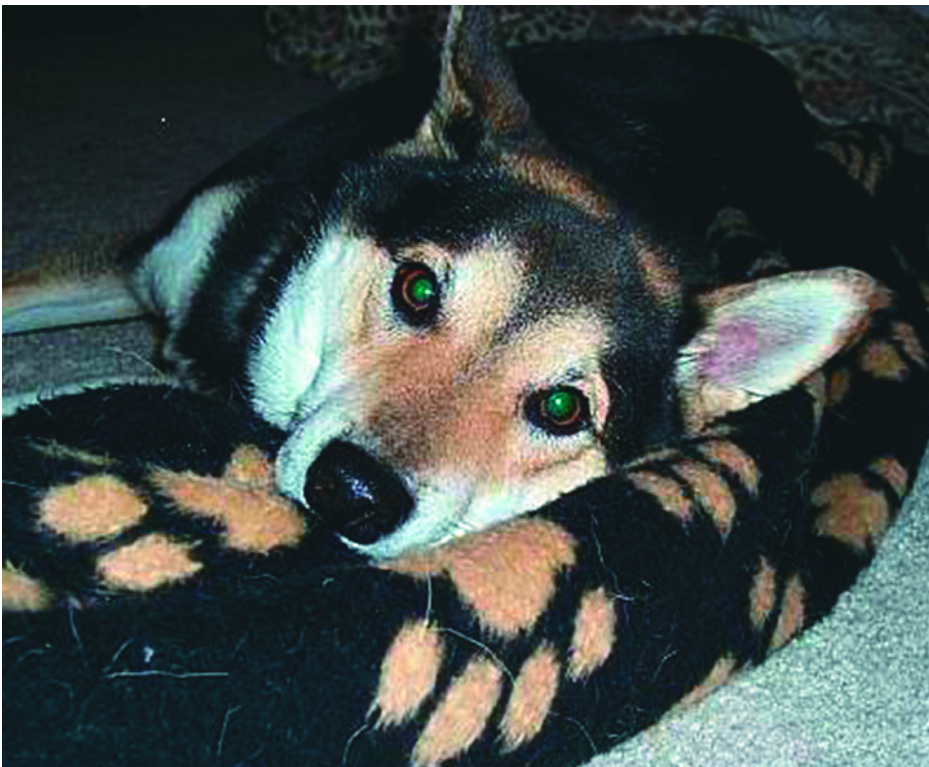


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Diarrhea & Vomiting in a Shiba Inu

A 1-year-old, 9-kg spayed female Shiba Inu was presented for acute gastrointestinal signs.



Courtesy Shane Smith

History. The dog had a chronic history of vomiting once or twice a month. Watery diarrhea with some mucus developed during the week prior to emergency evaluation. The patient vomited 8 times the night of presentation, with the vomitus progressing from food to blood-tinged fluid. The dog was up-to-date on vaccinations, was receiving seasonal heartworm preventative, and ate a commercial adult maintenance dry food.

Physical examination. The dog had a body condition score of 5/9. She was estimated to be 6% dehydrated and was afebrile. There was no pain assessed on abdominal palpation. On rectal examination, a scant amount of liquid feces was present. No other abnormalities were detected.

ASK YOURSELF ...

- What are possible causes of diarrhea and acute vomiting in a young dog?
- What diagnostics would be helpful in determining a diagnosis?

continues

Diagnosis:

***Campylobacter*-associated diarrhea (or erythromycin-responsive diarrhea associated with *Campylobacter* infection)**

Diagnostics. Serum sodium and potassium were mildly decreased. Abdominal radiographs showed increased intestinal gas (**Figure 1**). No parasitic ova were found with zinc sulfate centrifugation. A wet preparation revealed large numbers of motile spirochetes along with normal mixed bacterial flora. A fecal smear showed a large number of small, curved rods (**Figure 2**) and neutrophils. A fecal culture was submitted for *Clostridium*, *Salmonella*, and *Campylobacter*; *Campylobacter upsaliensis* was identified.

Wet preparations to visualize *Campylobacter* can be made by mixing a drop of feces and a drop of saline on a microscope slide and placing a coverslip over it. Examination may reveal motile curved rods with an unusual “darting” motion. A fecal smear stained with Wright-Giemsa or Diff-Quik may show small curved and “gull-wing”-shaped rods, although many times the organisms are missed. The presence of

DID YOU ANSWER ...

- In younger dogs, dietary indiscretion and gastrointestinal foreign bodies are common. However, diarrhea is not a major sign of foreign bodies. Infectious diseases (eg, parvoviral enteritis, intestinal parasites) also rank high on the differential list. Secondary gastrointestinal signs may occur with metabolic diseases, such as Addison’s disease.
- Abdominal radiography and zinc sulfate fecal centrifugation should be performed. If centrifugation is unavailable, flotation samples must sit for 10 to 15 minutes before examining. Submit a sample for IFA for *Giardia* and *Cryptosporidium*, and examine a stained fecal smear or a wet preparation of the feces. Complete blood count, serum biochemical profile, and urinalysis help exclude metabolic causes and evaluate electrolyte and acid–base status.

white blood cells should prompt fecal culture regardless of whether pathogenic bacteria are seen on the smear.

Fecal culture is a more reliable and definitive method of diagnosis. Inform reference laboratories of a potential fecal pathogen because specific culture media and conditions are required and *Campylobacter* species grow slowly. Fecal culture panels typically include *Campylobacter*, *Salmonella*, and *Clostridium*, which are all causes of hemorrhagic diarrhea.

