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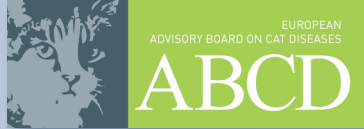
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# GIARDIASIS IN CATS

## ABCD guidelines on prevention and management



**Tim Gruffydd-Jones, Diane Addie, Sándor Belák, Corine Boucraut-Baralon, Herman Egberink, Tadeusz Frymus, Katrin Hartmann, Margaret J Hosie, Albert Lloret, Hans Lutz, Fulvio Marsilio, Karin Möstl, Maria Grazia Pennisi, Alan D Radford, Etienne Thiry, Uwe Truyen and Marian C Horzinek**

**Overview:** *Giardia* is a protozoan parasite that infects the small intestine of cats and can cause diarrhoea. The biotypes that affect cats do not appear to infect humans. Infection is most common in young cats, particularly from multicat backgrounds.

**Disease signs:** Infected cats that develop clinical signs show small intestinal diarrhoea and there may be associated weight loss.

**Diagnosis:** Diagnosis of infection is usually based on an in-practice ELISA for faecal antigen or zinc sulphate flotation of several pooled faecal samples. Polymerase chain reaction (PCR) tests are available but not used so widely. Infection can be detected in clinically healthy cats so interpretation of a positive result in cats with diarrhoea requires care.

**Treatment:** Fenbendazole or metronidazole are regarded as the treatments of choice. Secondary gut changes may be slow to resolve and so diarrhoea may continue for some time after infection has been eliminated.

Giardiasis is  
not considered  
to be a zoonotic  
infection.



### Agent

A number of names have been used for the coccidian flagellate protozoan parasite *Giardia* – *G duodenalis*, *G lamblia* and *G intestinalis*. *Giardia* can infect a number of hosts including man. Seven different molecular subtypes have been identified, designated A to G. F is the subgroup seen in cats, whereas A and B are the main subgroups in man.<sup>1</sup> This is, therefore, not considered to be a zoonotic infection.<sup>2,3</sup>

### Life cycle

The parasite has a direct life cycle. It lives in the lower small intestine of the cat in its trophozoite form, adherent to the intestinal wall. It replicates by binary fission to produce the encysted form, which is passed in the faeces in addition to the trophozoites.

### Epidemiology

*Giardia* is transmitted by the faecal–oral route. Although trophozoites are excreted in the faeces, these do not survive well in the environment and are unlikely to cause infection. In contrast, cysts are highly infectious and successful transmission requires only a small number to be ingested. The cysts can survive in the environment for up to several months in ideal conditions and indirect transmission via faecal contamination can occur.

Epidemiological studies in different countries, and sampling of different cat populations, have shown a variable prevalence. While dependent on the diagnostic screening test used, generally a prevalence of 1–20% has been reported.<sup>4–6</sup> In some studies the prevalence in cats with diarrhoea has not been notably different as compared with healthy cats.

## Pathogenesis

The parasite can cause damage to and loss of the epithelial cells of the lower small intestine, provoking an inflammatory response. There may be blunting of the intestinal villi, leading to malabsorption.

## Clinical signs

Young cats are more susceptible to both infection and associated disease, with most clinical infections occurring in cats under 1 year of age. Many infections are not followed by overt disease, and the importance of *Giardia* as a diarrhoeal pathogen in cats is not clear. Experimental infections have induced clinical signs, but not in all cases. The mechanism by which diarrhoea is induced is also not clear, but thought to be related to malabsorption; there may be accompanying weight loss, which is a prominent feature in some cases. The diarrhoea is typically of a small intestinal nature, with passage of liquid or semi-liquid faeces, but may sometimes show large intestinal features, with the inclusion of mucus/blood. The clinical course may last for weeks.

## Immunity

The immune response to *Giardia* infection is poorly understood in cats. Based on information from infection in other species, it is presumed that cellular immunity and an IgA response are key to providing protective immunity.

