Chapter 23

Miscellaneous Enteric Viruses

Keywords Viral enteritis • Acute viral gastroenteritis • Rotavirus • Coronavirus • Norwalk virus • Calicivirus • Echovirus • Enterovirus • Diarrhea

Acute viral gastroenteritis is second only to the common cold as a cause of illness in the United States. It often occurs in outbreaks, sometimes associated with food or water, and is a major recurrent problem in public health. Although most infections are self-limited, viral gastroenteritis can cause severe dehydration (particularly rotavirus), as well as chronic diarrhea in children with immunodeficiency syndromes such as severe combined immunodeficiency. Enteric viral infections are also a significant cause of diarrhea in patients with AIDS. Similar to adenovirus, rotavirus and enterovirus are associated with intussusception in children.

Many enteric viruses do not cause disease in humans; others seldom if ever cross the stage of the surgical pathologist, as they are detected in stool samples rather than biopsy specimens. Common enteric viruses known to cause diarrhea in humans include, but are not limited to, adenovirus, rotavirus, coronavirus, astrovirus, Norwalk virus and other enteric caliciviruses, and echovirus and other enteroviruses (see Table 23.1). Interestingly, enteric involvement has been documented in the coronavirus-associated severe acute respiratory syndrome (SARS), and diarrhea was a common presenting symptom in that outbreak.

Pathologic findings. Many surgical pathologists are unfamiliar with the non-specific biopsy findings of viral enteritis, as we so rarely encounter these specimens. Pathologic studies are limited, and may not reflect the spectrum of changes in mild illness since most biopsy specimens are obtained from relatively sick patients.

Small bowel biopsy findings include villous fusion, broadening, and blunting (Figs. 23.1, 23.2, and 23.3); crypt hypertrophy (Fig. 23.4); and an increased mononuclear cell infiltrate within the lamina propria with variably present neutrophils (Fig. 23.5). There may be an increase in intraepithelial lymphocytes as well (Fig. 23.6). Reactive and degenerative epithelial changes are usually present, particularly at the surface, including epithelial cell disarray and loss of nuclear polarity (Figs. 23.7 and 23.8). Increased apoptosis may be seen in surface and glandular epithelium. In the limited number of human studies available, the severity of the histologic lesion does not appear to correlate with clinical

Table 23.1 Comparison of selected enteric viruses causing diarrheal illness in humans

	Average incubation period	Patient's age	Symptoms	Length of symptoms	Other features
Rotavirus	1–3 days	Peak age 6–24 months	Vomiting, fever, diarrhea	5–7 days	Most common cause of severe, dehydrating diarrhea in children Asymptomatic in neonates, older children, adults Peaks in winter in temperate zones
Norwalk virus	2 days	Any age	Mild vomiting, diarrhea, myalgias, headache	12–48 hour	Associated with shellfish, other food, water Associated with outbreaks in nursing homes, families, community settings
Astrovirus	3–4 days	Children	Mild vomiting, diarrhea, fever	2–4 days	Also affects elderly patients, immunocompromised patients
Enteric adenovirus	7 days	Infants and young children	Vomiting, fever, diarrhea	3–12 days	Also affects the immunocompromised

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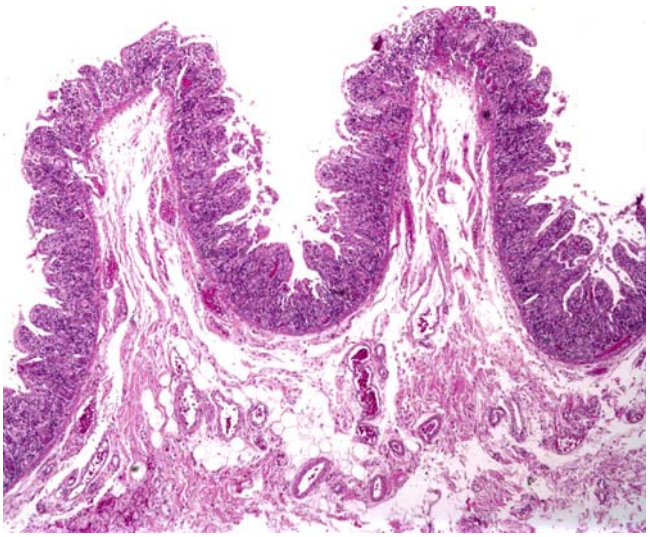

Fig. 23.1 A low-power view of severe viral enteritis shows villous blunting, broadening, and fusion in the small bowel mucosa

