international bowel ULTRASOUND GROUP

IBD Management Series

Bowel Ultrasound

in the **Treat to Target** Concept

Integrating Intestinal Ultrasound into Modern IBD Care

Presented By

Anda Les, MD/PhD

Department of Gastroenterology
Fundeni Clinical Institute, Bucharest, Romania

Luneburg, 13th-14th of March

Learning Objectives

Session Goals & Key Takeaways

Target Outcomes

Understand the T2T Paradigm

Comprehend the Treat-to-Target strategy and STRIDE-II framework for optimizing long-term IBD outcomes through objective monitoring.

Master IUS Fundamentals

Identify key Intestinal Ultrasound parameters including Bowel Wall Thickness (BWT), Doppler signals, and interpretation of inflammatory activity.

Evaluate Evidence & Economics

Analyze recent clinical trial data (STARDUST, TRUST&UC) and understand the cost-effectiveness of IUS compared to MRI and endoscopy.

Apply Decision Frameworks

Utilize clinical decision trees to select the appropriate modality (IUS vs. MRE vs. Colonoscopy) based on patient scenarios and clinical questions.

Implement into Practice

Develop strategies to integrate point-of-care ultrasound into routine IBD clinic workflows for real-time decision making.

Core Competencies

- STRIDE-II Targets
- Sonographic Parameters
- Predictive Value Assessment
- Modality Selection Logic
- Workflow Integration

"Moving from symptom-based care to objective, tight control monitoring."

The Problem: Symptom-Endoscopy Discordance

Why Symptoms Are Not Enough

Silent Inflammation Risk

50-60%

of patients in clinical remission have ongoing mucosal inflammation.

Source: Baars et al., Inflamm Bowel Dis 2012

Why This Matters

Silent Disease Progression

Ongoing inflammation without symptoms leads to structural damage, strictures, and surgery.

The T2T Imperative

Treat-to-Target requires OBJECTIVE biomarkers, not just symptom relief.

Role of IUS

Intestinal Ultrasound bridges the gap: visualizing inflammation directly, non-invasively, and in real-time.

The "Silent" Gap in IBD Monitoring

Clinical Remission		Endoscopic Activity	
"I feel fine"	VS	"Active Inflammation"	
Pain Score	0/10	Mucosal Ulcers	Present
Stool Frequency	Normal	Bowel Wall	Thickened
Well-being	Good	Calprotectin	High

Baars JE, et al. Inflamm Bowel Dis. 2012;18:1634-1640.

INTERNATIONAL BOWEL
ULTRASOUND GROUP

From Mucosal Healing to Transmural Healing

Mucosal Healing

Assessment

Ileocolonoscopy

What it evaluates

Mucosal ulcers

Erosions

Surface inflammation

Limitations

- Only the inner mucosal layer
- Cannot assess deeper bowel wall inflammation

Clinical Implication

- ✓ Associated with improved outcomes
- ! May miss persistent transmural inflammation

Transmural Healing

Assessment

Intestinal Ultrasound (IUS)

Magnetic Resonance Enterography

What it evaluates

- Bowel wall thickness
- Doppler vascularity
- Wall stratification
- Inflammatory fat

Clinical Implication

- ✓ Deeper remission
- ✓ Lower risk of relapse
- ✓ Reduced hospitalization and surgery

Castiglione F. Am J Gastroenterol 2013, Maaser C. ECCO-ESGAR Guideline 2020, Kucharzik T. Clin Gastroenterol Hepatol 2023

Clinical Case Presentation

Initial Assessment & Ultrasound Findings

Real World Case

Demographics

35-year-old Female

Occupation: Physician

Presenting Complaint

Epigastric Pain

Relevant Medical History

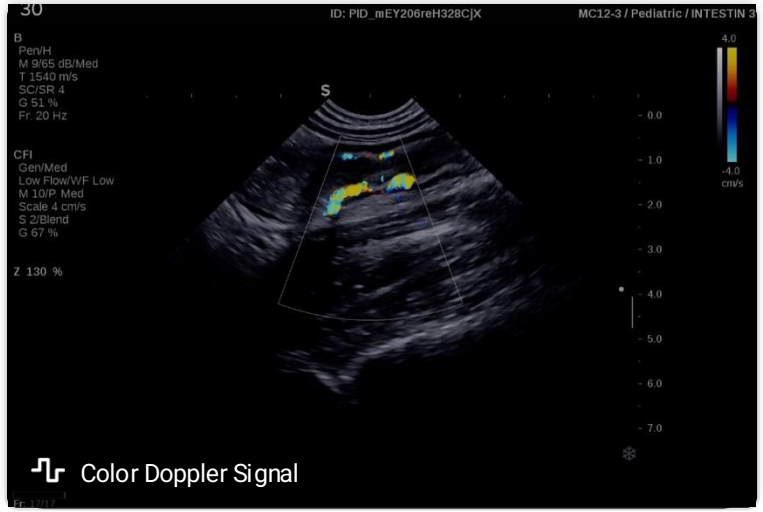
Recurrent *Clostridioides difficile* infection

2 Documented Episodes

Examination Focus

Intestinal Ultrasound (IUS) performed to investigate persistent abdominal symptoms and rule out IBD or other pathology given history.

Figure 1: Bowel Wall Thickening Assessment



Color Doppler Signal

Cross-sectional View

Direct Visualization & Mucosal Assessment

Diagnostic Confirmation

Endoscopy Findings

Upper GI Assessment

Examination revealed significant pathology in the upper gastrointestinal tract, characterized by multiple ulcers and diffuse mucosal inflammation.

Terminal Ileum (TI)

The terminal ileum demonstrated marked involvement with visible ulcerations, significant edema, and loss of normal vascular pattern.

