Colonic disease may fistulize into the stomach or duodenum, causing feculent vomiting, or to the proximal or mid-small bowel, causing malabsorption by "short circuiting" and bacterial overgrowth. Ten percent of women with Crohn's colitis will develop a rectovaginal fistula.

Perianal disease affects about one-third of patients with Crohn's colitis and is manifested by incontinence, large hemorrhoidal tags, anal strictures, anorectal fistulae, and perirectal abscesses. Not all patients with perianal fistula will have endoscopic evidence of colonic inflammation.

GASTRODUODENAL DISEASE Symptoms and signs of upper GI tract disease include nausea, vomiting, and epigastric pain. Patients usually have an *Helicobacter pylori*–negative gastritis. The second portion of the duodenum is more commonly involved than the bulb. Fistulas involving the stomach or duodenum arise from the small or large bowel and do not necessarily signify the presence of upper GI tract involvement. Patients with advanced gastroduodenal CD may develop a chronic gastric outlet obstruction.

Laboratory, Endoscopic, and Radiographic Features Laboratory abnormalities include elevated ESR and CRP. In more severe disease, findings include hypoalbuminemia, anemia, and leukocytosis.

Endoscopic features of CD include rectal sparing, aphthous ulcerations, fistulas, and skip lesions. Colonoscopy allows examination and biopsy of mass lesions or strictures and biopsy of the terminal ileum. Upper endoscopy is useful in diagnosing gastroduodenal involvement in patients with upper tract symptoms. Ileal or colonic strictures may be dilated with balloons introduced through the colonoscope. Strictures ≤4 cm and those at anastomotic sites respond better to endoscopic dilation. The perforation rate is as high as 10%. Most endoscopists dilate only fibrotic strictures and not those associated with active inflammation. Wireless capsule endoscopy (WCE) allows direct visualization of the entire small-bowel mucosa (Fig. 351-8). The diagnostic yield of detecting lesions suggestive of active CD is higher with WCE than CT or magnetic resonance (MR) enterography or small-bowel series. WCE cannot be used in the setting of a small-bowel stricture. Capsule retention occurs in <1% of patients with suspected CD, but retention rates of 4–6% are seen in patients with established CD. It is helpful to give the patient with CD a patency capsule, which is made of barium and starts to dissolve 30 h after ingestion. An abdominal x-ray can be taken at around 30 h after ingestion to see if the capsule is still present in the small bowel, which would indicate a stricture.

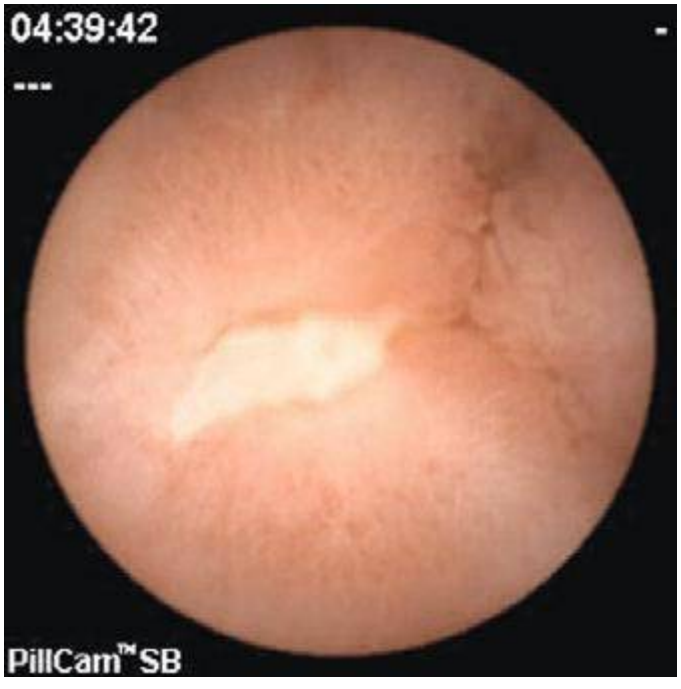

FIGURE 351-8 Wireless capsule endoscopy image in a patient with Crohn's disease of the ileum shows ulcerations and narrowing of the intestinal lumen. *(Courtesy of Dr. S. Reddy, Gastroenterology Division, Department of Medicine, Brigham and Women's Hospital, Boston, Massachusetts; with permission.)*

