

Cryptosporidiosis in neonatal calves

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PARASITE CONTROL PROGRAMME

THIS GUIDE IS ONE OF A SERIES ON INDIVIDUAL PARASITIC DISEASES THAT INCLUDES

1. Liver Fluke
2. Redwater
3. Gutworms
4. Rumen Fluke

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PARASITE CONTROL PROGRAMME



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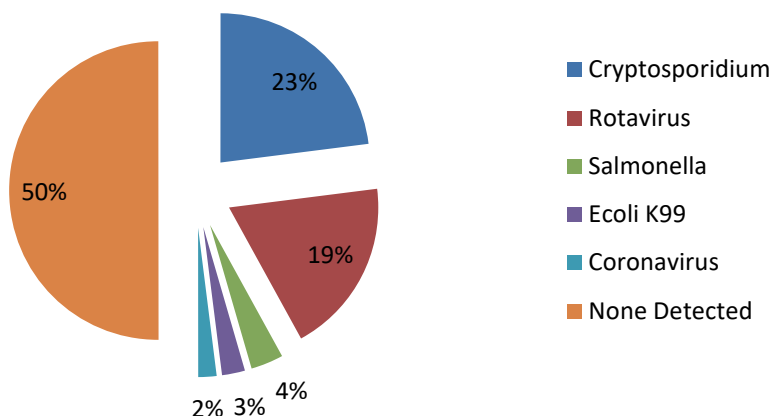
Cryptosporidiosis in neonatal calves

Cryptosporidiosis: An important enteric protozoan disease in newborn calves

Frequency of Enteropathogens

The relative frequency of enteropathogens identified on post-mortem submissions of calves less than one month of age to DAFM RVLs during 2012.

Source: All-island Animal Disease Surveillance Report 2012:
A joint AFBI / DAFM Veterinary Laboratories publication



Causal agent: *Cryptosporidium parvum*, a small single cell organism which causes damage to the cells of the distal end of the small intestine, resulting in mild to severe diarrhoea. It is highly infectious and is very difficult to eradicate once established as the oocyst infective stage is resistant to inactivation by many of the disinfectants commonly used on Irish farms.

Age of affected animals: 1-4 week old calves (infected calves may or may not show signs of disease)

Typical disease in: 7-13 day old calves

In affected herds with a pure *C. parvum* infection morbidity is high but mortalities are usually low. However, severe cases may result in death. In situations where there is concurrent infection with another neonatal enteric pathogen, usually rotavirus, mortalities are high. Mixed infections are particularly common amongst calves and disease tends to be more common in calves that have received inadequate colostrum.

Clinical signs of disease:

- Lethargy/weakness
- Profuse watery diarrhoea with strands of mucus; scouring may last 5-12 days. Typically it is 6 days before calves recover their appetite for milk. Scouring from a mixed infection is usually more severe and often fatal
- Dehydration



Life cycle of parasite

The oocyst infective stage once ingested invades the cells lining the wall of the small intestine. There it undergoes numerous asexual multiplication stages and a final sexual reproductive stage before further infective oocysts are excreted in the faeces. There is also an endogenous infective cycle, where a proportion of the oocysts are thin walled and excyst in the intestine. The freed sporozoites then initiate an auto-infection cycle which may prolong the disease (See Figure 1).

Disease transmission

The parasite is transmitted via the faecal-oral route through the ingestion of oocysts from infected animals. Oocysts may be present in faecal matter on the floors of trailers, on walls and floors of calf pens and houses and protective garments of owners and handlers. Other sources of oocysts include contaminated feeding utensils and anything else calves may find to lick and suckle.

Calves become infected by:

- (i) Being reared in calf pens/houses that have been previously contaminated by infected calves
- (ii) Ingesting food and water contaminated with oocysts
- (iii) Contact with faeces from older infected calves
- (iv) In rare circumstances, where husbandry is inadequate prior to and during calving, transmission may occur via the dam