Key Observations:

Deep ulcerations present

Surrounding mucosal edema

Consistent with active inflammatory disease

Fcal- 1200ug/g

Figure 1: Mucosal inflammation with ulcerations and oedema

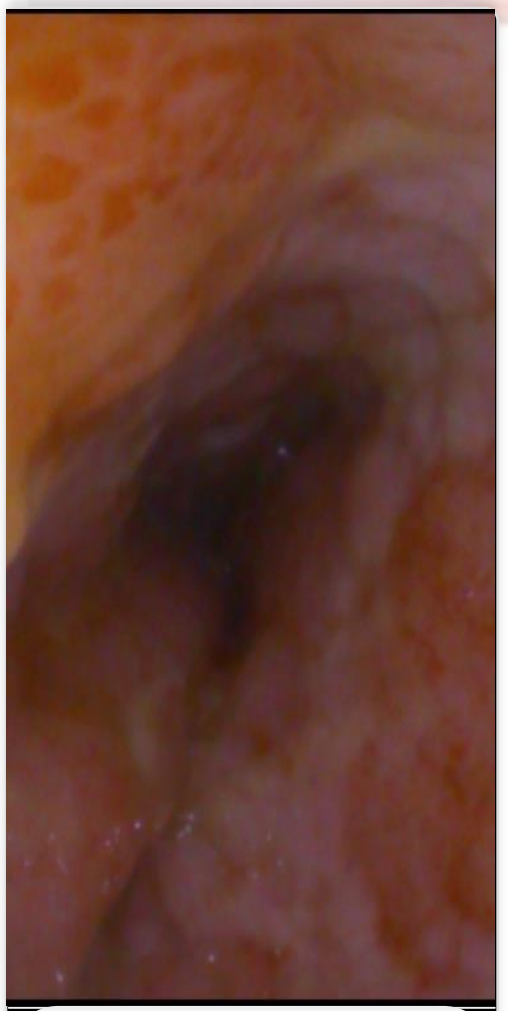


Figure 2: Deep ulceration surrounded by edematous tissue.

Figure 3: Terminal ileum showing characteristic ulcerative lesions.

Intestinal Ultrasound (IUS)

Point-of-Care Monitoring

Non-Invasive Tool

Technique & Setup

Real-time assessment at the bedside using convex (survey) and (survey) and linear (detail) probes. Requires no fasting, no no bowel preparation, and no intravenous contrast.

Core Readouts

Bowel Wall Thickness (BWT): Primary metric (Pathology: >3mm).
Color Doppler: Evaluates hyperemia (vascularity) as a sign of active inflammation.

Extended Assessment

Assessment of bowel wall stratification (loss of layers), inflammatory mesenteric fat (echogenicity), and reactive lymphadenopathy.

Complication Detection

High specificity for identifying strictures (pre-stenotic dilation), fistulae, sinus tracts, tracts, phlegmons, and abscesses.

Clinical Value

- **Immediate Decision Making:** Enables "Treat-to-Target" adjustments during the clinic visit without waiting for MRI/CT reports.
- **Patient Experience:** Non-invasive, radiation-free, and highly preferred by patients. Facilitates shared understanding of disease activity.
- **Reliability:** Strong inter-observer agreement (ICC > 0.8) when performed by trained experts.

Limitations

- **Anatomical Blind Spots:** Difficulty visualizing the rectum (pelvic depth), deep sigmoid, and proximal small bowel (jejunum) due to gas/depth.
- **Operator Dependent:** Requires specialized training (e.g., IBUS curriculum) and experience to achieve proficiency.
- **No Mucosal Detail:** Cannot replace endoscopy for dysplasia surveillance or detection of superficial mucosal lesions.

Dolinger MT, et al. Clin Gastroenterol Hepatol. 2024;22:1823-1835. | Novak KL, et al. J Crohns Colitis. 2021;15:609-616.

