Clinical Gastroenterology and Hepatology 2024;22:1790–1795

CLINICAL PRACTICE UPDATES

AGA Clinical Practice Update on the Role of Intestinal Ultrasound in Inflammatory Bowel Disease: Commentary

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DESCRIPTION: **In the past 3 years, the use of intestinal ultrasound (IUS) for monitoring inflammatory bowel disease in clinical practice has grown substantially in the United States. This American Gastroenterological Association (AGA) Institute Clinical Practice Update (CPU) aims to review the available evidence and guidance regarding the role of intestinal ultrasound in inflammatory bowel disease care.**

METHODS: **This CPU was commissioned and approved by the AGA Institute Clinical Practice Updates Committee (CPUC) and the AGA Governing Board to provide timely guidance on a topic of high clinical importance to the AGA membership and underwent internal peer review by the CPUC and external peer review through standard procedures of *Clinical Gastroenterology and Hepatology*. This expert commentary incorporates important and recently published studies in this field, and it reflects the experiences of the multidisciplinary group of authors composed of adult and pediatric gastroenterologists.**

Keywords: Crohn's Disease; Inflammatory Bowel Disease; Intestinal Ultrasound; Ulcerative Colitis.

Inflammatory bowel disease (IBD), comprising Crohn's disease (CD) and ulcerative colitis (UC), is a chronic disorder characterized by gastrointestinal inflammation that can lead to significant morbidity, including bowel obstructions, fistulas, and cancer.[1] The primary treatment goal in IBD is to reverse endoscopically visible inflammation to support long-term clinical remission and avoidance of IBD complications.[2] Because clinical remission does not always correlate with endoscopic healing and frequent endoscopies can overburden patients, inflammatory biomarkers such as fecal calprotectin (FC) and C-reactive protein are often used to guide treatment.[3] Yet stool or blood collection for biomarker measurement can be challenging to access. Thus, alternative noninvasive objective indicators of gastrointestinal inflammation are sorely needed.

Intestinal ultrasound (IUS) has emerged as a valuable tool for objectively assessing and monitoring IBD activity. IUS offers a noninvasive, radiation-free alternative to endoscopies and biomarkers through real-time, high-resolution examination of the bowel wall, mesentery, and adjacent structures. IUS has been used to guide IBD care for over a decade in Europe and its adoption in the United States is rapidly rising. IUS has gained acceptance in IBD care for its ability to visualize disease activity and complications at the point of care, facilitating timely treatment adjustments and clinical decision-making. We aim to address IUS techniques, its current clinical use, and how it addresses barriers to delivering IUS-driven care for patients with IBD.

Intestinal Ultrasound Technique

Equipment required to perform IUS includes a high-resolution ultrasound system, a low-frequency convex transducer, and a high-frequency linear transducer

Abbreviations used in this paper: **AUC, area under the receiver operating characteristic curve; BWT, bowel wall thickness; CD, Crohn's disease; CI, confidence interval; CTE, computed tomography enterography; FC, fecal calprotectin; IBD, inflammatory bowel disease; IBUS, International Bowel Ultrasound Group; IUS, intestinal ultrasound; MRE, magnetic resonance enterography; OR, odds ratio; UC, ulcerative colitis; VCE, video capsule endoscopy.**

Most current article

1542-3565/$36.00
https://doi.org/10.1016/j.cgh.2024.04.039

capable of assessing color Doppler signals. Traditional IUS is a transabdominal examination of the colon and small intestine performed without bowel preparation, fasting, or intravenous or oral contrast. A detailed discussion of contrast ultrasound modalities, which can optimize the detection of intestinal strictures and differentiate intra-abdominal phlegmons and abscesses, is beyond the scope of this CPU.[4] IUS for IBD is conducted with an initial global assessment of the bowel with the convex transducer, followed by an evaluation using the linear transducer to assess disease activity (Figure 1), although a linear transducer alone is often adequate in patients with a small body habitus and children.[5] The primary measure of disease activity includes bowel wall thickness (BWT) and bowel wall hyperemia using color Doppler signal.[6] The presence of inflammatory mesenteric fat, loss of bowel wall stratification, and surrounding lymphadenopathy can indicate more severe disease. Finally, IUS can identify intestinal complications such as strictures, fistulae, sinus tracts, phlegmons, and abscesses. IUS was shown to be accurate in detecting both small intestinal and colonic inflammation. However, it has less accuracy in defining the location of disease in the mid to proximal small bowel, the length of disease (particularly beyond 10 cm), and proximal small bowel and rectal inflammation.[7]