In CD, early radiographic findings in the small bowel include thickened folds and aphthous ulcerations. "Cobblestoning" from longitudinal and transverse ulcerations most frequently involves the small bowel. In more advanced disease, strictures, fistulas, inflammatory masses, and abscesses may be detected. The earliest macroscopic findings of colonic CD are aphthous ulcers. These small ulcers are often multiple and separated by normal intervening mucosa. As the disease progresses, aphthous ulcers become enlarged, deeper, and occasionally connected to one another, forming longitudinal stellate, serpiginous, and linear ulcers (see Fig. 345-4*B*).

The transmural inflammation of CD leads to decreased luminal diameter and limited distensibility. As ulcers progress deeper, they can lead to fistula formation. The radiographic "string sign" represents long areas of circumferential inflammation and fibrosis, resulting in long segments of luminal narrowing. The segmental nature of CD results in wide gaps of normal or dilated bowel between involved segments.

Both CT and MRI of the small bowel can be performed by enterography (CTE or MRE), using oral and IV contrast, as well as enteroclysis. Although institutional preference guides technique selection, CTE and MRE tend to be preferred over enteroclysis due to ease and patient preference. Although CTE, MRE, and small-bowel follow-through (SBFT) have been shown to be equally accurate in the identification of active small-bowel inflammation, CTE and MRE have been shown to be superior to SBFT in the detection of extraluminal complications, including fistulas, sinus tracts, and abscesses. Currently, the use of CT scans is more common than MRI due to institutional availability and expertise. However, MRI is thought to offer superior soft tissue contrast and has the added advantage of avoiding radiation exposure changes (Figs. 351-9 and 351-10). The lack of ionizing radiation is particularly appealing in younger patients and when monitoring response to therapy where serial images will be obtained. Either CTE or MRE is the first-line test for the evaluation of suspected CD and its complications. Pelvic MRI is superior to CT for demonstrating pelvic lesions such as ischiorectal abscesses and perianal fistulae (Fig. 351-11).

Complications Because CD is a transmural process, serosal adhesions develop that provide direct pathways for fistula formation and reduce the incidence of free perforation. Perforation occurs in 1–2% of patients, usually in the ileum but occasionally in the jejunum or as a complication of toxic megacolon. The peritonitis of free perforation, especially colonic, may be fatal. Intraabdominal and pelvic abscesses occur in 10–30% of patients with CD at some time in the course of their illness. CT-guided percutaneous drainage of the abscess is standard therapy. Despite adequate drainage, most patients need resection of the offending bowel segment. Percutaneous drainage has an especially high failure rate in abdominal wall abscesses. Systemic glucocorticoid therapy increases the risk of intraabdominal and pelvic abscesses in CD patients who have never had an operation. Other complications include intestinal obstruction in 40%, massive hemorrhage, malabsorption, and severe perianal disease.

Serologic Markers Patients with CD show a wide variation in the way they present and progress over time. Some patients present with mild disease activity and do well with generally safe and mild medications, but many others exhibit more severe disease and can develop serious complications that will require surgery. Current and developing biologic therapies can help halt progression of disease and give patients with moderate to severe CD a better quality of life. There are potential risks of biologic therapies such as infection and malignancy, and it would be optimal to determine at the time of diagnosis which patients will require more aggressive medical therapy. This same argument holds true for UC patients as well.

Subsets of patients with differing immune responses to microbial antigens have been described, and serology is often tested for