## Diagnosis

The infection is diagnosed using direct examination of faecal smears (wet mount examination), faecal flotation methods, faecal ELISA antigen assays, direct immunofluorescence on faecal smears and PCR.

Trophozoites can be identified in fresh faecal smears. They are motile with a rolling action. A small amount of freshly passed faeces or mucus is mixed with a drop of saline solution on a microscope slide, covered with a coverslip and immediately examined under a microscope at a magnification of x100. Further examination at x400 allows definitive identification. It is also possible to examine for trophozoites using microscopy of duodenal aspirates collected during endoscopic small intestinal intubation. *Giardia* resides further down the small intestine of cats, beyond the reach of upper endoscopic intubation.<sup>7</sup>

### European Advisory Board on Cat Diseases

The European Advisory Board on Cat Diseases (ABCD) is a body of experts in immunology, vaccinology and clinical feline medicine that issues guidelines on prevention and management of feline infectious diseases in Europe, for the benefit of the health and welfare of cats. The guidelines are based on current scientific knowledge of the diseases and available vaccines concerned.

The latest version of the giardiasis in cats guidelines is available at [www.abcd-vets.org](http://www.abcd-vets.org)

**Cysts are highly infectious and successful transmission requires only a small number to be ingested.**



### EBM grades

The ranking system for grading the level of evidence of various statements within this article is described on page 533 of this Special Issue.

A zinc sulphate flotation method is recommended for faecal screening. Excretion of cysts is erratic and therefore several (usually three) faecal samples collected on consecutive or alternative days should be screened. Routine saturated salt or sucrose methods are unsatisfactory since they lead to distortion of the cysts.

It is also possible to use a direct fluorescent antibody technique to detect cysts in faecal smears, a test not widely used in Europe.

ELISA techniques for detecting antigen in faeces are available, including an in-practice SNAP test (IDEXX Ltd), but do not appear to be more sensitive than careful faecal screening [EBM grade IV].<sup>8</sup> Recent studies have shown that ELISA detection of antigen correlates well with direct fluorescent antibody screening results.<sup>9</sup>

PCR tests are available but not widely used. They have the advantage of being able to identify the subtype present. However, PCR-based studies have shown a high proportion of positives (up to 80%), which has raised concerns that they may detect infections that are not clinically relevant.<sup>10</sup>

The faecal flotation method has been the standard test used in the past, but the in-practice faecal antigen test appears to be equally sensitive and specific, and is convenient to perform [EBM grade I]. Examination of faecal smears is cheap and has the advantage of identifying other potential parasites – but it is not popular in practice and less sensitive.<sup>11</sup>

A pragmatic approach often used by practitioners as an alternative to testing is to assess the response to treatment.

## Treatment

The standard treatment of *Giardia* infection has generally been an imidazole, usually fenbendazole, given at 50 mg/kg for 5–7 days [EBM grade II].<sup>12,13</sup> However, metronidazole is an alternative, and the original recommendation was to use it at a dosage of 50 mg/kg for 5 days. This dosage carries an increased risk of side effects – central nervous system toxicity causing weakness, ataxia, disorientation and seizures. Recently, it has been suggested that a daily dosage of 25 mg/kg is effective, which is unlikely to induce side effects [EBM grade IV].

## Prevention

A vaccine based on inactivated trophozoites (Giardia Vax; Fort Dodge/Pfizer) has been used in the USA, but not in Europe, and is no longer available. It was used for treatment as well as for prevention.

**KEY POINTS**

- ❖ *Giardia* is a protozoan parasite of the small intestine.
- ❖ It is not considered to be a zoonotic agent.
- ❖ Disease is most common in young cats from multicat backgrounds.
- ❖ Infection causes diarrhoea, often with weight loss.
- ❖ Giardiasis is diagnosed by faecal antigen ELISA or faecal flotation of pooled faecal samples.
- ❖ Fenbendazole and metronidazole are the treatments of choice.

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**Conflict of interest**

The authors do not have any potential conflicts of interest to declare.

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