IUS Examination Technique

Step-by-Step Scanning Protocol

Standardized Protocol

1 Patient Positioning

Supine
Standard position

Left , right lateral, standing?
For better views

2 Transducer Selection

Convex Probe
3-5 MHz
Overview

Linear Probe, microconvex probe
7-12, 2-9 MHz
Detail

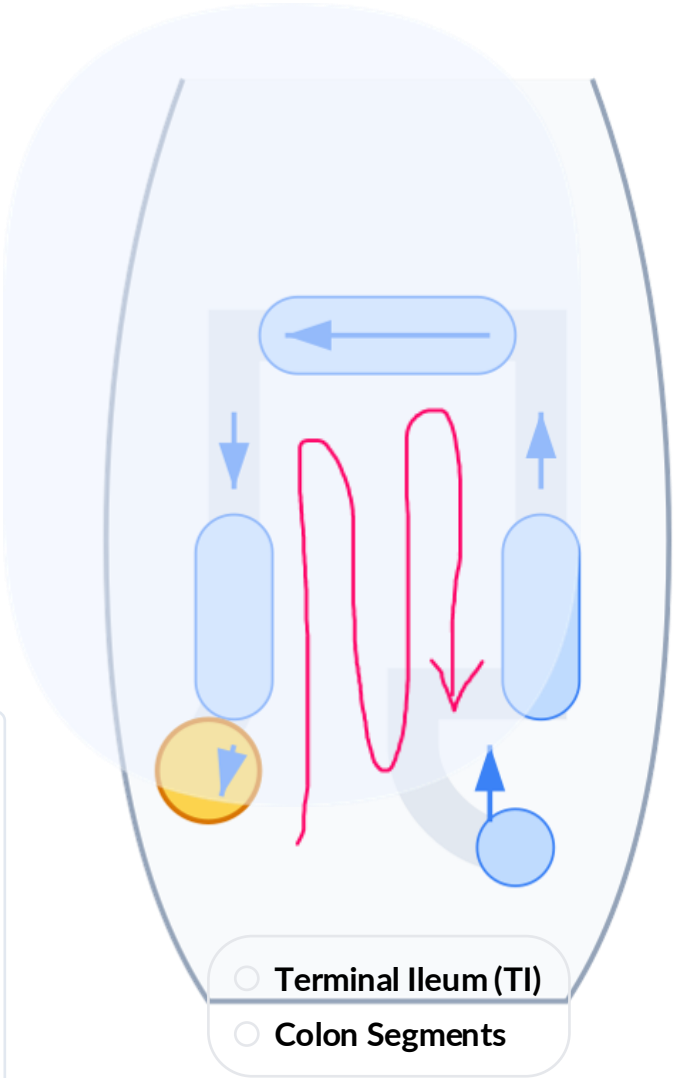
5 Scanning Tips

Graded Compression

Displace gas/loops to improve visualization

Measurement
Perpendicular to lumen, avoiding haustra

Doppler Settings
Low velocity scale (< 5 cm/s), high gain



3 Systematic Scanning Sequence

1. Sigmoid & Rectum
Start in LLQ, identify psoas/iliac vessels

2. Descending Colon
Follow up left flank to splenic flexure

3. Transverse Colon
Scan across epigastrium (variable position)

4. Ascending Colon
Down right flank from hepatic flexure

5. Terminal Ileum
Most common site of CD. Crosses R iliac vessels.

4 Key Landmarks

Psoas Muscle
Posterior landmark for TI/Sigmoid

Iliac Vessels
TI crosses over Right Iliac Vessels

Maconi G, et al. Ultraschall Med. 2012;33:38-43. | IBUS Group Recommendations

Key IUS Parameters & Clinical Applications

Technical Assessment & Patient Management

Point-of-Care

Diagnostic Parameters

Bowel Wall Thickness (BWT)

PRIMARY

The most robust marker of activity. Pathologic thresholds typically defined as:

> 3 mm

Color Doppler (Hyperemia)

Evaluates vascularity within the bowel wall. Increased Doppler signal (Limberg score) indicates active inflammation.

Structure & Mesentery

Wall Stratification: Loss of layers suggests severe transmural inflammation.

Mesenteric Fat: Hyperechoic "creeping fat" surrounding inflamed loops.

Complications

Detection of strictures (pre-stenotic dilation), fistulae, phlegmons, and abscesses.

Clinical Workflow Applications

1 Diagnosis Triage

Rapidly rule out IBD in symptomatic patients or prioritize urgent ileocolonoscopy for those with positive findings.

Tight Control Monitoring

Assess response early (Weeks 2–12). BWT changes often precede endoscopic healing.

Predict Response **Identify Failure**

Post-Op Recurrence

Non-invasive assessment of the neo-terminal ileum (Rutgeerts score surrogate)

Neo-terminal ileum BWT ≥3–4 mm → recurrence suspected

BWT ≥5–5.5 mm → strongly predictive of severe recurrence (Rutgeerts ≥ i3)

Acute Severe UC

Bedside daily monitoring to decide on colectomy or rescue therapy timing.

Early IUS predicted response to IV steroids

Ultrasound at 48 hours predicts the need for rescue therapy

: Novak KL, et al. J Crohns Colitis. 2021;15:609-616. | Dolinger MT, et al. Clin Gastroenterol Hepatol. 2024;22:1823-1835. Rispo A. et al. Inflamm Bowel Dis.2018, Ilvemark J et al., J Crohn's Colitis 2022

Treat-to-Target Strategy

The STRIDE-II Framework

Continuous Optimization

Strategic Definition

A proactive strategy utilizing predefined objective targets and tight monitoring cycles to optimize long-term disease outcomes.

Clinical Rationale

Symptoms often misalign with internal inflammation. Objective monitoring prevents silent damage and reduces complications.

STRIDE-II Target Hierarchy

Long-term Remission — Target

- ✓ Endoscopic Healing **No Ulcers**
- ✓ Proposed IUS Remission target **BWT < 3mm**

Intermediate Targets

CRP & Calprotectin Normalization

Symptom Relief

Care Cycle

Maintenance Phase
Monitor every 6–12 months

Colonoscopy vs. IUS Monitoring Workflow

Reducing Burden & Accelerating Decisions

Workflow Contrast

Traditional Colonoscopy

High Burden • Episodic

Scheduling Delay
Wait times for endoscopy slot
4-12 Weeks

Bowel Preparation
Dietary restriction & laxatives
24-48 Hours

Procedure & Sedation
Invasive scope, anesthesia risk
30-60 Mins

Recovery Time
Post-sedation monitoring, day off work
2-4 Hours

Frequency Limit
Every 6-12 Mo

Cost Impact
$$$ (High)

VS

IUS Monitoring

Low Burden • Continuous

Same-Day Access
Point-of-care in clinic visit
Immediate

Zero Preparation
No fasting, no laxatives needed
None

Rapid Scan
Non-invasive abdominal ultrasound
10-15 Mins

Instant Results
Discuss findings immediately with patient
Real-Time

Frequency Limit
Every 4-12 Wks

Cost Impact
$ (Low)

Dolinger MT, et al. Clin Gastroenterol Hepatol. 2024;22:1823-1835. | Allocca M, et al. J Crohns Colitis. 2021;15:143-151.

Comparison of Monitoring Modalities

Selecting the Optimal Tool for Treat-to-Target

Decision Matrix

Modality	Invasive	Radiation	Cost	Real-Time	Key Advantages	Limitations
Intestinal Ultrasound Focus Tool	None	⊘	$	✓	+ Point-of-care decision making + High patient acceptance + Dynamic assessment (peristalsis)	– Operator dependent – Limited view (rectum, jejunum) – Gas/Obesity interference
MRE / MRI	Minimal	⊘	$$$	✗	✓ Whole bowel & pelvic view ✓ Excellent transmural detail	! High cost & wait times ! Claustrophobia / Contrast required
CT Enterography	Minimal	☢	$$	✗	✓ Rapid acquisition ✓ High availability	! Ionizing radiation exposure ! Lower soft tissue contrast vs MRI
Ileocolonoscopy	Invasive	⊘	$$$	✓	✓ Gold standard for mucosa ✓ Biopsies & therapeutics	! Requires prep & sedation ! Invasive risks (perforation)
Biomarkers (FC/CRP)	Low	⊘	$	✗	✓ Objective & quantitative ✓ Easy remote monitoring	! Indirect measure (no localization) ! False positives/negatives

✓ Real-time capability ☢ Radiation risk $ Low Cost | $$$ High Cost

IUS offers the best balance of safety, cost, and immediacy for frequent T2T monitoring

Dolinger MT, et al. Clin Gastroenterol Hepatol. 2024;22:1823-1835. | Panés J, et al. Aliment Pharmacol Ther. 2011;34:125-145.

IUS in Crohn's Disease: Treat-to-Target Overview

Why IUS in Treat-to-Target (T2T)?

Beyond Mucosal Healing: Endoscopy may miss ongoing **transmural inflammation**, leading to bowel damage.

