

Cryptosporidiosis in Neonatal Calves



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Contributing to a profitable and sustainable farming and agri-food sector through improved animal health

Animal Health Ireland, 2-5 The Archways, Carrick-on-Shannon, Co. Leitrim, N41 WN27

Phone 071 9671928 Email ahi@animalhealthireland.ie

www.AnimalHealthIreland.ie

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Cryptosporidiosis in neonatal calves

Cryptosporidiosis: An important and extremely contagious protozoan disease, that causes diarrhoea in newborn calves.

Frequency of diarrhoea causing pathogens in calves

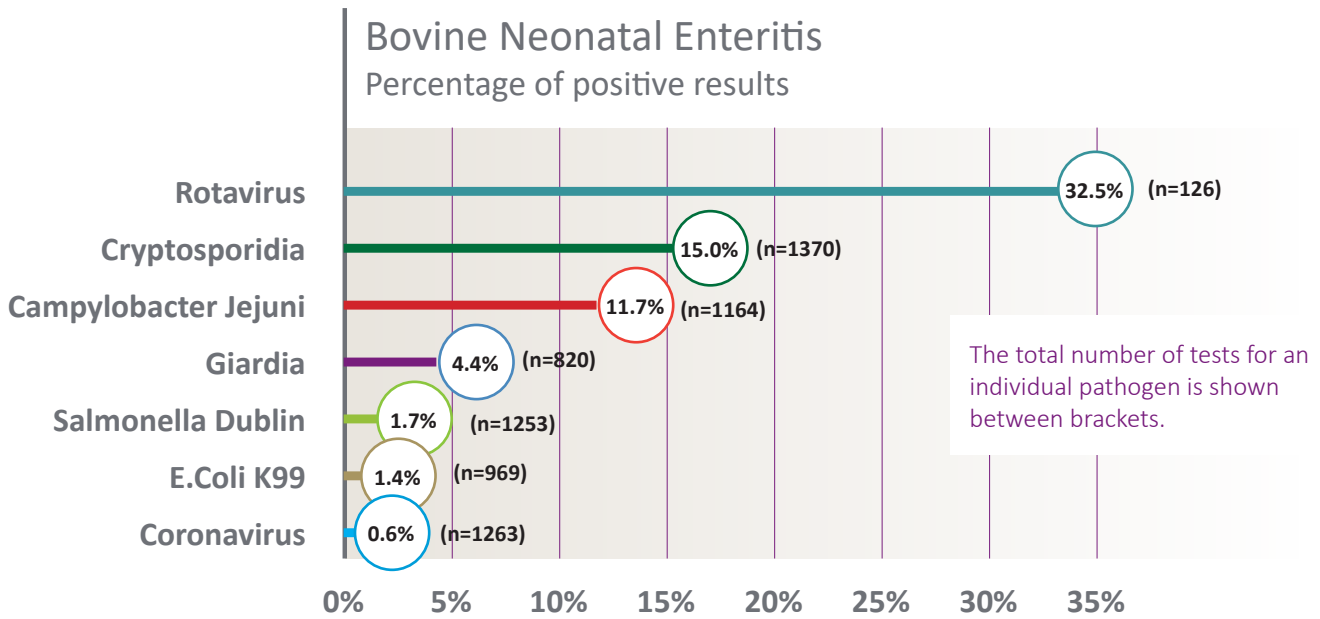


Figure 1. Relative frequency of enteropathogenic agents identified in calf faecal samples tested in 2019.

Source: All-island Animal Disease Surveillance Report 2019: A joint AFBI/DAFM Veterinary Laboratories publication.



A summary of the disease

Causal agent: *Cryptosporidium parvum*, a small single cell organism which causes damage to the cells 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).

The disease usually appears in: 7-13 day old calves. In affected herds with *Cryptosporidium* infection only, illness is high but mortalities are usually low. However, severe cases may result in death. In situations where there is concurrent infection with another neonatal intestinal infection, 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 *Cryptosporidium parvum*

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 2).