Comparison of IUS to Alternative Imaging Modalities

Several imaging modalities support assessing disease activity and complications in IBD, summarized in Table 1. Magnetic resonance enterography (MRE) and computed tomography enterography (CTE) are the cross-sectional imaging modalities of choice to assess small intestinal disease activity in CD. IUS, performed by well-trained practitioners, is comparable in accuracy to MRE and CTE for defining disease activity of the ileum, with several practical advantages. IUS does not require oral or intravenous contrast and can be performed in gastroenterology clinics to inform shared decision-making and real-time treatment changes while avoiding additional appointments, a clear benefit compared with ultrasound performed in the radiology suite. Its lack of radiation emission is also an advantage over CTE. Ultrasonography is operator-dependent, but studies in IUS show moderate to excellent inter-observer reliability.[8,9] Changing clinical practice to incorporate IUS and implementing IUS findings in multidisciplinary clinical decision-making without additional imaging studies will require time and experience. MRE and IUS demonstrated similar accuracy for assessing disease activity in the terminal ileum in newly diagnosed or clinically active patients with CD in a multicenter randomized trial. These findings suggest that both

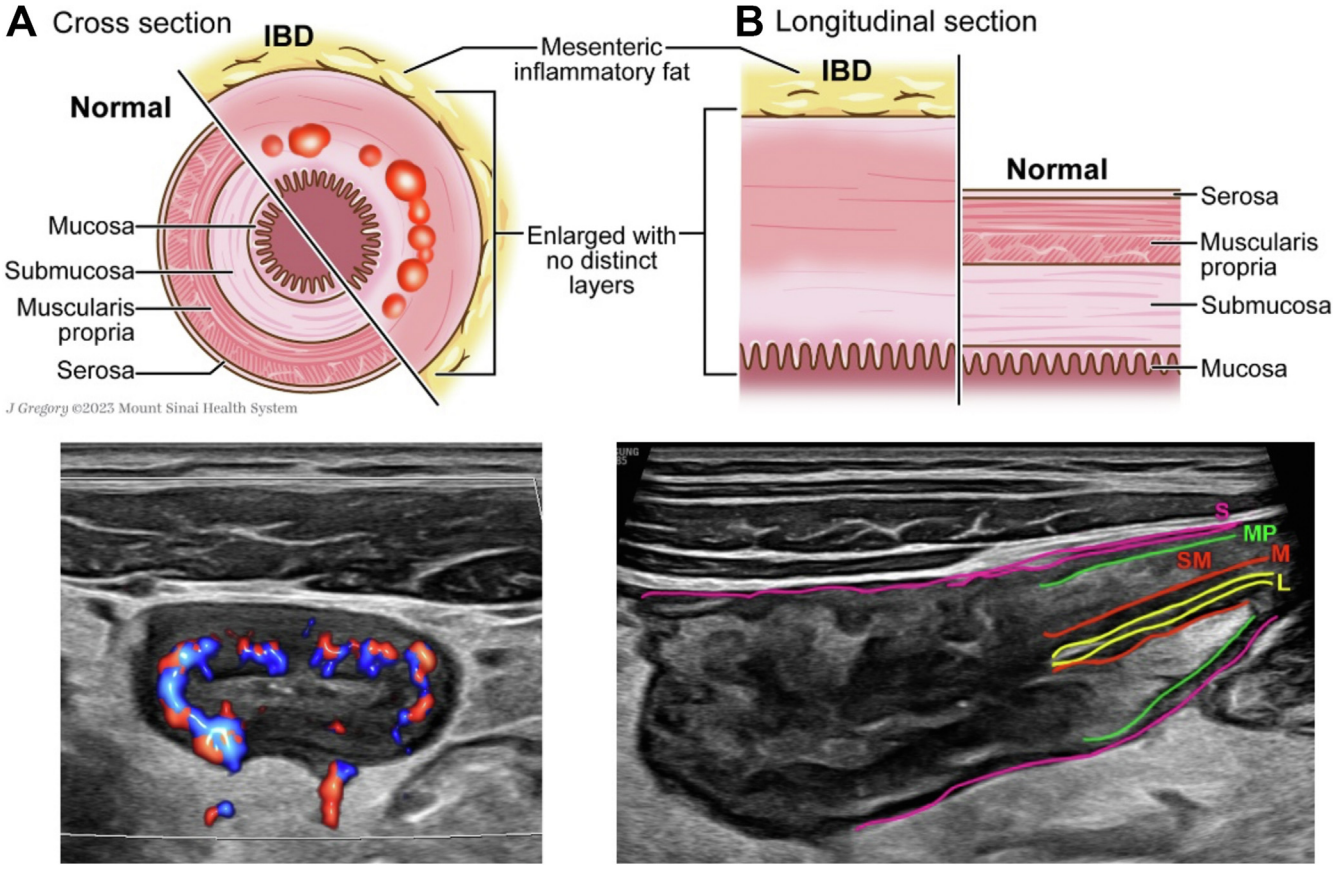

Figure 1. Graphical representation of the bowel wall layers as seen on IUS and key IUS features of active disease.

Table 1. Comparison of Imaging and Endoscopic Modalities in Assessing Disease Activity In IBD

Procedure	Preparation	Procedural risk	Cost	Limitation
Intestinal Ultrasound	None	None	$	■ Limited visualization of the stomach, esophagus, and rectum ■ No ability for interventional procedure ■ Exam may be limited by body habitus and overlying bowel gas
MR-Enterography	■ Oral contrast ■ IV contrast ■ Fasting required	■ Contrast-related allergies ■ Claustrophobia-related discomfort	$$$	■ Lower sensitivity for proximal small bowel disease compared with EGD and VCE ■ Lower sensitivity for colonic disease compared with ileocolonoscopy and IUS ■ No ability for interventional procedure ■ Weight limitations