Operational Advantages: Real-time, non-invasive, radiation-free, and point-of-care (POCUS).

Ideal for Monitoring: Enables frequent assessment unavailable with MRI/Endoscopy.

Patient-Centric: Immediate results discussion enhances adherence and understanding.

Therapeutic Targets & Measurements

Operational Targets

EarlyResponse: ≥25% or >2mm reduction in Bowel Wall Thickness (BWT) at 8-12 weeks.

GoalRemission: BWT ≤3mm, normal Doppler signal, no inflammatory fat (6-12 months).

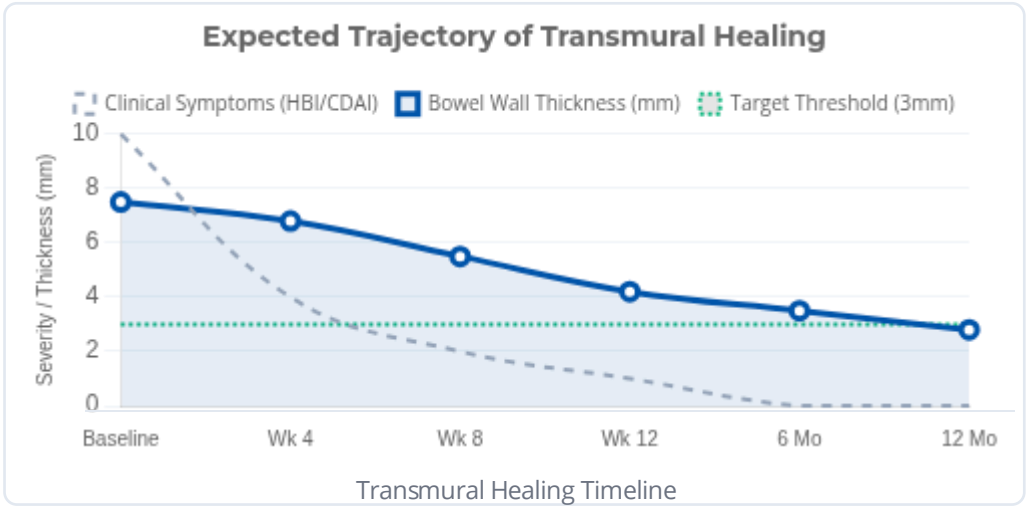
Key Measurements

Bowel Wall Thickness (BWT): Primary metric.

Color Doppler: Assessing vascularity (Limberg score).

Complications: Strictures, fistulas, abscesses.

T2T Monitoring Pathway



Clinical Advantages

Timely Decisions: Supports rapid escalation/de-escalation based on objective data.

Reduced Invasiveness: Replaces endoscopy for routine monitoring in stable patients.

Stricture Assessment: Differentiates inflammatory vs. fibrotic strictures (using CEUS/elastography).

Safety: Radiation-free, safe for use in pregnancy and pediatric populations.

Perianal Disease: Transperineal US (TPUS) offers effective non-invasive assessment.

IUS Integration Pathway

From Diagnosis to Maintenance

Clinical Algorithm

1 — **Baseline** — Day 0 / Start

2 — **Response Check** — Weeks 4–12

3 — **Maintenance** — Every 6–12 Mo

Initial Assessment

- Record max BWT & extent
- Document Doppler signal
- Set Target: Normalization
- Combine with Ileocolonoscopy

Treatment Response

- **Responder:** ≥25% BWT Reduction
- **Non-Responder:** <25% BWT Reduction
- **Action:** Optimize/Switch if no response

Surveillance

- Monitor for subclinical flare
- **Target:** BWT < 3mm
- Prevent silent progression

Flare Assessment

Urgent Visit / Acute Symptoms

Same-Day IUS Triage

Is inflammation active?

↓

ACTIVE

Escalate Therapy / Steroids

INACTIVE

Consider IBS / Other Causes

Avoids unnecessary empiric steroids

Key IUS Thresholds

≥ 4mm Active Disease Risk	**< 3mm** Target Remission
≥ 25% ↓ Treatment Response	**>25mm** Pre-stenotic Dilation

Complication Detection

- Suspected stricture, fistula, or abscess?
- **Findings:** Hypoechoic tracts / collections
- Immediate triage for surgical/medical planning

: Dolinger MT, et al. Clin Gastroenterol Hepatol. 2024;22:1823-1835. | Turner D, et al. Gastroenterology. 2021;160:1570-1583.

3-Month Follow-up Evaluation

Monitoring Response to Therapy

Treatment Week 12

Therapeutic Timeline

Baseline

Diagnosis & Induction

Initial diagnosis confirmed. Commenced corticosteroids for rapid symptom control.

Month 1

Biologic Initiation

Started Infliximab (IFX) at standard induction dosing (5 mg/kg at weeks 0, 2, 6).

Month 3 (Current)

First Treat-to-Target Assessment

Standard dose maintenance. Patient reports partial symptom improvement. Objective assessment via IUS required.