Life Cycle of *Cryptosporidium parvum*

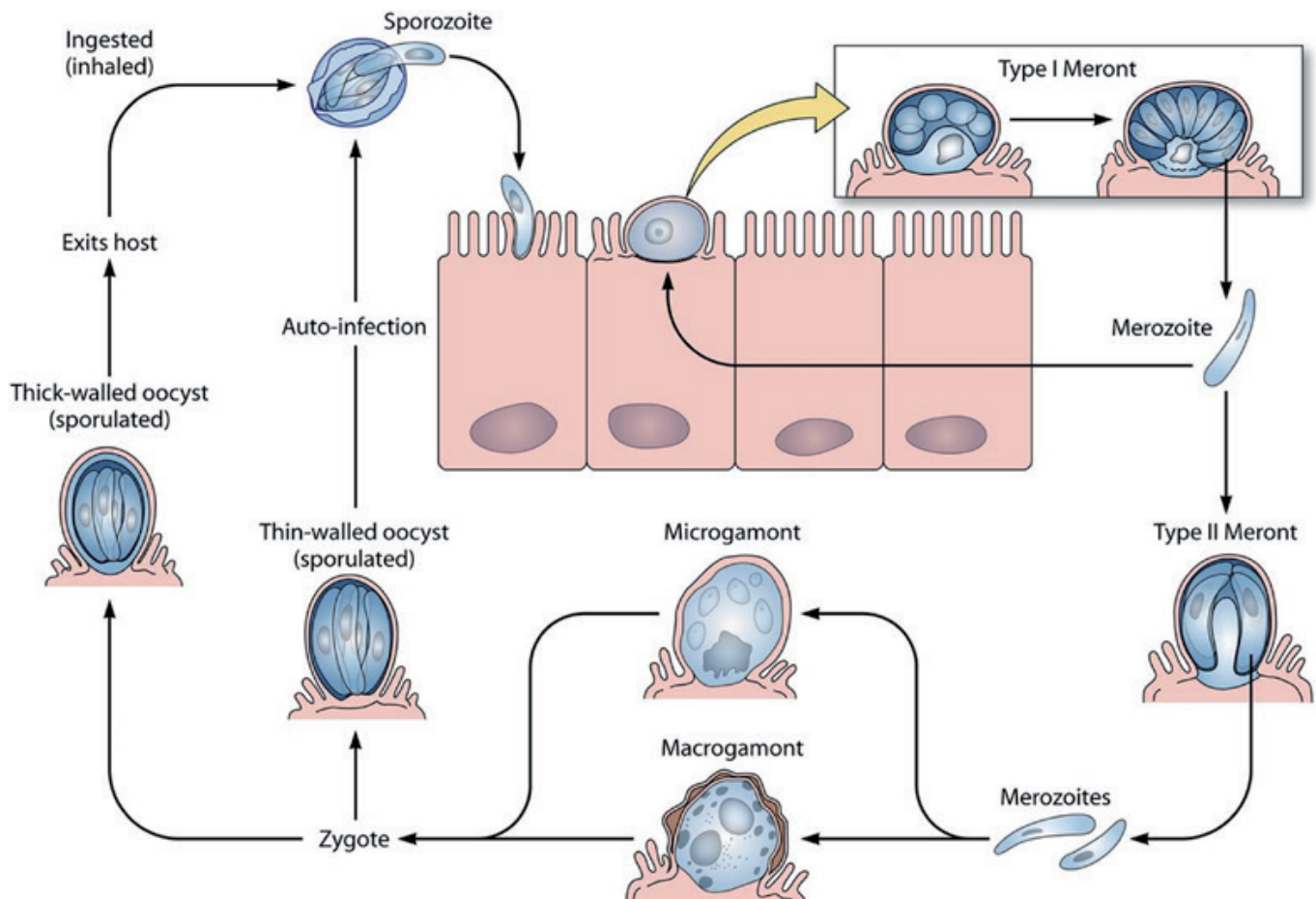


Figure 1

Diagnosis

It is not possible to distinguish cryptosporidiosis from the other neonatal enteric diseases on clinical signs alone as these are non-specific.

- (a) Definitive diagnosis is difficult and requires specific tests to be carried out either by a veterinary laboratory or the veterinary practitioner. However, an accurate diagnosis is critical for the successful implementation of control and preventative measures. This can be carried out by using a rapid diagnostic kit, or by sending samples to a suitable laboratory that uses microscopy and/or molecular identification techniques.
- (b) It is important to differentiate cryptosporidiosis from disease caused by other common neonatal enteric pathogens such as rotavirus, coronavirus, *E-coli* and *Salmonella* spp.

