# **Chapter 2**

# Aeromonas, Vibrio cholerae, and Related Bacteria

**Keywords** Aeromonas sp • Vibrio sp • Plesiomonas sp • Edwardsiella sp • Colitis • Bacteria

Aeromonas species are ubiquitous in soil and water sources throughout the world. Infection commonly results from exposure to untreated water, but also may result from consuming contaminated foods such as produce, meat, and dairy products. Aeromonads are not part of the normal human intestinal flora. They were initially believed to be nonpathogenic, as they are occasionally isolated from the stool of asymptomatic persons. They are increasingly recognized as a cause of gastroenteritis in both healthy and immunocompromised adults and children, based on the recovery of the organism from the stool of symptomatic patients in the absence of other pathogens, and subsequent complete response to antibiotic therapy. The motile Aeromonas hydrophila and Aeromonas sobria most often cause gastrointestinal disease in humans, although other species may as well.

Gastrointestinal *Aeromonas* infections most frequently present in the late spring, summer, and early fall. Children are most commonly affected. A mild, self-limited diarrheal illness is most frequently described, sometimes accompanied by nausea, vomiting, and cramping abdominal pain. A more severe, dysentery-like illness occurs in 15–25% of patients, featuring bloody or mucoid diarrhea and fecal leukocytes. This variant is most likely to mimic chronic idiopathic inflammatory bowel disease endoscopically. A minority of patients experiences a subacute, chronic diarrhea lasting months to years, and the chronic nature of the symptoms may mimic chronic idiopathic inflammatory bowel disease clinically.

*Pathologic features.* Endoscopically, findings include mucosal edema, friability, erosions, exudates, and loss of vascular pattern (Fig. 2.1). The distribution is often segmental, either right- or left-sided, and may mimic ischemic colitis, Crohn's disease, or ulcerative colitis macroscopically. A severe pancolitis mimicking fulminant ulcerative colitis has been described as well. The histologic features are usually those of acute self-limited colitis, including cryptitis,



Fig. 2.1 Both *Aeromonas* and *Plesiomonas* colitis can show mucosal erythema, erosions, and friability (courtesy Dr. Karl Landberg)

crypt abscesses, and a neutrophilic infiltrate in the lamina propria (Fig. 2.2). However, ulceration (Fig. 2.3) and focal architectural distortion may be seen in some cases (Fig. 2.4).

*Differential diagnosis.* The differential diagnosis includes other infectious colitides, ischemic colitis, and chronic idiopathic inflammatory bowel disease. Stool cultures are critical to diagnosis, and certain selective media may be required.

When architectural distortion is present in a patient with chronic symptoms or macroscopic features mimicking chronic idiopathic inflammatory bowel disease, it may be difficult to resolve the issue of *Aeromonas* infection versus Crohn's disease or ulcerative colitis. *Aeromonas* has been reported as a cause of exacerbations in idiopathic inflammatory bowel disease as well. For these reasons, some authorities recommend culturing for *Aeromonas* in all patients with refractory chronic inflammatory bowel disease, as well as patients (particularly children) with a presumed initial presentation of chronic idiopathic inflammatory bowel



**Fig. 2.2** *Aeromonas* colitis. Low-power view shows cryptitis and a mixed inflammatory infiltrate in the lamina propria (**a**). Well-developed neutrophilic cryptitis and crypt abscesses are common features (**b**–**d**)

disease. Although there are no histologic features specific for *Aeromonas* infection (as with many infections of the gastrointestinal tract), it is important for the surgical pathologist to realize that this is one of the bacteria that can most closely mimic chronic idiopathic inflammatory bowel disease.

*Plesiomonas shigelloides* and *Edwardsiella tarda* are similar freshwater bacteria. Although less commonly isolated than *Aeromonas* species, they are believed to cause a similar clinical, macroscopic, and histologic spectrum of disease (Fig. 2.5).

*Vibrio cholerae*, specifically the toxigenic O1 strain, is the causative agent of cholera, an important worldwide cause of watery diarrhea and dysentery that may lead to significant dehydration, electrolyte imbalance, and death within hours. In the United States, most cases occur in patients who have traveled to or emigrated from endemic or epidemic areas. Most infections are due to consumption of raw or undercooked seafood, especially shellfish. Other *Vibrios*, including non-O1 strains of *V. cholerae*, *V. hollisae*, and *V. parahaemolyticus*, also can cause severe gastroenteritis.



**Fig. 2.3** Focal colonic ulcerations in a case of right-sided *Aeromonas* colitis, proven by culture and PCR assay, which mimicked Crohn's disease clinically

Symptoms of cholera include abrupt onset of diarrhea, usually profusely watery and rarely bloody, accompanied by abdominal pain, vomiting, muscle cramps, and fever. Strains other than toxigenic O1 *V. cholerae* are more likely to cause bloody diarrhea, fecal leukocytes, and dissemination to extraintestinal sites; however, the clinical scenarios produced by toxigenic *V. cholerae* O1 and other *Vibrios* may be indistinguishable. Disseminated infection is a particularly important risk with immunocompromised patients; patients with underlying liver disease, partial or total gastrectomy, and diseases of iron metabolism are also at risk for more serious *Vibrio* infections.

Despite the severity of the illness, toxigenic *V. cholerae* O1 is a non-invasive organism that causes minimal or no histologic changes in the gut. Rare non-specific findings such as small bowel mucin depletion, degenerative surface epithelial changes, and a mild increase in lamina propria mononuclear cells have been reported rarely.



Fig. 2.4 Architectural distortion in Aeromonas infection may mimic chronic idiopathic inflammatory bowel disease (a and b)



Fig. 2.5 Culture-proven *Plesiomonas* colitis showing patchy architectural distortion (a), cryptitis, and crypt abscesses (b). An ulcerative ileitis was also present (c)

Non-toxigenic O1 and other non-cholerae *Vibrio* species may show an erosive enterocolitis with active neutrophilic inflammation and associated hemorrhage. Useful ancillary diagnostic tests include culture, darkfield examination of stool, and serologic studies. A history of travel to or emigration from an endemic or epidemic area also can be invaluable.

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