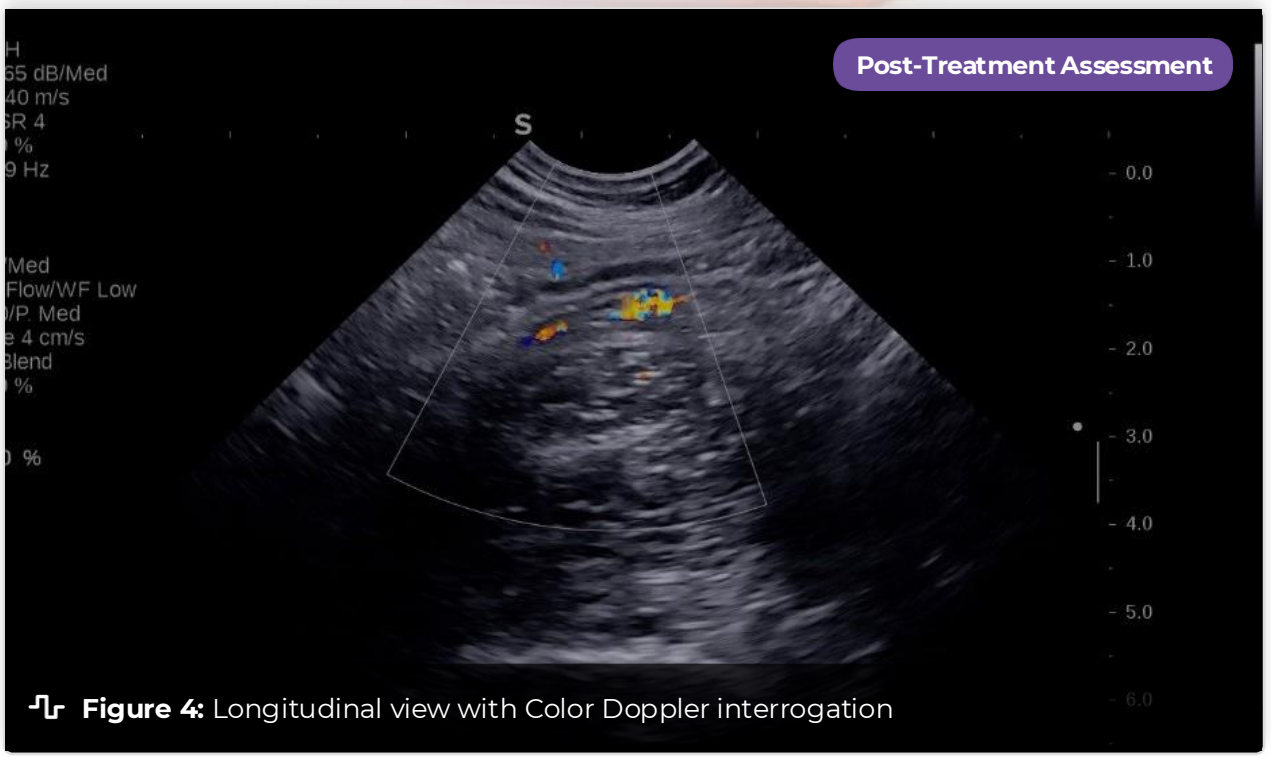


Figure 4: Longitudinal view with Color Doppler interrogation

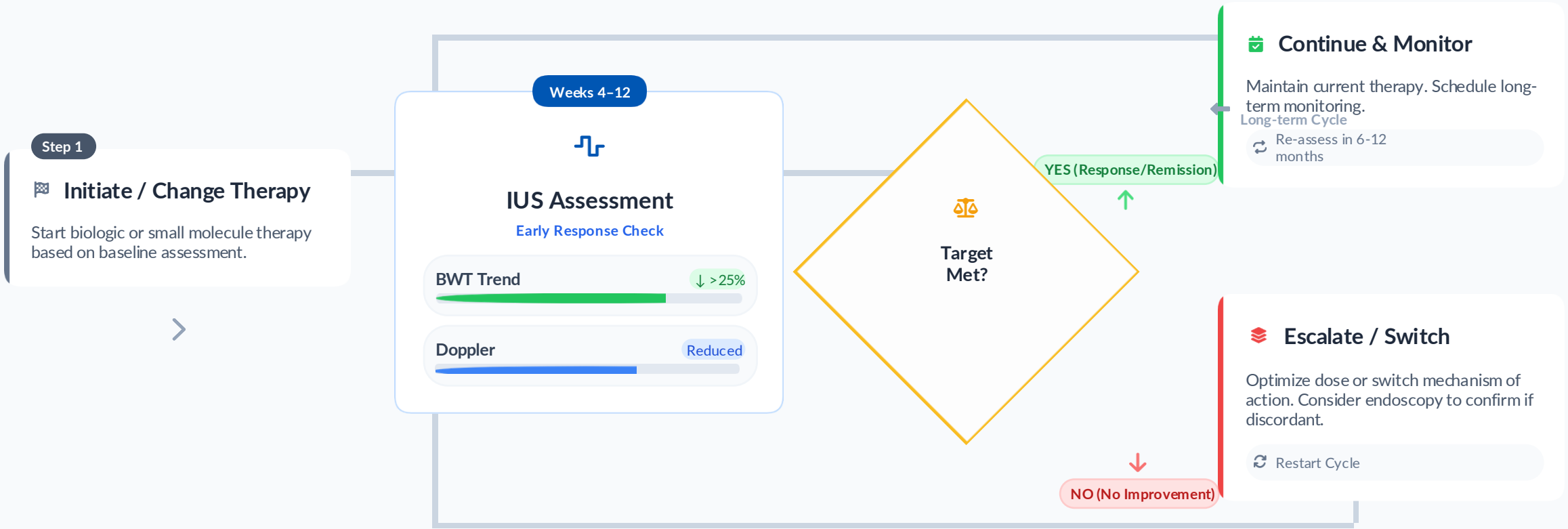
IUS Findings: Ongoing Activity

Vascularity (Limberg Score)	Interpretation
Minimal Doppler signal observed at the level of the TI	Signs of significant improvement of the inflamed TI

Treat-to-Target Workflow with IUS Integration

Decision Pathway & Monitoring Cycles

Clinical Pathway



Action Decision Flow

References: Turner D, et al. Gastroenterology. 2021;160:1570-1583. | Kucharzik T, et al. Clin Gastroenterol Hepatol. 2023;21:153-163.

2025 Studies Analysis

Quantitative Findings & Clinical Translation

Deep Dive

Standardization

International Consensus

Allocca M, Jairath V, et al. JCC 2025

35	150
Int'l Experts	Statements

Key Consensus Definitions

PARAMETER	CONSENSUS DEFINITION
IUS Response	≥25% BWT reduction OR Multifactorial Improvement
IUS Remission	BWT ≤3 mm No Color Doppler Signal
Timing (Colon)	Assess at Weeks 4–8
Timing (Ileum)	Assess at Week 12

Practice Change

Adopting these definitions allows for uniform reporting in clinical trials and provides clear numerical targets for "Treat-to-Target" protocols in daily practice.

Real-World Utility

Point-of-Care Impact

Tan WL, et al. JGH 2025

447	45%
Examinations	Active Disease

Reduction in Additional Testing

Stool Tests	-51%
Endoscopies	-39%
Imaging (MRI/CT)	-22%

p<0.0001 significance

Efficiency Gain

Demonstrates that integrating IUS reduces burden on endoscopy units and lowers costs while maintaining high correlation with gold standards.