Ideal specimens for diagnosis:

- (i) Faecal samples (collected in sterile plastic containers) from untreated, scouring calves should be submitted to the nearest suitable laboratory during the early stages of an episode of diarrhoea in a group of calves.
- (ii) Dead neonatal calves should be taken to a laboratory for post-mortem examination.

Treatment

There is no routine drug regime that is consistently successful, thus a palliative or supportive approach to treatment is required.

Affected calves:

- (a) Ensure all ill calves are isolated and housed in a clean, warm and dry environment.
- (b) Give one or two extra feeds (2 litres each) of a good quality oral rehydration solution (see AHI leaflet: **Management of the scouring calf**) as soon as the calf starts scouring and while it is scouring.
- (c) Continue to offer scouring calves normal amounts of milk or milk replacer as long as they want to drink. Suckler calves should be left with their dams.
- (d) Treat the calves with halofuginone lactate for *C. parvum* infection. Although the therapeutic impact of using this drug in scouring calves is equivocal, it may reduce the severity of disease if administered early in the course of infection. Please note that as this product is a prescription only medicine (POM) and a prescription from your veterinary practitioner is required to obtain it.
- (e) In cases of mixed infection involving other neonatal pathogens, control measures appropriate for the specific agent should be instituted.

Unaffected calves:

Good hygiene and management will reduce the chance of infection spreading

- (i) All unaffected healthy calves should be moved immediately from the contaminated environment.
- (ii) Administration of halofuginone lactate to in-contact calves limits the impact of infection.

Disease prevention

Good hygiene and animal management are most important in reducing the incidence of cryptosporidiosis.

Calving pens and calf rearing pens/houses should be thoroughly cleansed and left free of animals for at least 3-4 months before the new calving season.

Recommended procedure for cleaning calving and calf rearing pens and houses

- (i) All dried faeces and other dirt should be removed from the walls, floors and rails of the pens
- (ii) All surfaces steam cleaned or power-hosed with an effective disinfectant e.g the amine based Keno™ Cox (CIDLines N.V., Belgium), p-chloro-m-cresol (Neopredisan (Vertrieb GmbH, Germany)), hydrogen peroxide with peracetic acid (Ox-Virin, (Ox-Oxcta, Spain)), 3% hydrogen peroxide.
- (iii) All surfaces should be washed with one of the aforementioned anti-protozoan disinfectants taking care to remove dirt from within cracks and crevices on the walls and floors allowing at least one hour of contact time with the disinfectant.
- (iv) A final rinse with water and left to dry.
- (v) Once dry the houses and pens should be left empty of livestock for at least 3-4 months.

This last point is critical to the control and prevention of cryptosporidiosis as desiccation is important in inactivating *C. parvum* oocysts. Oocysts are protected somewhat from dehydration in dried faeces, so any faeces remaining from the previous year's calves need to be removed.



Disease control measures

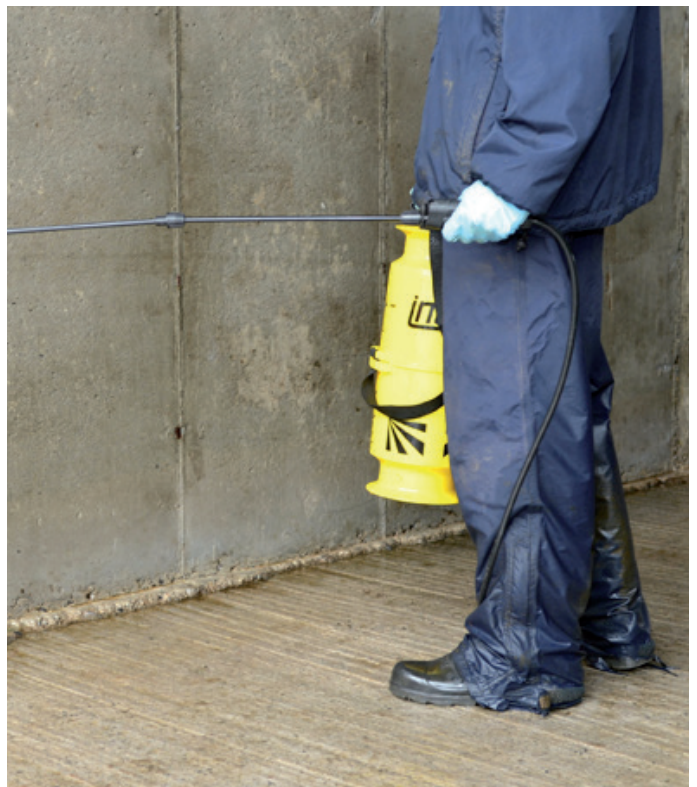
- (a) Ensure all calves receive adequate good quality colostrum within the first two hours of birth
- (b) House calves either individually or in small groups in suitably prepared pens/houses.
- (c) Never mix new born calves with calves older than 3-4 days
- (d) Strict hygiene with feeding equipment (bottles, buckets, nipples etc)
- (e) Replace or replenish bedding (straw etc) every 2 days
- (f) Raise feeding and water troughs off the floor, at least 0.75m
- (g) Identify calves with diarrhoea quickly. Isolate and remove all sick calves to a hospital pen once they have been identified and start appropriate treatment. Isolate all calves with diarrhoea for at least a week after scouring stops

