Campylobacter infection

INFECTIONS due to *Campylobacter* species have been recognised in animals for many years, although it is only relatively recently that the organism has been attributed to enteric infections in humans and their pets. There are many species of *Campylobacter*, most of which are pathogens of food-producing animals. *Campylobacter jejuni* is pathogenic to humans and animals and is found throughout the world in most species of birds and mammals. Other species that have been isolated from diarrhoeic dogs, but whose pathogenicity is unclear, include *C. coli*, *C. laridis* and *C. upsaliensis*. Campylobacteriosis is more common than salmonellosis as a cause of food poisoning in humans. There appear to be no discernible differences between the organisms causing human, canine and feline enteritis.

Pathogenesis

Campylobacters are thin, curved, Gram-negative motile rod bacteria. In Gram smears, S-shaped, seagull-shaped and sometimes long spiral forms may be seen. Many of the animal pathogens are commensals of the oral cavity, genital tract and intestinal tract. Some non-patho-

genic species are saprophytes in the environment.

C. jejuni is the main species of concern in dogs and cats, in which it causes enteritis. The role of *C. coli* as a cause of disease in animals is unclear although it is excreted by pets and is zoonotic. *C. jejuni* is microaerophilic (requires oxygen for growth) and, although it does not grow outside the body, it may survive in water for long periods, resisting chilling and freezing.

The organisms are spread by the faecal-oral route with the main sources of infection for pet animals being undercooked/raw food (liver, chicken, tripe and unpasteurised milk), water and direct (fresh diarrhoea from infected animals) or indirect (contaminated feeding/water bowls, other implements) contact with infected animals. Infection is most common in groups of animals in kennels and animal homes but can occur in individuals.

Accurate figures for the incidence of campylobacteriosis in pet animals in the UK are difficult to obtain. According to different studies, *Campylobacter* species may be isolated from between 20 and 30 per cent of diarrhoeic pet dogs and

cats, compared with less than 10 per cent of clinically normal dogs. In colonies, however, up to 100 per cent of dogs may be asymptomatic excretors of *Campylobacter*. Thus, it is evident that a carrier state exists and, in addition, *Campylobacter* species may be found in diarrhoea as an opportunist infection (eg, secondary to exocrine pancreatic insufficiency, malabsorption, giardiasis, coronavirus and parvovirus infections). A positive isolation of *C. jejuni* is, therefore, not necessarily diagnostic for campylobacteriosis.

Infections occur in many domestic mammals (including dogs and cats) and birds (including chickens, parrots and other pet birds) although infection of rabbits and other children's pets is uncommon.

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Electron micrograph of *Campylobacter jejuni* showing a spiral bacterium with a flagellum. Picture courtesy of Professor C. A. Hart, Department of Medical Microbiology, University of Liverpool

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Control measures

- Infected faeces should be disposed of by burning or burial after its disinfection
- Infected bedding should be disinfected or burnt
- Thorough hand disinfection should be carried out after contact with infected animals or bedding. The organism is sensitive to most disinfectants including the chlorine in household water supplies
- Affected animals should not be mixed with susceptible ones
- Affected dogs, especially puppies with diarrhoea, should be kept out of contact with children, particularly while diarrhoea persists
- Any pet with diarrhoea should be isolated from food preparation areas and scrupulous hygiene and disinfection carried out

Clinical disease in animals

C jejuni produces an adhesin, a cytotoxin and a heat-labile toxin similar to that of *Escherichia coli*. The latter two probably account for the clinical signs. Mild to watery diarrhoea, although occasionally mucoid and bloody, dullness and inappetence are the most common presenting signs. In contrast to humans, fever, anorexia and vomiting are rarely recognised in animals. The severity of infection is dependent on various factors including previous exposure, immune status, numbers and virulence of ingested organisms and the presence of other enteric pathogens. Clinical illness due to *C jejuni* is usually seen in animals under six months of age. The organisms can invade the body from the gut during the first 48 hours after infection, which may result in a slight rise in temperature, but this is unusual. Straining with the production of clear mucus, occasionally blood stained, can also be seen.

Death from campylobacter infection alone is unlikely but can occur in very young puppies and kittens. The infection appears to be self-limiting and affected animals and birds will recover in up to 10 days. Recovery is dependent upon the development of an appropriate secretory immunoglobulin A response, in common with many enteric infectious diseases. Repeated exposure to *Campylobacter* organisms throughout life probably results in a high level of gut immunity, which would prevent subsequent tissue invasion and colonisation. This would explain the lower incidence of clinical campylobacteriosis in older animals.

Campylobacter infections may occasionally be associated with abortion. A fetal septicaemia may result following infection and diarrhoea in the bitch.

Diagnosis

Isolation of the organisms from fresh (less than 24-hour-old) faeces and rectal swabs/scrapes are the most reliable methods for diagnosis. If cultures of samples are to be delayed, they should be stored in Cary Blair medium at 4°C. All *Campylobacter* isolates from animals should be treated as potentially zoonotic and should therefore be fully identified.

Zoonotic disease

Campylobacter and salmonella infections are the most common causes of enteritis in humans and are the commonest zoonoses. In humans, campylobacters cause an acute but self-limiting enteritis which lasts approximately 10 days. Symptoms include fever, headache, abdominal pain, vomiting and diarrhoea (often blood stained). More rarely, signs of arthritis, septicaemia and abortion are observed. Most infections are mild and mortality is extremely unusual. Diagnosis depends on identification of the organism from fresh faecal samples and it is usual to carry out serotyping.

Treatment

The duration of the severe diarrhoea associated with *Campylobacter* infection can be reduced by antimicrobial treatment. Although most infections are self-limiting, with animals making a complete recovery without treatment, treatment is recommended to minimise the risk to

humans and other animals. Erythromycin, given orally for up to 10 days, is still the first line antibiotic of choice for *Campylobacter* infections in humans. Other members of the macrolide group of antibiotics may also be effective. Many *Campylobacter* species produce beta-lactamases, thus accounting for their resistance to ampicillin. Although fluoroquinolones are effective against many *Campylobacter* species, responsible prescribing practice should reserve them for the treatment of serious (life-threatening) Gram-negative infections which are resistant to other antibacterials in routine clinical use. Fluid therapy should be instituted if dehydration exists.

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