



Contemplating *Campylobacter* spp

Kunaal Jindal, MD; and John M. Embil, MD, FRCPC

There are many causes of infectious diarrhea. *Campylobacter* spp is a frequent and often overlooked cause of diarrhea. Although it is common, other pathogens, such as Norovirus and *Escherichia coli* O157:H7, often take center stage and it is therefore that *Campylobacter* spp is this month's **Bug of the Month**.

What is Campylobacter spp?

These small, gram-negative, spiral-shaped bacteria can cause severe GI disease in humans. Currently, 18 species of *Campylobacter* are recognized; however, the principle cause of *Campylobacter* enteritis (> 99%) is due to *C. jejuni*. *Campylobacter* spp are well adapted to colonize the mucous membrane of the alimentary canal due to its ability to “corkscrew” through the mucosa with its spiral shape and long flagella.

Why is it important?

Campylobacter spp enteritis is a leading cause of acute diarrheal illness worldwide. In North America, most cases occur as isolated, sporadic events, not as a part of a large outbreak. In the US, *Campylobacter* spp is estimated to affect over 1 million people every year, with an estimated cost of \$1.5 to \$8.0 billion annually.

Where does it arise?

A wide variety of birds carry *C. jejuni*, with chickens representing

the largest known single source of *Campylobacter* spp infection. Many flocks of chickens are asymptomatically colonized with *C. jejuni* and the bacteria are easily spread between birds through shared water sources or through contact with contaminated feces. During slaughter and processing, *C. jejuni* can be transmitted from the intestines to the meat, resulting in up to 60% of raw chicken being contaminated with *C. jejuni*. *Campylobacter* spp can also be recovered from unpasteurized milk if the cow is infected or the milk is contaminated with manure. Mountain streams and surface water can similarly become contaminated through contact with infected feces from cows or birds. *Campylobacter* spp is common in the developing world and travellers to these areas are at risk of becoming infected.

How do we get infected with it?

The majority of cases of campylobacteriosis are caused by the handling or eating of raw or undercooked poultry. As little as one drop of juice from raw chicken is enough to be infective to

humans. Cross contamination from raw meat often occurs while cooking. An archetypal example would be the use of unwashed cutting boards or utensils to cut vegetables or bread, after those items have been used to prepare raw chicken.

C. jejuni occasionally is associated with person-to-person transmission when the infected person is a small child or is producing a large amount of diarrhea. Outbreaks are usually unrelated to poultry consumption and are due to drinking of unpasteurized milk or contaminated water.

What are its clinical features?

After an incubation period of two to five days, most patients begin to have diarrhea, abdominal pain and cramping and fever. As many as one-third of patients experience no GI symptoms during the prodromal phase and suffer only from fever and malaise. The diarrhea stage typically experienced includes cramping, periumbilical abdominal pains and profuse diarrhea, which is commonly bloody. The abdominal pains may radiate to the right iliac fossa, mimicking acute

appendicitis. Nausea and vomiting often accompany the other symptoms. The diarrheal stage is self-limiting and lasts an average of seven days.

How is it diagnosed?

The diagnosis of *Campylobacter spp* cannot be made clinically as there are a myriad of infections that cause abdominal pain and bloody diarrhea. Isolating the bacteria through fecal cultures establishes the diagnosis. The culture of *Campylobacter spp* is carried out on selective media and incubated in a gas mixture of 5% to 10% oxygen, 1% to 10% carbon dioxide and some hydrogen. Subsequent analysis and identification of *Campylobacter spp* colonies can be made under the microscope.

Does it need to be treated?

As *Campylobacter spp* infection is self-limiting, rarely is specific treatment needed. Maintenance of adequate hydration and replenishment of electrolyte depletion should be the goal of therapy. Antibiotic treatment is only indicated in patients with increased risk or with severe disease. These include persons who are pregnant, severely ill, elderly, immunocompromised

and patients with bloody stools or symptoms persisting longer than one week. *C. jejuni* is sensitive to macrolides, fluoroquinolones, aminoglycosides, tetracyclines and chloramphenicol; however, resistance to fluoroquinolones is increasing. The antibiotic of choice for the treatment of *Campylobacter spp* gastroenteritis is azithromycin 500 mg p.o. q.d. for three days or ciprofloxacin 500 mg p.o. b.i.d. for three days.

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What are the complications?

Most people recover from *C. jejuni* infections within one week of onset, although recovery can take up to 10 days. Long-term complications rarely arise due to this infection, but the following summarize some potential complications of infection with *C. jejuni*:

- **Guillain-Barre syndrome:** This disease affects the nerves of the body several weeks after the diarrheal illness has resolved. It involves the body's immune system mounting an attack on the body's own nerves, resulting in an ascending paralysis which may last weeks to months and may require intensive care. Up to 40% of Guillain-Barre cases are attributable to *C. jejuni*

- **Reactive arthritis:** This arthritis is similar to that following *Salmonella spp* and *Shigella spp* and has a relatively low incidence ranging from 0% to 2.6%. Carriers of the HLA-B27 gene are more likely to develop this complication. Joint pain and swelling typically appear one to two weeks following the onset of diarrhea. The duration of arthritis ranges from one week to months and frequently affects the knees, ankles, wrists and small joints of the hands. Twenty per cent of patients will also develop conjunctivitis. Patients should be reassured as this disease is self-resolving

How can it be prevented?

The most important prevention measure is the proper handling and cooking of poultry. Since *C. jejuni* is heat killed, all chicken should be cooked throughout until the center is no longer pink and the juices run clear. The internal temperature should reach 170° F (77° C) for breast meat and 180° F (82° C) for thigh meat. Avoidance of cross contamination is imperative through the washing of cutting boards and utensils with hot, soapy water. Hand washing before and after handling raw foods also prevents cross contamination. Avoid drinking unpasteurized milk and untreated surface water. Campers and travellers to developing nations must be cautioned against consuming untreated water. Everyone, especially those with diarrhea, must wash their hands carefully with soap after using the washroom.

Dr. Jindal is a Plastic Surgery Resident, University of Toronto, Toronto, Ontario.

Dr. Embil is a Consultant, Infectious Diseases and an Associate Professor, University of Manitoba. He is also Medical Director, Infection Prevention and Control Program, Health Sciences Centre and Winnipeg Regional Health Authority, Winnipeg, Manitoba.

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