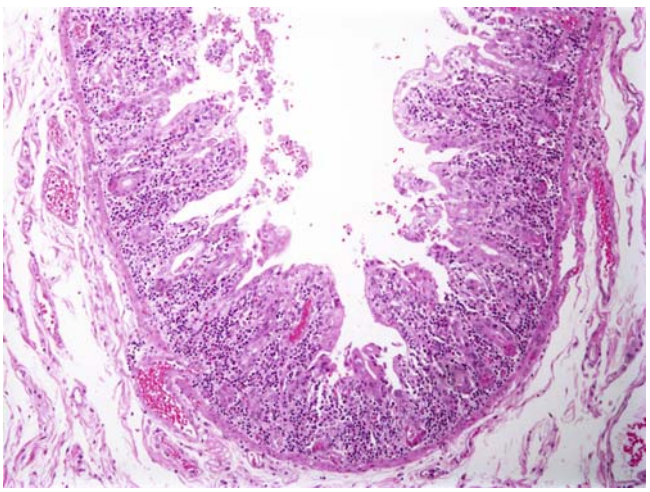

Fig. 23.2 Villous blunting, broadening, and fusion, along with an increased mononuclear cell infiltrate in the lamina propria and sloughing of surface epithelium

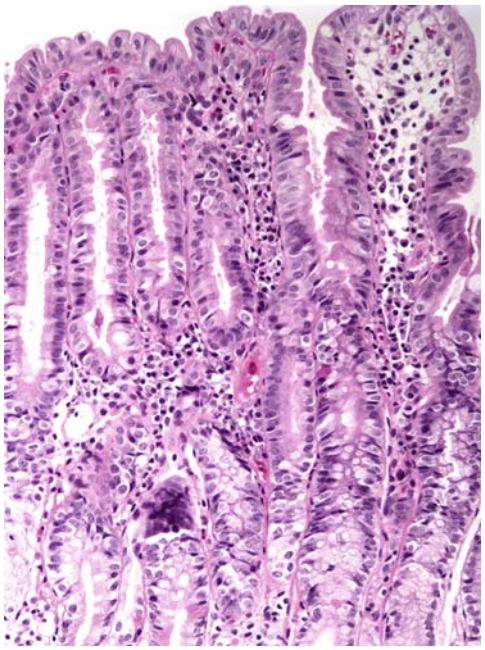

Fig. 23.3 Villous fusion in a case of viral enteritis

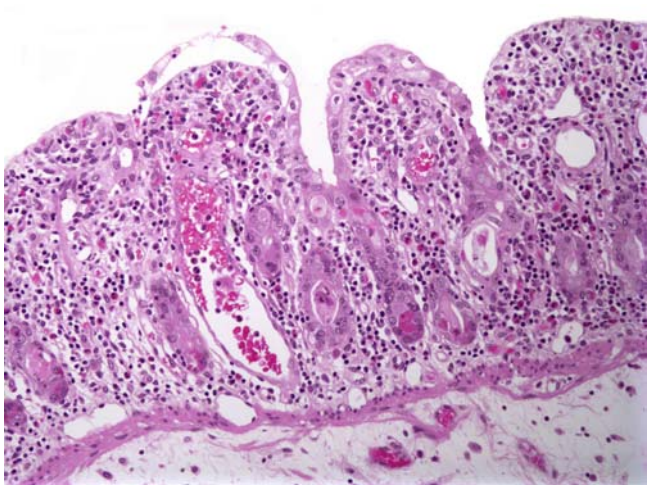

Fig. 23.4 Marked villous blunting and broadening, along with crypt hypertrophy and surface degenerative changes

severity of illness. Most human studies of the histopathology associated with enteric viral infection are limited to the duodenum. The rare reports that have evaluated the large bowel report histologic findings ranging from normal to focal cryptitis with increased apoptosis. With the exception of adenovirus infection in immunocompromised patients (see Chapter 22), inclusions are not seen on light microscopy.

Differential diagnosis. The differential diagnosis includes celiac disease, NSAID injury, and peptic ulcer disease. The histologic changes in viral enteritis rapidly return to normal as the patient's symptoms abate, and serologic assays for celiac disease should be negative. Peptic ulcer disease usually features more neutrophils and active inflammation than viral enteritis, and lacks villous fusion and significant apoptosis. A history of NSAID usage (rare in pediatric patients) can help distinguish viral enteritis from NSAID injury, and again villous fusion is unusual in an adverse drug reaction. Viral culture and electron microscopic examination of tissue or feces may be valuable ancillary diagnostic tests.

