

Endoscopic and Radiographic Assessment of Crohn's Disease



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KEYWORDS

- Crohn's disease • Mucosal healing • Endoscopy • Computed tomography • MRI
- Ultrasound • Enterography

KEY POINTS

- Crohn's disease (CD) is a transmural chronic inflammatory disorder that can affect any part of the gastrointestinal tract.
- Assessments of disease activity and response to therapy are essential to the management of CD.
- Clinical symptoms correlate poorly with CD activity and long-term outcomes.
- Endoscopic and radiographic responses have been associated with favorable clinical outcomes.
- There are multiple endoscopic and radiologic scoring systems that provide objective measurements of disease activity and response to therapy in CD.

BACKGROUND

Management algorithms for Crohn's disease (CD) patients continue to rapidly evolve. A key concept that is driving the search for objective disease assessment tools is the notion that symptoms often do not correlate with disease activity. A powerful study by Modigliani and colleagues¹ demonstrated no significant correlation between endoscopic disease activity measured with the CD endoscopic index of severity (CDEIS) and clinical symptoms measured with the CD activity index (CDAI). This has been followed by more recent work noting the lack of agreement between CDAI and C-reactive protein (CRP), fecal calprotectin, and endoscopic interrogations with the simple

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endoscopic score for CD (SES-CD) scoring system.² In both the ACCENT 1 (A Crohn's Disease Clinical Trial Evaluating Infliximab in a New Long-Term Treatment Regimen) and the SONIC (Study of Biologic and Immunomodulator Naive Patients in Crohn's Disease) trials, nearly 18% of patients with symptoms and CDaIs suggesting active CD disease did not have mucosal ulcerations on baseline ileocolonoscopy (IC).^{3,4} In short, symptoms alone cannot reliably predict disease activity and should not be used to guide management decisions.

Endoscopic and radiographic assessments, however, can provide accurate and objective CD activity assessments. These modalities complement each other. IC is the gold standard for establishing an inflammatory bowel disease (IBD) diagnosis with tissue acquisition. It also provides detailed and prognostic mucosal assessments, and allows performance of therapeutic stricture dilation. Capsule endoscopy (CE) can evaluate the mucosa of the entire gastrointestinal tract. Computed tomography enterography (CTE), magnetic resonance enterography (MRE), and ultrasound (US) can provide transmural disease assessments in regions inaccessible to standard endoscopic techniques, diagnose penetrating disease complications, detect and screen for unsuspected strictures before CE, and detect extraintestinal IBD manifestations. Clinical research now demonstrates that mucosal healing on endoscopy or radiologic response to medical therapy is associated with better long-term outcomes.^{5,6} These endoscopic and radiologic tools continue to evolve with the creation of objective scoring systems that are discussed in this review article.

ENDOSCOPY

CD can involve any segment of the gastrointestinal tract from the mouth to the anus. Hence, endoscopic modalities for the evaluation of CD include IC, esophagogastroduodenoscopy (EGD), CE, and balloon-assisted enteroscopy (BAE). Endoscopic applications in CD include the initial diagnosis, assessment of disease extent and severity, response to therapy, evaluation for postoperative recurrence, colorectal neoplasia surveillance, and therapeutic intervention such as stricture dilation. For establishing the initial CD diagnosis, IC is the gold standard, often demonstrating mucosal erythema, edema, mucosal friability, aphthous ulcerations, serpiginous ulcerations, skip lesions, and strictures (**Fig. 1**). Histologic findings of chronic inflammation include crypt architectural distortion and noncaseating granulomas. EGD is the preferred test for evaluating upper gut CD involvement, which can affect up to 16% of adult CD patients.⁷ BAE is used to obtain tissue confirmation of CD when TI and colonic skipping is present, and to perform therapeutic interventions such as stricture dilation and retrieval of retained capsule endoscope.

CE is a minimally invasive modality for small bowel examination in CD. Potential indications include assessing for proximal small bowel disease and monitoring response to medical therapy. The yield of CE in suspected and established CD has varied in the literature, ranging from 50% to 70%.⁸ CE is reported to have a higher sensitivity for proximal small bowel CD mucosal lesions than CTE or MRE.⁹ The utilization of CE has been limited by the risk of capsule retention that can approach 2.6% in some patient populations.¹⁰ Therefore, patency capsule administration should be considered in CD patients with a history of obstructive symptoms, strictures, prior small bowel resection or anastomosis, or in the absence of recent CTE or MRE imaging.¹¹

A critical role of endoscopy is to assess response to therapy and achievement of mucosal healing. Mucosal healing in CD is defined as the absence of ulcerations. In contrast to clinical symptoms, mucosal healing in IBD has been associated with favorable long-term outcomes, including clinical remission, lower rates of surgery,

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