CT-Enterography	■ Oral contrast ■ IV contrast ■ Fasting required	■ Contrast-related allergies ■ Radiation exposure	$$	■ No ability for interventional procedure
Video Capture Endoscopy (VCE)	■ Optional bowel prep ■ Fasting required	■ Capsule retention	$$	■ High sensitivity for smaller lesions may be non-specific ■ No ability for interventional procedure ■ Limited by ability of patient to swallow pillcam
Esophagogastroduodenoscopy (EGD) and Ileocolonoscopy	■ Full bowel preparation ■ Fasting required ■ Sedation/anesthesia	■ Bowel perforation ■ Hemorrhage ■ Infection ■ Sedation-related risks (hypotension, laryngospasm) ■ Increased risk in setting of cardiovascular comorbidities	$$$$	■ No small intestinal evaluation proximal to terminal ileum ■ Limited assessment in stenotic disease

CT, Computed tomography; EGD, esophagogastroduodenoscopy; IV, intravenous; MR, magnetic resonance; IUS, intestinal ultrasound; VCE, video capture endoscopy

MRE and IUS are valid first-line tools for CD activity assessment.[10] In a sub-study of 38 patients who underwent serial IUS, interobserver agreement for small bowel disease activity was 82% (kappa coefficient [κ], 0.64 and 0.61 for new diagnosis and clinical relapse, respectively). This interobserver agreement is higher than serial MRE (interobserver agreement, 69%; κ, 0.36 and 0.56 for new diagnosis and clinical relapse, respectively).[11,12] Further, meta-analysis data shows that IUS, MRE, and CTE have comparable accuracy for detecting IBD-related complications such as fistula, stricture, and abscesses.[13] The advantages of ileocolonoscopy and video capsule endoscopy (VCE) over IUS are their ability to directly visualize intestinal mucosa for inflammation or other pathology. However, ileocolonoscopy and VCE are more time-intensive and expensive than IUS. Further, while ileocolonoscopy is preferred over VCE and IUS when biopsies or dilations are necessary, they often require sedation, and examination is limited to the terminal ileum and colon. Although several scoring systems have been developed to standardize reporting IUS results, none are regularly used in clinical practice.

