Introduction

Traditionally, colonoscopy and biopsies along with radiological studies using contrast have served as the imaging “gold standard” for the evaluation of pediatric patients with suspected or known inflammatory bowel disease (IBD), as in adults. Imaging techniques are obligatory at initial presentation to establish the diagnosis and to assess the location, extent, inflammatory activity, and severity of disease. In 1989 we reported on the utility of an esophagagogastroduodenoscopy (EGD) with biopsies in order to ascertain the presence of findings suggestive of Crohn disease in the upper gastrointestinal tract. This is now part of the diagnostic guidelines of the IBD Working Group of the European Society for Pediatric Gastroenterology Hepatology and Nutrition. Other imaging techniques employed in IBD are extensively discussed elsewhere in this book by Drs Nwomeh and Crandall. These include trans-abdominal (US) and endoscopic ultrasound (EUS), enterography by computed tomography (CTE) or magnetic resonance imaging (MRE), as well as nuclear scans and positron emission tomography. Despite these techniques, complete assessment of the small bowel has remained a challenge.

Push enteroscopy can certainly access more of the proximal jejunum than EGD. However this technique only affords visualization of the proximal jejunum and is a relatively invasive procedure in young children. Although intra-operative enteroscopy can afford visualization of the entire small bowel, it is even more invasive, necessitating a laparotomy or laparoscopy. Potential complications that may ensue include prolonged ileus, obstruction, perforation, or fistula formation. Double-balloon or push-pull enteroscopy is a novel technique that can achieve diagnostic, as well as therapeutic, enteroscopy for the entire bowel, without requiring surgery. However, this procedure requires a long period of manipulation, and no experience in pediatric patients has been reported to date. Thus, the small bowel has been a relatively inaccessible “black box” for pediatric endoscopy specialists.
That all changed rather dramatically with the recent development of videocapsule endoscopy (CE). This innovative technique has revolutionized enteroscopy, providing for the first time a non-invasive method for the complete endoscopic evaluation of the small bowel mucosa [6, 7]. The extremely short focal length of the lens (1 mm) permits incredibly precise imaging of the intestinal mucosa as the capsule transits along the lumen, without requiring insufflation of air. The astounding resolution of the lens (0.1 mm) yields extraordinarily detailed, high-quality images of the mucosa and offers the ability to visualize normal villi, easily identifying focal areas of villous edema or atrophy (Figure 20.1). A recent meta-analysis has shown that CE is better able to identify small bowel lesions consistent with Crohn disease compared to traditional radiological methods [8]. The goals of this review are to provide an update on the clinical utility of CE for IBD in the pediatric age group, as well as information on the practical applications of CE in children.

Figure 20.1. Normal mucosal findings (A) in the mid small bowel as seen by wireless capsule endoscopy in a child suspected of Crohn disease. The astonishing resolution of the capsule’s lens (0.1 mm) affords visualization of the normal villi and mucosal blood vessels. In contrast, subtle inflammatory changes of the small bowel mucosa that were not visualized radiologically can readily be seen focally by capsule endoscopy. There include (B) areas of mucosal nodularity with focal villous atrophy as well as white tipped villi, signifying inflammatory edema, as well as superficial linear ulcerations (C). Whereas these lesions detected by capsule endoscopy are typical of Crohn disease, they may be caused by other etiologies, including the use of medications such as non-steroidal anti-inflammatory drugs.