The optimal calf rearing system for disease control is to rear them in individual pens for at least the first two weeks

On farms that experience severe problems with cryptosporidiosis every year, the calves may be treated with halofuginone lactate for the first 7 days. Treatment must be started from birth and continued daily for the first week. Halofuginone lactate does not prevent infection but it reduces the severity of the diarrhoea and the number of oocysts excreted.

Anyone in contact with the calves should endeavour to prevent transmitting the disease from one group to another group of calves

- (h) Ideally, animal handlers/farm workers/owners should wash their hands and change their protective clothes and footwear between each group of calves. However, if this is not possible then at the very minimum they should wash their hands and disinfect their boots.
- (i) **It is critical that anyone in contact with the calves should wash their hands change their clothes and footwear after handling sick calves.** This is to prevent transferring contaminated faeces from the sick pen to other locations on the farm.
- (j) **An additional precaution is to feed youngest calves first, work up by age groups and feed the sick calves last.**



Preventing the introduction of *Cryptosporidium parvum* onto a farm

Once a herd becomes infected with *C. parvum*, the parasite rapidly becomes established and is very difficult to eradicate. In most clean herds disease is introduced through the purchase of infected calves. Thus farmers in general and particularly those with cryptosporidiosis-free herds should never buy in calves in the susceptible age group (less than 2 weeks old). However, if for whatever reason young calves have to be introduced into a herd then ideally, they should be purchased from a cryptosporidiosis-free herd and segregated from the resident calves until they are past the age when they are at high risk of infection.

Prevention of human infection

- (i) *Cryptosporidium parvum* is also a highly infectious disease of humans and is especially dangerous for young children, immunocompromised individuals and elderly adults.
- (ii) Humans become infected through contact with infected animals and through ingestion of contaminated food and water.

Animal handlers/farm workers/owners should be ever mindful of the dangers of transmitting cryptosporidiosis to their family and the wider community.

- (i) It is critical that animal handlers, farm workers and owners wash their hands, change their clothes and footwear after handling calves and especially after handling sick calves. Adherence to strict sanitation and hygiene protocols is necessary to ensure that animal workers do not become infected and to decrease the likelihood of them contaminating their family environment.
- (ii) Children and immunocompromised adults should not be allowed to handle or care for sick calves
- (iii) Farm owners should comply with all the regulations regarding the collection, storage and disposal of slurry and run-off water from animal buildings. This reduces the incidence of ground and surface water contamination with *Cryptosporidium* oocysts and should ensure a clean water supply for their families and the general public.

Disposal of slurry and dung

Farmers should be very careful when disposing of slurry and dung from calves that have been infected with *C. parvum*. Slurry and dung containing *Cryptosporidium* spp. oocysts can contaminate surface and ground water and if this water is used as a source for potable water then there is every likelihood that humans will get cryptosporidiosis.

Preventing surface and ground water contamination

- (a) Only spread slurry and dung on land during those times of the year allowed by national regulations
- (b) Do not spread immediately before or after rain or on excessively wet pasture
- (c) Do not spread on fields with a large slope
- (d) Do not spread closer than 10m to a ditch or stream



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