Applications of IUS in Clinical Care

There are multiple clinical roles for IUS. First, IUS can be used as a screening tool, akin to FC, to rule out IBD in the appropriate clinical context. Further, positive IUS findings (increased BWT or hyperemia) can help expedite ileocolonoscopy for IBD diagnosis confirmation. For example, in patients with CD, postoperative IUS showing a BWT $\geq$3 mm in the neo-terminal ileum or adjacent colon combined with an FC $\geq$50 ug/g detects CD recurrence with a positive predictive value of 74% (95% confidence interval [CI], 63%–84%) and a negative predictive value of 71% (95% CI, 42%–92%).[14] Second, IUS can be used to monitor disease activity and facilitate timely treatment adjustment.[15]

IUS is especially valuable in special IBD populations, such as pregnant patients, patients with serious comorbidities, and obese patients. First, IUS is an effective option for recognizing flares and monitoring treatment response in pregnant patients where avoiding the radiation of CTE or the sedation for ileocolonoscopy is ideal. In fact, IUS demonstrates a moderate-to-strong correlation with clinical activity and FC in pregnant patients with a sensitivity of 84% and a specificity of 98%.[16] Further, the colon and terminal ileum can be effectively visualized in the third trimester of pregnancy in up to 92% of cases.[17] Second, IUS can play a key role for patients with serious comorbidities such as renal failure who may be high risk for sedation-related complications during colonoscopy and cannot receive intravenous contrast for a CT or MR. Although IUS image quality may be limited in obese patients, a recent study showed no significant difference in IUS findings by weight for patients with IBD.[15] As such, obesity does not preclude image quality.

Crohn's Disease

Several studies have demonstrated that treatment response indicated by improvement or resolution of IUS findings can be identified within 3 months of biologic therapy initiation in CD.[18,19] Further, treatment failure can be predicted in patients with CD who have a higher baseline BWT, as these patients were 42% less likely to achieve transmural healing 1 year after treatment initiation independent of the type of therapy.[18] In a recent randomized trial comparing a treat-to-target approach with standard of care in patients with CD receiving ustekinumab, the first to incorporate IUS as an outcome measure, sonographic response (defined as a reduction in BWT of $\geq$25%) and transmural healing (defined as normalization of all IUS parameters) were seen in 46.3% and 24.1%, respectively, at 48 weeks.[20] Lack of sonographic response at week 4 also predicted poor week 48 endoscopic response with a negative predictive value of 73%.[20] To confirm these findings, in a single-center study of 31 adults with CD initiating anti-tumor necrosis factor treatment, patients with a 4- to 8-week post-treatment reduction in BWT of at least 18% were 10 times as likely to achieve a week 12 to 32 endoscopic response than patients who did not achieve BWT reduction.[21]

Ulcerative Colitis

IUS is also accurate in indicating and predicting treatment response in UC. In one prospective multicenter study of 224 patients with active UC, normalization of the BWT was visualized as early as 2 weeks after treatment change.[22] In a study of patients with UC initiating tofacitinib, an absolute BWT of $<$2.8 mm was predictive of week 8 endoscopic remission (sensitivity 73%, specificity 100%, area under the receiver operating characteristic curve [AUC], 0.87 [95% CI, 0.74–1.0]). A 32% reduction in BWT similarly predicted week 8 endoscopic response with a sensitivity of 71%, specificity of 90%, and AUC of 0.87 (95% CI, 0.74–1.0).[23] Further, hospitalized patients with acute severe UC with a $\geq$20% reduction in BWT within 48 $\pm$ 24 hours after intravenous corticosteroid initiation were more likely to achieve endoscopic response (odds ratio [OR], 22.6; 95% CI, 4.2–201.2) and avoid rescue treatment with a biologic (OR, 6.3; 95% CI, 1.4–33.5) compared with patients without a $>$20% reduction in BWT.[24] Although the evidence for the role of IUS in patients with active UC is growing, there is still a gap in research on its role in patients with UC in remission.