Validation

Systematic Review of Scores

Innocenti T, et al. IBD 2025

23	13
Scoring Systems	Validated Scores

Performance Metrics

METRIC	POOLED RANGE
Sensitivity	68–100%
Specificity	57–100%
Accuracy	72–91%

Top Validated Scores:

BUSS (CD) | MUC (UC) | IBUS-SAS

Reliability

Confirms high diagnostic accuracy across multiple systems, supporting widespread adoption of validated scores like MUC and BUSS.

Allocca M, et al. J Crohns Colitis. 2025;19(9):jjaf170. | Tan WL, et al. J Gastroenterol Hepatol. 2025;40(10):2472-2481. | Innocenti T, et al. Inflamm Bowel Dis. 2025;31(11):3194-3212.

Clinical Evidence: Key Studies

Supporting IUS in Treat-to-Target Strategies

Multi-Center Data

Crohn's Disease n=386

STARDUST Trial

Ustekinumab T2T vs Standard of Care

46%

Sonographic Response

Week 48 (≥25% BWT reduction)

24%

Transmural Healing

Full normalization of parameters

Significance: Frst large trial incorporating ultrasound monitoring in a T2T strategy

Lack of Week 4 response strongly predicted failure to achieve Week 48 endoscopic endpoints.

Ulcerative Colitis n=224

TRUST&UC Study

Multicenter Prospective Observational

2wks

Rapid Response Detection

Significant BWT normalization observed as early as **2 weeks** after treatment intensification.

Significance: Demonstrates IUS responsiveness in UC, validating it as a tool for early monitoring to guide rapid treatment optimization.

Systematic Review (2025) 18 studies

UC Prognostic Review (Josefsen S. Et al, J .clin .med, 2025)

Predictive Value of IUS in UC

Rescue Therapy

BWT ≥4mm at 48h

AUC 0.77

Endoscopic Remission

BWT ≤3.6mm at 2wks

AUC 0.87

Key Finding: BWT <3mm at 48h associated with **0% colectomy risk** at 1 year. Identifies early responders.

Diagnostic Accuracy n=284

METRIC Trial

IUS vs MRE in Newly Diagnosed CD

92%

Sensitivity (Small Bowel)

84%

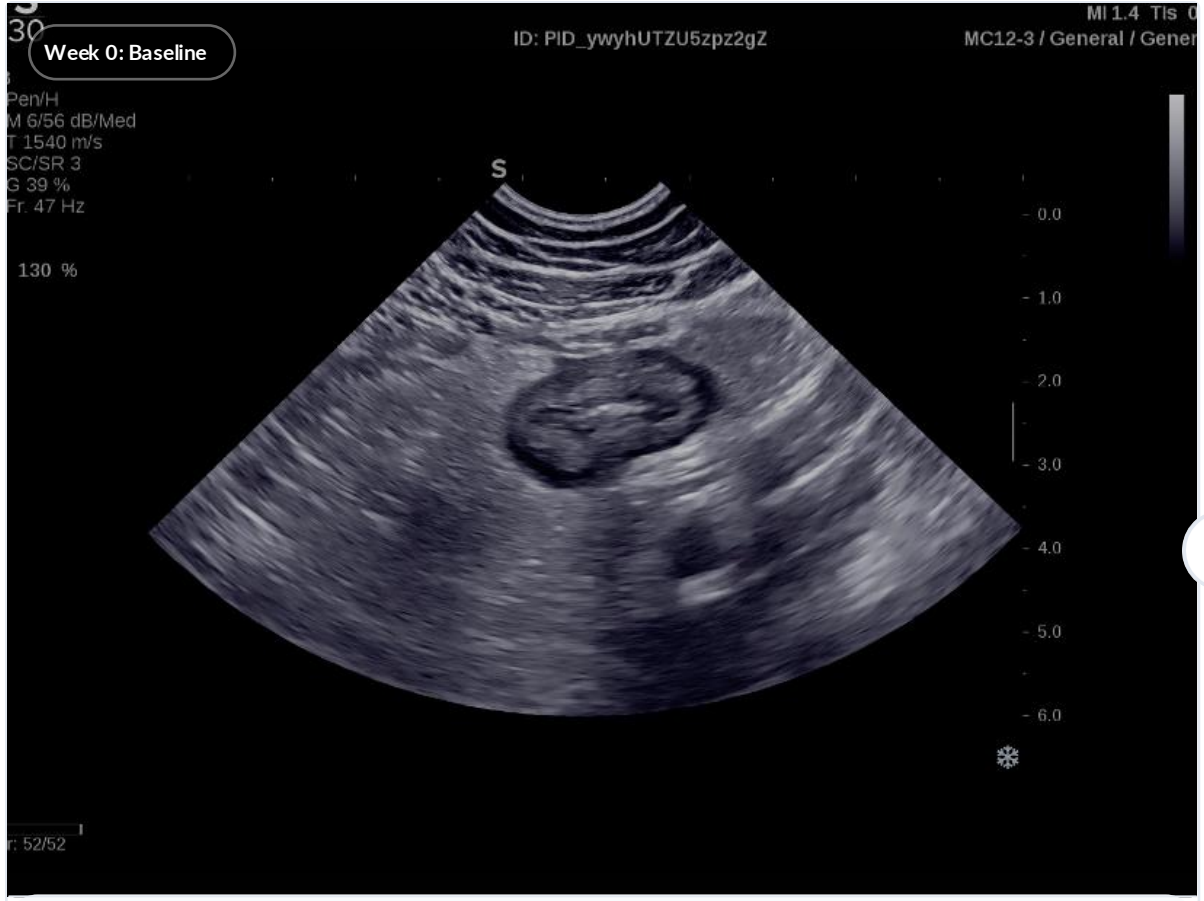
Specificity (Small Bowel)

Significance: Confirmed IUS has high diagnostic accuracy comparable to MRE for detecting small bowel CD, supporting its role as a primary monitoring tool.