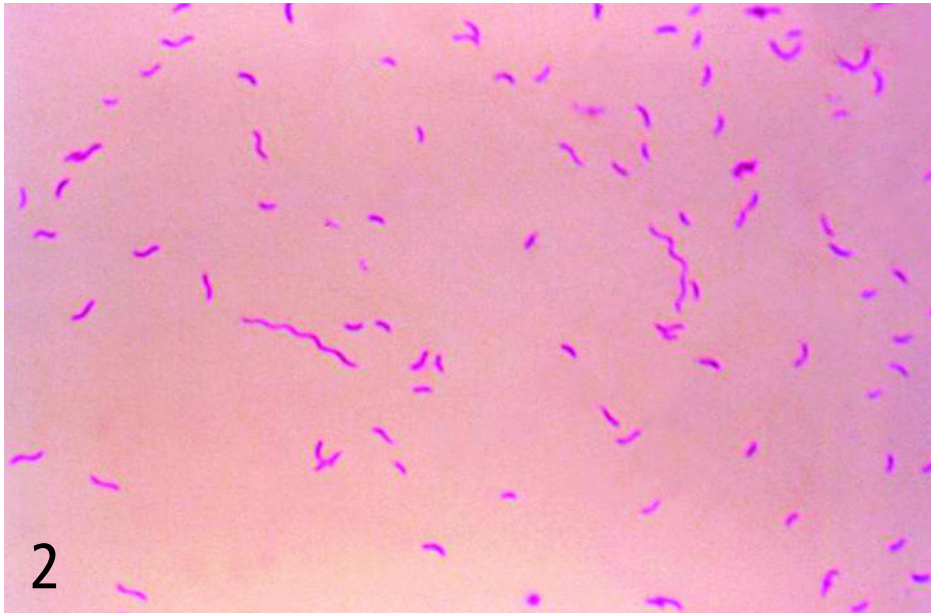
Treatment. The dog was treated with intravenous fluid therapy, metoclopramide by constant rate infusion (1 mg/kg/day), famotidine

(0.5 mg/kg Q 24 H), sucralfate (0.5 g PO Q 8 H), and erythromycin (27 mg/kg Q 12 H; to fit closest tablet size). The patient was given nothing by mouth for 24 hours and then a bland commercial diet was slowly introduced.

As *Campylobacter* infections tend to be self-limiting in dogs and cats, it is unknown if antimicrobial therapy alters the course of disease. Treatment appears warranted in animals with severe diarrhea and may be warranted in cats and dogs without clinical signs that cohabitate with young children or elderly or immunocompromised persons. The treatment of choice is erythromycin, though it can cause vomiting. Second-generation cephalosporins have been used



Abdominal radiographs showing increased intestinal gas



Gram stain of cultured *Campylobacter* species showing tiny curved rods and "gull-wing"-shaped rods
 Courtesy Centers for Disease Control and Prevention

effectively. Fluoroquinolones are effective, but drug resistance has been shown in dogs and is prevalent in humans. Plasmid-mediated resistance is seen with tetracyclines as well.

Outcome. The dog's vomiting resolved in the hospital and the diarrhea improved. The patient was discharged after 48 hours with instructions to administer erythromycin orally for 3 weeks. The erythromycin was well tolerated and the diarrhea resolved within 1 week.

As demonstrated by this case, it is difficult to prove that an organism in feces is associated with clinical signs exhibited by an individual animal. Improvement in this patient may have been coincidental and not related to antimicrobial therapy. Even when a suspect organism is isolated, attempts must be made to identify other possible causes of gastrointestinal signs by completing a thorough diagnostic evaluation.

Discussion. *Campylobacter* species are gram-negative, microaerophilic rods that colonize the gastrointestinal tract of dogs, cats, swine, poultry, and humans. The infection is spread by the

fecal-oral route via contact with feces or contaminated fomites. Although *Campylobacter* species can colonize the small and large intestine, pathologic lesions are often limited to the colon. Enterotoxins produced by the bacteria cause secretory diarrhea and epithelial damage.

Campylobacter species have been cultured from the feces of both healthy and diarrheic dogs and cats. In one study, the bacterium was isolated from 18% and 23% of healthy cats and dogs, respectively, compared to 16% and 27% of cats and dogs with diarrhea,¹ making the diagnosis of clinical infection both difficult and controversial. In this case, neither the positive culture nor the apparent response to erythromycin therapy definitively implicate *Campylobacter* as the cause of clinical signs, nor does it rule out an underlying intestinal disorder. *C jejuni* more frequently infects dogs less than a year of age than older dogs. Colonization by *C upsaliensis* can be prolonged and puppies can shed bacteria continuously for months.²

In most dogs and cats, colonization with *Campylobacter* is not associated with clinical

Tx at a Glance

Erythromycin:

- Dogs: 20 mg/kg Q 12 H for 7–21 days
- Cats: 10 mg/kg Q 8 H for 7–21 days

signs. Whether clinical disease develops may depend on age, immune competence, synergistic gastrointestinal infections or disease, and environmental stressors. The organism should be considered in dogs with unexplained chronic diarrhea. Signs in dogs thought to be clinically affected vary from self-limiting soft feces to mucoid diarrhea, hematochezia, and vomiting; signs may be acute, chronic, or intermittent.

Zoonotic potential. *C upsaliensis* is zoonotic, with dogs and cats being the only known sources so far. A case control study showed the odds of *Campylobacter* infection in infants and children was more than 16 times greater with puppy ownership.³ *C jejuni* may be an anthroponosis, as infection may be transferred from people to pets. *Campylobacter* causes significant diarrhea, vomiting, and abdominal pain in human patients and symptoms are frequently severe, especially in young children and the elderly. ■

See Aids & Resources, back page, for references, contacts, and appendices.
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IFA = immunofluorescent antibody assay