Patient Experience and Diversity, Equity, and Inclusion Considerations

IUS provides a patient-centered approach to care. Although patients with IBD are willing to undergo invasive testing with ileocolonoscopy when their gastroenterologist requires it, qualitative research data has shown that they prefer noninvasive monitoring options, such as IUS.[25] In patients with IBD offered IUS-driven care vs standard care, patients who received IUS and had active disease were more confident making informed decisions about managing their disease than patients receiving standard care.[e1] Further, once widely available, point-of-care IUS can improve access to care and treat-to-target monitoring for patients in rural and underserved areas, who face challenges scheduling, finding dependent care, or driving to CTE, MRE, or ileocolonoscopy appointments, which could also address barriers to equitable care.

IUS and Environmental Sustainability

As it becomes more important to prioritize environmental sustainability, integrating IUS into clinical care can limit health care-related waste. IUS requires fewer plastic and paper supplies than colonoscopy or MRE, reducing environmental waste (eg, oxygen tubing, catheters, plastic cups, forceps). In IUS, the use of nonreusable plastic is limited to the gel bottles required to obtain images. Therefore, IUS may move IBD care in a more sustainable direction.

IUS Training and Implementation

The development of an institutional IUS program begins with equipment selection. Identifying an institution's specific clinical need is paramount in choosing the ideal ultrasound system. Budget allocation,

portability, necessary software sophistication, transducer variety, machine durability, user-friendliness, and image resolution all demand careful consideration. Full-scale ultrasound systems, such as those used by the radiology departments, offer advanced features, high resolution, customization options, and a broad array of transducers, albeit with the drawback of bulkiness. Smaller, portable, or hand-held systems are budget-friendly and have a lesser footprint but limited resolution and functionality. The selection of an appropriate image storage system is vital for tracking IUS studies. Some institutions use local hard drives with DICOM reader software, offering accessibility but at the cost of limited storage space. Institutional servers are budget-friendly and allow widespread access and integration with electronic health records. Cloud-based solutions provide vast storage but are expensive and require consideration of HIPAA compliance.

The integration of IUS into clinical practice can take diverse forms. One common approach involves scheduling 2 consecutive appointments on the same day. Here, the gastroenterologist conducts the IUS before a clinic visit, and the results are shared promptly with the treating physician. An IUS examination can also be performed during a clinic visit with an IUS-trained clinician to inform subsequent treatment strategies. An alternative approach involves establishing a standalone IUS clinic where health care professionals refer their patients. Each model has implications for billing and necessitates careful consideration of local clinical workflow. Although specific Current Procedural Terminology codes for IUS are not yet available, other codes can be used (eg, 76705 – limited abdominal ultrasound). Detailed guidance on billing, availability of Current Procedural Terminology codes, and documentation templates are available elsewhere.[e2]

Although not universal, radiologists with expertise in IUS can be utilized to support IBD monitoring in patients who do not need point-of-care testing. However, for gastroenterology providers, proficiency in IUS can be acquired through comprehensive training. At the time of publication, there is yet to be an official United States-based certification for IUS for gastroenterologists. However, groups such as the International Bowel Ultrasound Group (IBUS) offer a program for IUS training and certification. For example, the IBUS certification process comprises 3 modules. Module 1 involves an intensive introductory course, providing fundamental knowledge and hands-on experience with simulators and actual patients. Module 2 entails hands-on training with at least 40 patients at a certified IBUS training center. Module 3 includes an advanced workshop and a final exam, ensuring thorough expertise in the field. In the future, national organizations may require maintenance of certification to ensure skills are up to date.

Limitations of IUS

Despite its versatility, IUS does have limitations. Considering the limited width of view provided by the transducers, precise measurement of length of disease is difficult in extensive small bowel CD. In these circumstances, MRE provides more details on extent of disease deeper pelvic structures. Overlying bowel gas may also obscure the proximal (duodenal) disease, and rectal disease may be difficult to visualize without a distended bladder. Further, IUS is not a advised modality for dysplasia surveillance. For these reasons, endoscopy or flex sigmoidoscopy is the most reliable way to assess mucosal disease activity of the duodenum and rectum and dysplasia surveillance.

