Intestinal Spirochetes
Organisms in Search of a Disease?

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The field of gastroenterology includes many examples of organisms whose pathogenicity has been questioned in the past. Older members of the American Society for Clinical Pathology might remember the skepticism with which the original publications by Warren and Marshall detailing the description of Helicobacter pylori associated with chronic active gastritis were greeted. It was not until Koch’s postulates were fulfilled by having a volunteer ingest the organism that the bacterium was accepted as a pathogen. We now accept that H pylori, while present as an asymptomatic infection in many people, is a pathogen with a large variety of manifestations. On the other hand, the pathogenic status of Blastocystis hominis probably will never be resolved satisfactorily.

In this issue of the Journal, Koteish and colleagues present a retrospective review of 14 cases in which endoscopic biopsies revealed the presence of spirochetes in the colon. The study raises many interesting questions about the clinical and pathogenic significance of these organisms but provides few definitive answers. Genotypic analysis of 13 of the cases indicated that 11 patients were infected with Brachyspira aalborgi, while the remaining 2 patients had Brachyspira pilosicoli infections. The predominance of B aalborgi as the intestinal spirochete was confirmed by a recent study from Australia with similar findings. Six of the patients had symptoms, which was the reason for biopsy: 2 HIV-infected men and all 4 of the children. The remaining patients, who were all adults, were asymptomatic and underwent biopsy for reasons other than diarrhea or abdominal pain. Two patients were treated with antibiotics. The 1 patient for whom follow-up information was available had complete resolution of symptoms. Two of the asymptomatic adults had follow-up biopsy, with spirochetes found in the specimen from one of these patients. Interestingly, even in symptomatic patients, the presence of spirochetes, which were found throughout the colon, was not associated with active inflammation, mucosal damage, or histologic changes consistent with chronic infection.

What are we to make of these findings? Because this case series involved a search of the surgical pathology files in a large tertiary care hospital from January 1994 to January 2002, the prevalence of intestinal spirochetosis, whether symptomatic or asymptomatic, may be low. However, Koteish and colleagues reported that spirochetes are present in the colon in approximately 2.5% to 16% of people from Western countries, with prevalence rates as high as 50% in inhabitants of the developing world and in homosexual men. However, few people with spirochetes in their colons have gastrointestinal symptoms. In a study of Dutch patients with acute or chronic gastroenteritis and from whom no other pathogen could be found, only 1.1% of fecal samples (2/182) were positive for B aalborgi by polymerase chain reaction. According to this study and others, the patients likely to have symptoms are children and immunocompromised adults, especially males with HIV. However, at least 1 study has detailed the presence of gastrointestinal symptoms in heterosexual adults who were not immunocompromised.

The most important question still to be answered is whether the association of spirochetes in the colon with gastrointestinal symptoms is causal or coincidental. The definitive way to answer this question is to attempt to fulfill Koch’s postulates, which has not been done. Moreover, given the large number of people who harbor spirochetes in the colon and are asymptomatic, fulfilling these postulates might require a very specific type of host.
However, there are case reports indicating that the organism is pathogenic in certain circumstances. In the article previously cited in which spirochetes caused gastrointestinal symptoms in heterosexual adults,12 there was documentation by electron microscopy of uptake of the organisms by a variety of cells, including colonic epithelium and goblet cells, macrophages, and Schwann cells, along with stunting of the microvilli. In another study that reported 3 cases in people with advanced HIV infection,14 2 patients had colitis, and colonoscopy revealed diffuse ulceration or pustules. Histologically, these lesions had extensive epithelial necrosis along with acute inflammatory cells in the mucosa and lamina propria. Spirochetes were seen in the mucosa and crypts. The third patient, who had cholestatic hepatitis, underwent a liver biopsy that also was positive for organisms.

An ultrastructural study15 of intestinal spirochetosis in 2 homosexual men with AIDS and gastrointestinal symptoms also showed invasion of the colonic mucosa by spirochetes, along with a conspicuous inflammatory response composed of macrophages in the lamina propria. B pilosicoli also has been found in the bloodstream of patients with severe illnesses.16 However, the organisms might have gained access to the blood by translocation rather than by active invasion. Unfortunately, blood cultures from more than 1,000 people whose clinical symptoms were similar to those in the previous article16 or who had symptoms similar to those of people with carriage of intestinal spirochetes were all negative.17

The work of Koteish and colleagues4 brings to our attention the presence of spirochetes in the colon, more often than not as a coincidental finding in biopsy specimens obtained because of other conditions. The article, along with other publications, shows that the predominant spirochete in these circumstances is B aalborgi, which so far has been found only in humans and is distributed diffusely through the colon. This spirochete species is distributed widely in certain populations, but unlike other intestinal spirochetes that are important enteric pathogens in animals, B aalborgi might be pathogenic only in certain clinical circumstances that have yet to be defined completely.

References