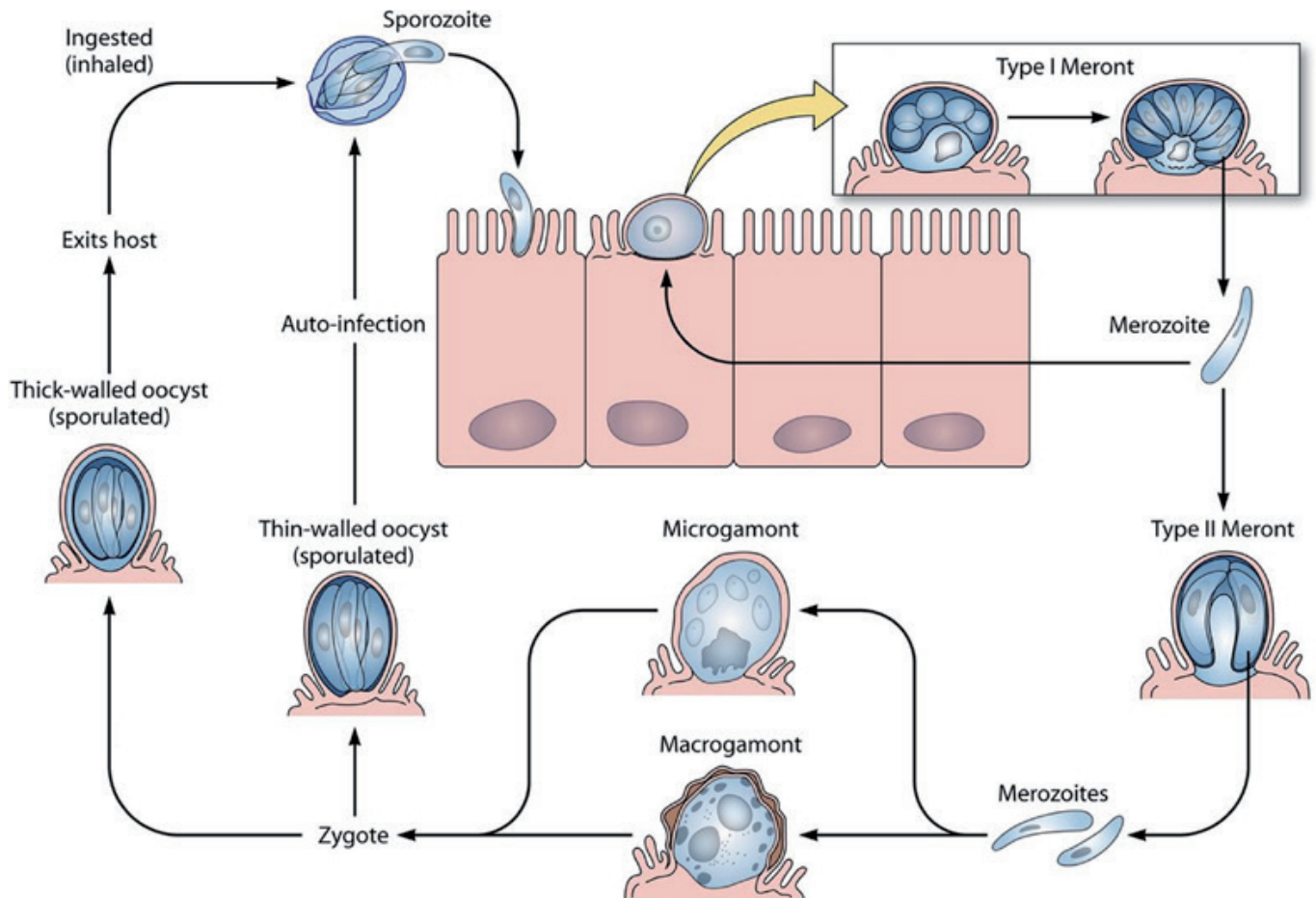


Figure 2.

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 walls and floors of calf pens and houses, on the floors of trailers and on the garments of those rearing the calves. Other sources of oocysts include contaminated feeding utensils and anything else calves may find to lick and suckle.

Calves become infected by:

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

Diagnosis

It is not possible to distinguish cryptosporidiosis from the other neonatal intestinal diseases on clinical signs alone as these are non-specific (the same clinical signs may be present if the calf has a different disease).

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. Confirmation of the diagnosis is crucial to successfully treat the disease.

It is important to differentiate Cryptosporidiosis from disease caused by other common neonatal enteric pathogens such as rotavirus, coronavirus, *E-coli* and *Salmonella* spp. in order to target treatment and control effectively.

Ideal specimens for diagnosis:

- 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.
- 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

- Ensure all ill calves are isolated and housed in a clean, warm, and dry environment.
- Give one or two extra feeds (2 litres each) of a good quality oral rehydration solution as soon as the calf starts scouring and while it is scouring. (see AHI leaflet: 'Management of the scouring calf' [click here](#))
- 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. Although it is fine to stomach tube electrolytes at any time, do not stomach tube milk to sick calves as it will enter the rumen and not be digested. This may cause additional problems for an already sick calf.
- You can consider treating the calves with halofuginone lactate (Halocur) or paromomycin (Paroform Crypto) for infection. Although the therapeutic impact of using either drug in scouring calves is unclear, it may however, reduce the severity of disease if administered early in the course of infection. Halofuginone can be potentially toxic if the correct dose is not given, so having an accurate body weight is recommended before treating and do not give on an empty stomach. Please note that as these products are a prescription only medicine (POM), a prescription from your veterinary practitioner is required to obtain them and veterinary advice should be sought before using them.
- In cases of mixed infection involving other neonatal infections, control measures appropriate for the specific agent should be instituted.