Kucharzik T, et al. Clin Gastroenterol Hepatol. 2023;21:153-163. | Maaser C, et al. Gut. 2020;69:1629-1636. | Taylor SA, et al. Lancet Gastroenterol Hepatol. 2018;3:548-558. | Josefsen S, et al. J Clin Med. 2025;15(1):35.

Longitudinal Assessment & Clinical Findings-UC

Pre vs Post Therapy



Active Disease

Pre-Treatment Assessment

Significant bowel wall thickening, loss of stratification, and inflammatory fat densification.

Clinical Response

Post-Treatment Assessment

Reduced wall thickness, restoration of stratification, and normalized echogenicity of the mesentery.

Images courtesy of [Fundeni C I. A.Les, MD, PhD].

Latest Evidence (2025–2026): Guidelines & Outcomes

Guidelines & Consensus (2025)

ECCO–ESGAR–ESP–IBUS Guideline

Standard of Care

Baseline: Obtain IUS and/or MRE at diagnosis for all patients.

Reassessment: Check response at **~12 weeks** after any treatment change.

Monitoring: Regular IUS every 3–6 months in remission.

Indices: Use validated scores (e.g., SUS-CD, IBUS-SAS) for objective reporting.

International Consensus for Trials

Research

Establishes standardized definitions for transmural healing to support integration into clinical trials and routine practice.

Endorses IUS as a **key Treat-to-Target tool** alongside endoscopy.

Practical Takeaways for T2T:

Act on non-response at 8-12 weeks. Coordinate with endoscopy for mucosal targets. Standardize reporting.

Key Studies & Clinical Data

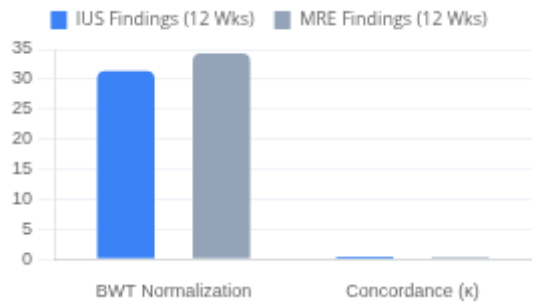
Published 2025 Prospective

IUS vs. MRE Intermodality Study

Agreement: Fair–moderate (κ ≈ 0.31–0.43) for transmural response.

Findings: IUS detected more active colonic segments at baseline.

Rec: Maintain same modality for longitudinal follow-up.



Transmural Healing Outcomes

Clinical Application Reviews 2025 Practice

Diagnostic Advances

Fibrosis vs. Inflammation: CEUS & Elastography distinguish stricture types.

Perianal CD: Transperineal US (TPUS) provides non-invasive assessment.

Patient Outcomes

Long-term: Transmural healing on IUS linked to lower hospitalization & surgery rates.

Optimization: Combined monitoring (IUS + Calprotectin) improves outcomes.

Latest Evidence in IUS

Systematic Review 2025

IUS Scoring Systems & Validation

Innocenti T. et al., Inflamm Bowel Dis.

Primary Outcome

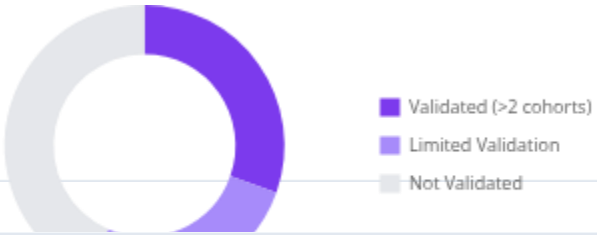
Identified 23 distinct IUS scores for CD & UC; only 13 validated.

Standardization Gap: Most scores use BWT, vascularity, & stratification, but definitions vary widely.

Validation Status: Only 7 scores validated in >2 independent cohorts.

Accuracy: Pooled sensitivity 68-100%, specificity 57-100% across development studies.

Score Validation Status



Clinical Review 2025

Prognostic Role of IUS in CD

Manzotti C. et al., World J Gastroenterol.

Clinical Utility

Early IUS response (2-4 weeks) predicts long-term endoscopic remission.

Surgery Prediction: BWT >7mm, altered echopattern, & complications predict short-term resection risk.

Post-op Recurrence: BWT >3mm at anastomosis is an accurate predictor of recurrence.

Transmural Healing: Associated with reduced hospitalization & steroid use.

Key Predictors of Surgery

BWT >7mm — **High Risk**

Loss of Stratification — **Med Risk**

Cohort Study 2025

Early CD Prognosis (Copenhagen)

Madsen GR. et al., Clin Gastroenterol Hepatol.

Transmural Remission (TR)

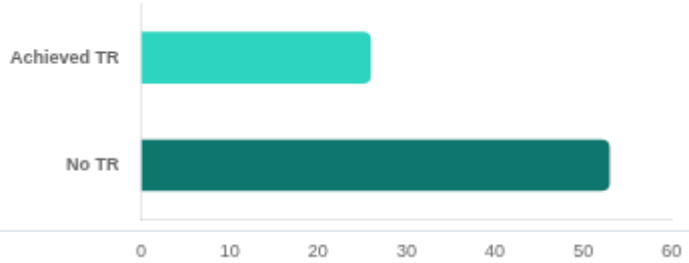
38% achieved TR at 3 months; strongly linked to steroid-free remission.

IBUS-SAS Score: Terminal ileum score >63 at diagnosis predicts resection (Sens 100%).

BMI Impact: Higher baseline BMI negatively impacts 12-month TR (OR 0.16 for obese).

Escalation: Early TR reduces risk of treatment escalation (26% vs 53%).

