on those cows still to calve to target the vaccine appropriately. For those cows that are within a month of calving various immunological products are available in paste form. It should be emphasised that these will only provide short-term protection and these products should not be used as an alternative to vaccination.

## Salmonella and *E coli* infections

Antibiotics should only be used in cases involving bacterial enteritis and must be prescribed by your vet. When a bacterial isolate is obtained which may be of significance the laboratory will carry out antibiotic sensitivity testing to enable appropriate antibiotic selection.

## Coccidiosis

If a diagnosis of coccidiosis is made specific anticoccidial drugs should be used under veterinary prescription. If creep feeding for calves is available then medication of the feed is likely to be the most efficacious and simplest to use method of treatment.

# ..... The Control and Management of Calf Diarrhoea in Beef Herds

## Authors:

### Colin Mason

Veterinary Centre Manager  
SAC  
Dumfries Veterinary Centre  
St. Marys Industrial Estate  
Dumfries  
DG1 1DX  
Phone 01387 267260  
Fax 01387 250028  
colin.mason@sac.co.uk

### George Caldow

Regional Veterinary Manager  
SAC  
St. Boswells Veterinary Centre  
Greycrook  
St. Boswells  
TD6 0EQ  
Phone 01835 822456  
Fax 01835 823643  
george.caldow@sac.co.uk