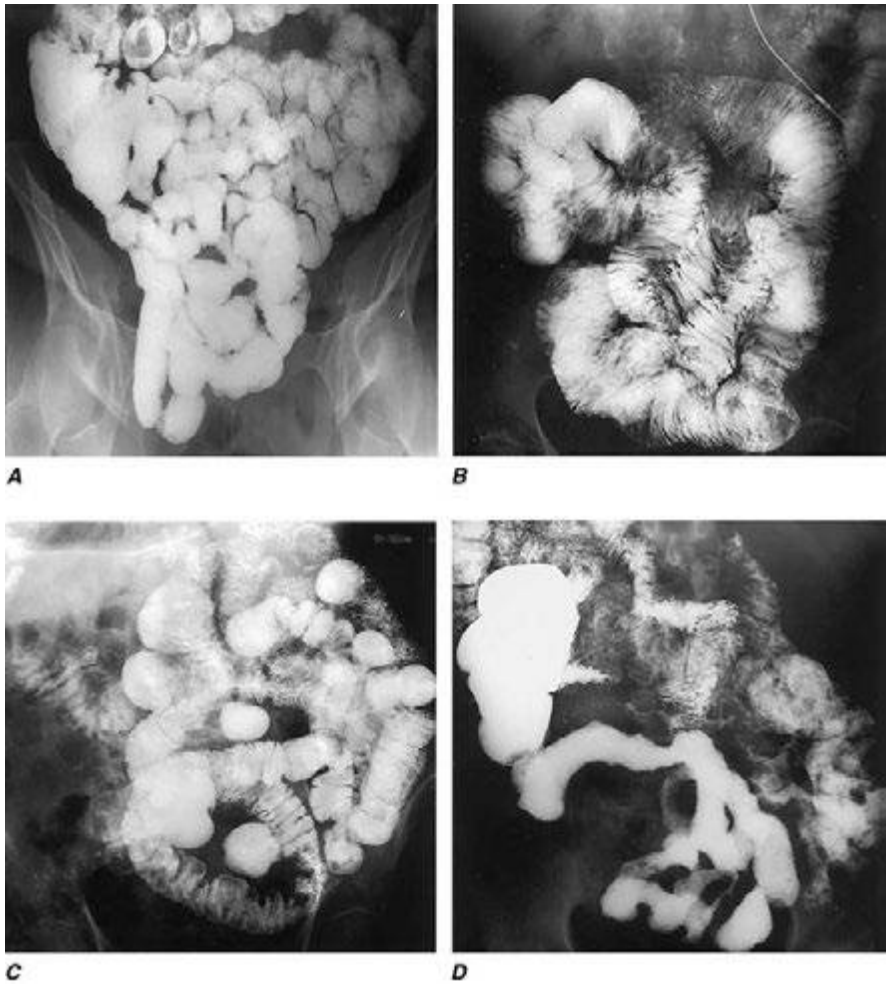

FIGURE 349-3 **Barium contrast small-intestinal radiologic examinations. *A.*** Normal individual. ***B.*** Celiac sprue. ***C.*** Jejunal diverticulosis. ***D.*** Crohn's disease. *(Courtesy of Morton Burrell, MD, Yale University; with permission.)*

histologic material from the proximal small-intestinal mucosa. The primary indications for a small-intestinal biopsy are evaluation of a patient (1) either with documented or suspected steatorrhea or with chronic diarrhea, and (2) with diffuse or focal abnormalities of the small intestine defined on a small-intestinal series. Lesions seen on small-bowel biopsy can be classified into three categories (Table 349-6):

1. *Diffuse, specific lesions.* Relatively few diseases associated with altered nutrient absorption have specific histopathologic abnormalities on small-intestinal mucosal biopsy, and these diseases are uncommon. *Whipple's disease* is characterized by the presence of periodic acid–Schiff (PAS)–positive macrophages in the lamina propria; the bacilli that are also present may require electron microscopic examination for identification (Fig. 349-4). *Abetalipoproteinemia* is characterized by a normal mucosal appearance except for the presence of mucosal absorptive cells that contain lipid postprandially and disappear after a prolonged period of either fat-free intake or fasting. *Immune globulin deficiency* is associated with a variety of histopathologic findings on small-intestinal mucosal biopsy. The characteristic feature is the absence of or substantial reduction in the number of plasma cells in the lamina propria; the mucosal architecture may be either perfectly normal or flat (i.e., villous atrophy). As patients with immune globulin deficiency are often infected with *Giardia lamblia, Giardia* trophozoites may also be seen in the biopsy.
2. *Patchy, specific lesions.* Several diseases feature an abnormal small-intestinal mucosa with a patchy distribution. As a result, biopsy samples obtained randomly or in the absence of endoscopically visualized abnormalities may not reveal diagnostic features. Intestinal *lymphoma* can at times be diagnosed on mucosal biopsy by the identification of malignant lymphoma cells in the lamina propria and submucosa (Chap. 134). Dilated lymphatics in the submucosa and sometimes in the lamina propria indicate *lymphangiectasia* associated with hypoproteinemia secondary to protein loss into the intestine. *Eosinophilic gastroenteritis* comprises a heterogeneous group of disorders with a spectrum of presentations and symptoms, with an eosinophilic infiltrate of the lamina propria, and with or without peripheral eosinophilia. The patchy nature of the infiltrate and its presence in the submucosa often lead to an absence of histopathologic findings on mucosal biopsy. As the involvement of the duodenum in *Crohn's disease* is also submucosal and not necessarily continuous, mucosal biopsies are not the most direct approach to the diagnosis of duodenal Crohn's disease (Chap. 351). Amyloid deposition can be identified by Congo Red staining in some patients with *amyloidosis* involving the duodenum (Chap. 136).
3. *Diffuse, nonspecific lesions. Celiac disease* presents with a characteristic mucosal appearance on duodenal/proximal jejunal mucosal biopsy that is *not* diagnostic of the disease. The diagnosis of celiac disease is established by clinical, histologic, and immunologic responses to a gluten-free diet. *Tropical sprue* (see below) is associated with histologic findings similar to those of celiac disease after a tropical or subtropical exposure but does not respond to gluten restriction; most often symptoms improve with antibiotics and folate administration.