Conclusions

IUS has the potential to transform our current approach to diagnosis and monitoring of patients with IBD. IUS objectively identifies treatment response, supporting a treat-to-target approach to IBD care. It can facilitate timely treatment adjustment and improve access to objective indicators of disease activity for special populations, such as pregnant patients, patients with comorbid serious diseases, and obese patients. Although IUS has some limitations, the value of IUS in diagnosing and monitoring IBD is comparable to established cross-sectional imaging modalities such as MRE and CTE. Although most IUS studies published to date are single-center, a few large multicenter projects were recently published, and more are underway. Current efforts to integrate IUS into IBD clinical practices focus on training gastroenterologists to facilitate increased adoption of IUS in day-to-day practice. In the future, training Advanced Practice Providers could benefit patients, especially if their primary focus is patients with IBD. Efforts are underway to incorporate transmural healing as endpoints for remission into IBD clinical trials.

Supplementary Material

Note: To access the supplementary material accompanying this article, visit the online version of *Clinical Gastroenterology and Hepatology* at www.cghjournal.org, and at http://doi.org/10.1016/j.cgh.2024.04.039.

References

1. Kanagala V, Stein DJ. Inflammatory bowel disease, a point of care clinical guide; Published online 2015:41–51. https://doi.org/10.1007/978-3-319-14072-8_7.
2. Ungaro RC, Yzet C, Bossuyt P, et al. Deep remission at 1 year prevents progression of early Crohn's disease. Gastroenterology 2020;159:139–147.

3. Baars JE, Nuij VJAA, Oldenburg B, et al. Majority of patients with inflammatory bowel disease in clinical remission have mucosal inflammation. Inflamm Bowel Dis 2012;18:1634–1640.
4. Calabrese E, Kucharzik T, Maaser C, et al. Real-time interobserver agreement in bowel ultrasonography for diagnostic assessment in patients with Crohn's disease: an international multicenter study. Inflamm Bowel Dis 2018;24:2001–2006.
5. Kellar A, Dolinger M, Novak KL, et al. Intestinal ultrasound for the pediatric gastroenterologist: a guide for inflammatory bowel disease monitoring in children: expert consensus on behalf of the International Bowel Ultrasound Group (IBUS) Pediatric Committee. J Pediatr Gastr Nutr 2023;76:142–148.
6. Novak KL, Nylund K, Maaser C, et al. Expert Consensus on Optimal Acquisition and Development of the International Bowel Ultrasound Segmental Activity Score [IBUS-SAS]: A Reliability and Inter-rater Variability Study on Intestinal Ultrasonography in Crohn's Disease. J Crohns Colitis 2021;15:609–616.
7. Dillman JR, Smith EA, Sanchez R, et al. Prospective cohort study of ultrasound-ultrasound and ultrasound-MR enterography agreement in the evaluation of pediatric small bowel Crohn disease. Pediatr Radiol 2016;46:490–497.
8. Voogd FD, Wilkens R, Gecse K, et al. A reliability study: strong inter-observer agreement of an expert panel for intestinal ultrasound in ulcerative colitis. J Crohns Colitis 2021;15:1284–1290.
9. Wassenaer EA, Rijn RR, Voogd FAE, et al. RAINBOW-group. A healthcare physician can be trained to perform intestinal ultrasound in children with inflammatory bowel disease. J Pediatr Gastroenterol Nutr 2022;74:e143–e147.
10. Taylor SA, Mallett S, Bhatnagar G, et al. METRIC study investigators. Diagnostic accuracy of magnetic resonance enterography and small bowel ultrasound for the extent and activity of newly diagnosed and relapsed Crohn's disease (METRIC): a multicentre trial. Lancet Gastroenterol Hepatol 2018;3:548–558.
11. Bhatnagar G, Mallett S, Quinn L, et al. Interobserver variation in the interpretation of magnetic resonance enterography in Crohn's disease. Br J Radiol 2022;95:20210995.
12. Bhatnagar G, Quinn L, Higginson A, et al. METRIC study investigators. Observer agreement for small bowel ultrasound in Crohn's disease: results from the METRIC trial. Abdom Radiol 2020;45:3036–3045.
13. Panés J, Bouzas R, Chaparro M, et al. Systematic review: the use of ultrasonography, computed tomography and magnetic resonance imaging for the diagnosis, assessment of activity and abdominal complications of Crohn's disease. Aliment Pharmacol Ther 2011;34:125–145.
14. Furfaro F, D'Amico F, Zilli A, et al. Noninvasive assessment of postoperative disease recurrence in Crohn's disease: a multicenter, prospective cohort study on behalf of the Italian Group for Inflammatory Bowel Disease. Clin Gastroenterol Hepatol 2023;21:3143–3151.
15. Saleh A, Abraham BP. Utility of intestinal ultrasound in clinical decision-making for inflammatory bowel disease:360. Crohns Colitis 2023;5:otad027.
16. Voogd FD, Joshi H, Wassenaer EV, et al. Intestinal ultrasound to evaluate treatment response during pregnancy in patients with inflammatory bowel disease. Inflamm Bowel Dis 2021;28:1045–1052.
17. Andrew B, Vasudevan A, Srinivasan A. The role of intestinal ultrasound during pregnancy in patients with inflammatory bowel disease. Am J Gastroenterol 2023;118:2096–2097.
18. Calabrese E, Rispo A, Zorzi F, et al. Ultrasonography tight control and monitoring in Crohn's disease during different biological therapies: a multicenter study. Clin Gastroenterol Hepatol 2022;20:e711–e722.
19. Kucharzik T, Wittig BM, Helwig U, et al. TRUST study group. Use of intestinal ultrasound to monitor Crohn's disease activity. Clin Gastroenterol Hepatol 2017;15:535–542.e2.
20. Kucharzik T, Wilkens R, D'Agostino MA, et al. STARDUST Intestinal Ultrasound study group. Early ultrasound response and progressive transmural remission after treatment with ustekinumab in Crohn's disease. Clin Gastroenterol Hepatol 2023;21:153–163.e12.
21. Voogd F de, Bots S, Gecse K, et al. Intestinal ultrasound early on in treatment follow-up predicts endoscopic response to anti-TNFα treatment in Crohn's disease. J Crohns Colitis 2022;16:1598–1608.
22. Maaser C, Petersen F, Helwig U, et al; German IBD Study Group and the TRUST&UC study group. Intestinal ultrasound for monitoring therapeutic response in patients with ulcerative colitis: results from the TRUST&UC study. Gut 2020;69:1629–1636.
23. Voogd F de, Wassenaer EA van, Mookhoek A, et al. Intestinal ultrasound is accurate to determine endoscopic response and remission in patients with moderate to severe ulcerative colitis: a longitudinal prospective cohort study. Gastroenterology 2022;163:1569–1581.
24. Ilvemark JFKF, Wilkens R, Thielsen P, et al. Early intestinal ultrasound predicts intravenous corticosteroid response in hospitalised patients with severe ulcerative colitis. J Crohns Colitis 2022;16:1725–1734.
25. Rohatinsky N, Zelinsky S, Dolinger M, et al. Crohn's disease patient experiences and preferences with disease monitoring: an international qualitative study, 360. Crohns Colitis 2023;5:otad012.