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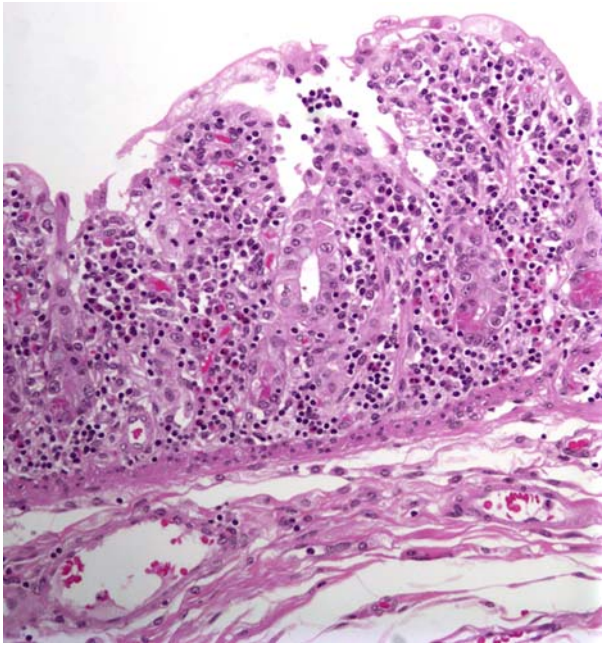

Fig. 23.5 Viral enteritis often shows an increase in mononuclear cells in the lamina propria, along with scattered granulocytes

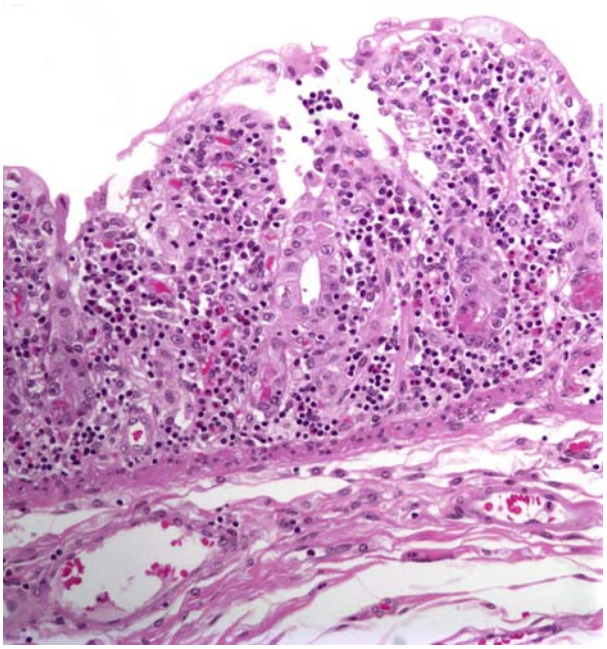

Fig. 23.6 Increased intraepithelial lymphocytes may be seen in surface and glandular epithelium

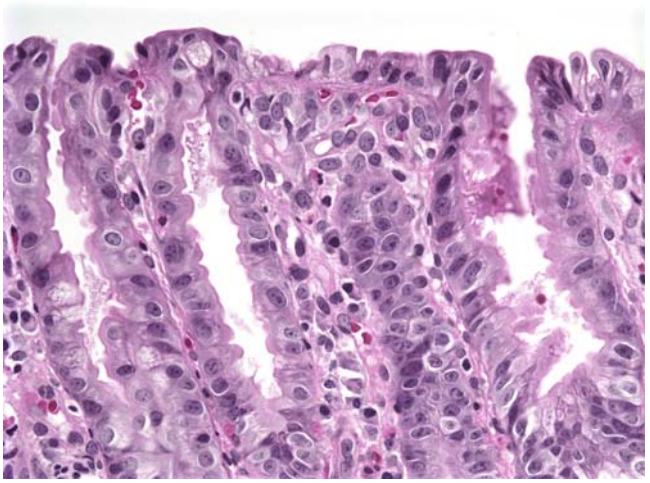

Fig. 23.7 Surface degenerative changes including pyknotic nuclei and loss of nuclear polarity

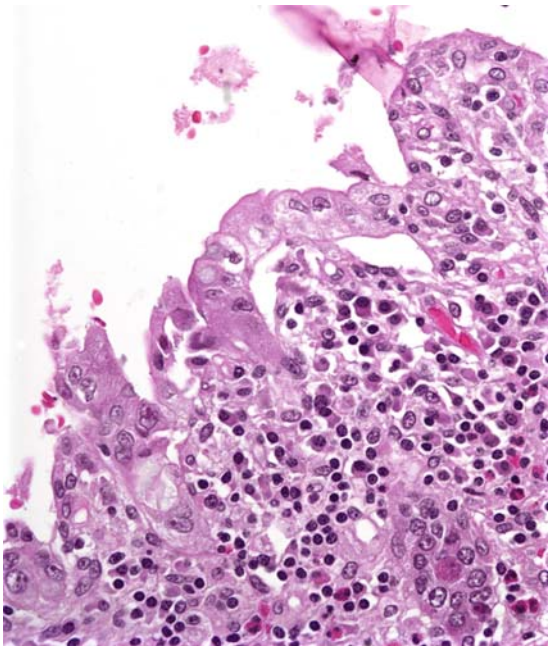

Fig. 23.8 Surface degenerative changes including epithelial cell disarray, loss of nuclear polarity, and sloughing of epithelial cells

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