Unaffected calves

Good hygiene and management will reduce the chance of infection spreading.

- All unaffected healthy calves should be moved immediately from the contaminated environment.
- 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 cleaned and left free of animals for at least 3-4 months before the new calving season.

It is very important to note that mortality is likely to be higher in situations when calves are co-infected with other pathogens such as rotavirus. Therefore, consider control of other pathogens. Speak to your veterinary practitioner about options for vaccinating the dam against other scour pathogens that may help the calf have better immunity to pathogens such as rotavirus, coronavirus and *E.coli*, which would help reduce the risk of co-infection.

Recommended procedure for cleaning calving and calf rearing pens and houses

- All dried faeces and other dirt should be removed from the walls, floors, any crevice and rails of the pens before applying the disinfectant as the presence of dirt will prevent it from working properly.
- All surfaces should be 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. Please note the contact time is important, for example many of the commercial disinfectants to work against *Cryptosporidium*, need 2 hours of contact time (that is applied to the clean surface with no organic matter). Check whichever product you are using and allow the recommended contact time.
- A final rinse with water and left to dry.
- 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 the lack of moisture 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

- Ensure all calves receive three litres of good quality colostrum within the first two hours of birth (Colostrum 1-2-3 rule. See AHI leaflet on Colostrum Management).
- House calves either individually or in small groups in suitably prepared pens/houses.
- Never mix newborn calves with calves older than 3-4 days.
- Strict hygiene with feeding equipment (bottles, buckets, nipples etc.).
- Replace or replenish bedding (straw etc.) every 2 days.
- Raise feeding and water troughs off the floor, at least 0.75m.
- 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.

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. Ideally the calf rearer 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.

It is critical that anyone in contact with sick calves should wash their hands and change their clothes and footwear after handling the calves. This is to prevent transferring contaminated faeces from the sick pen to other locations on the farm.

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 without known problems with Cryptosporidiosis 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

Cryptosporidium parvum is also a highly infectious disease of humans and is especially dangerous for young children, immunocompromised individuals, and elderly adults. Humans become infected through contact with infected animals and through ingestion of contaminated food and water. The calf rearer should be ever mindful of the dangers of transmitting Cryptosporidiosis to their family and the wider community. It is critical that anyone in contact with infected or potentially infected calves should change their clothes and footwear after handling them. This is necessary to ensure that all those working with calves do not become infected and to decrease the likelihood of them contaminating their family. Children and immunocompromised adults should not be allowed to handle or care for sick calves. Farmers 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 by:

- Only spreading slurry and dung on land during those times of the year allowed by national regulations.
- Not spreading immediately before or after rain or on excessively wet pasture.
- Not spreading on fields with a large slope.
- Not spreading closer than 10m to a ditch or stream



For more information consult the Animal Welfare Guidelines issued by the Farm Animal Welfare Advisory Council
<http://www.fawac.ie/media/fawac/content/publications/animalwelfare/Calf%20Welfare%20Guidelines%20%20FAWAC.pdf>

CALFCARE TECHNICAL WORKING GROUP

Catherine McAloon - (Chair) University College Dublin, **Charles Chavasse** - Zoetis, **Muireann Conneely** - Teagasc, **Christine Cummins** - Bonanza Calf Nutrition, **Grainne Dwyer** - AHI, **Bernadette Earley** - Teagasc, **Liam Gannon** - Volac, **John Gilmore** - Veterinary Practitioner, **Ciara Hayes** - DAFM, **Ian Hogan** - DAFM, **Emer Kennedy** - Teagasc, **Mark Little** - Trouw Nutrition, **John Mee** - Teagasc.

TECHNICAL WORKING GROUP RAPPORTEUR

Michelle McGrath - Animal Health Ireland.

PARASITE CONTROL TECHNICAL WORKING GROUP

James O'Shaughnessy - (Chair) DAFM, Veterinary Laboratory Services, **Charles Chavasse** - Zoetis, **Bosco Cowley** - MSD Animal Health, **Martin Danaher** - Teagasc Food Research Centre Ashtown, **Theo de Waal** - UCD School of Veterinary Medicine, **John Gilmore** - Veterinary Practitioner, **Barbara Good** - Teagasc, Athenry, **Fintan Graham** - Veterinary Practitioner, **Ian Hogan** - DAFM, Veterinary Laboratory Services, **Orla Keane** - Teagasc, Grange, **Mark McGee** - Teagasc, Grange, **Grace Mulcahy** - UCD School of Veterinary Medicine, **Mark Robinson** - Queen's University, Belfast, **Maresa Sheehan** - DAFM, Veterinary Laboratory Services.

TECHNICAL WORKING GROUP RAPPORTEUR

Natascha Meunier - Animal Health Ireland.

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