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Author Contributions
All authors contributed equally to the conception, design, drafting, and revision of this manuscript and approved the final version for submission.

Conflicts of interest
These authors disclose the following: Bincy Abraham served as a consultant for Abbvie, Bristol Myers Squibb (BMS), Janssen, Pfizer, Takeda, Samsung Bioepis, Fresenius Kabi, Celltrion, Ferring, and Medtronic; and is a member of the International Bowel UltraSound group (IBUS) and the intestinal ultrasound group of the United States and Canada (iUSCAN). Michael Dolinger received financial support from Neurologica Corp, a subsidiary of Samsung Electronics Co, Ltd, and Pfizer Inc; is also a member of IBUS; is the co-founder of iUSCAN. Mallory Chavannes received research support from the BMS Foundation; and is also a member of IBUS and iUSCAN. The remaining author discloses no conflicts.

Supplementary References

e1. Friedman AB, Asthana A, Knowles SR, et al. Effect of point-of-care gastrointestinal ultrasound on decision-making and management in inflammatory bowel disease. Aliment Pharmacol Ther 2021;54:652–666.

e2. Dolinger MT, Cleveland NK, Rubin DT, Dubinsky MC. Guide to intestinal ultrasound credentialing, documentation, and billing for gastroenterologists in the United States. Am J Gastroenterol 2023;118:1528–1531.