Treatment Escalation Risk (12 Mo)

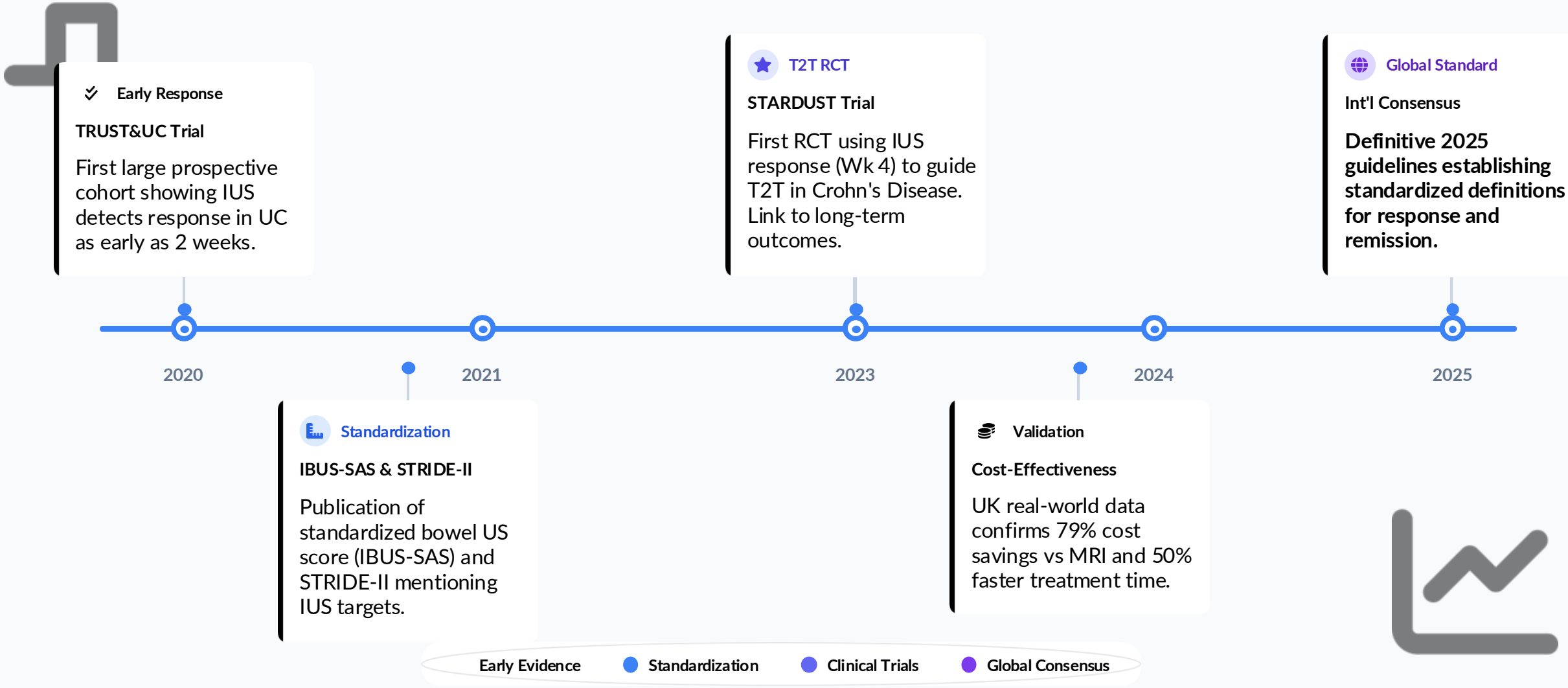


Ref Innocenti T (Inflamm Bowel Dis), Manzotti C (WJG), Madsen GR (CGH) - 2025 Publications

Evolution of IUS Monitoring (2020-2025)

From Emerging Tool to Standard of Care

Timeline



Maaser C, et al. Gut 2020 | Novak K, et al. JCC 2021 | Kucharzik T, et al. CGH 2023 | Allocca M, et al. JCC 2025

Economic Impact: Cost-Effectiveness Analysis

Annual Monitoring Costs in Treat-to-Target Strategy

Financial Model

Unit Cost per Procedure

Intestinal Ultrasound
Non-invasive / Point-of-Care
$150

MRI / MRE
Radiology Suite
$1,200

Colonoscopy
Endoscopy Unit
$1,500

Annual Savings Impact

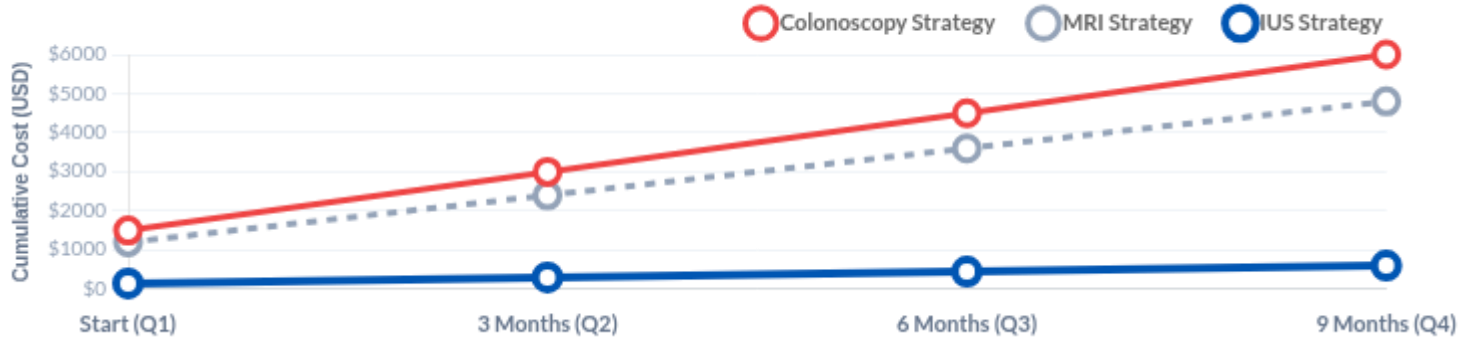
vs. MRI Strategy
$4,200
Saved per patient/yr

vs. Endoscopy
$5,400
Saved per patient/yr

Cumulative Cost: Quarterly Monitoring Strategy

1 Year Projection (4 Assessments)

~88% Cost Reduction



Real-World Evidence: Nottingham NHS Trust Study (2024)

Scand J Gastroenterol

Cost per Patient Episode
£78.86 (IUS) vs £375.35 (MRE)
79% Direct Cost Savings

Time to Treatment
46 Days (IUS) vs 91 Days (MRE)
50% Faster Treatment Decisions

8 IUS exams can be performed for the cost of a single MRI scan.

Frequent objective monitoring is essential for T2T, but financially unsustainable wit MRI/Endoscopy. IUS makes tight control economically viable.

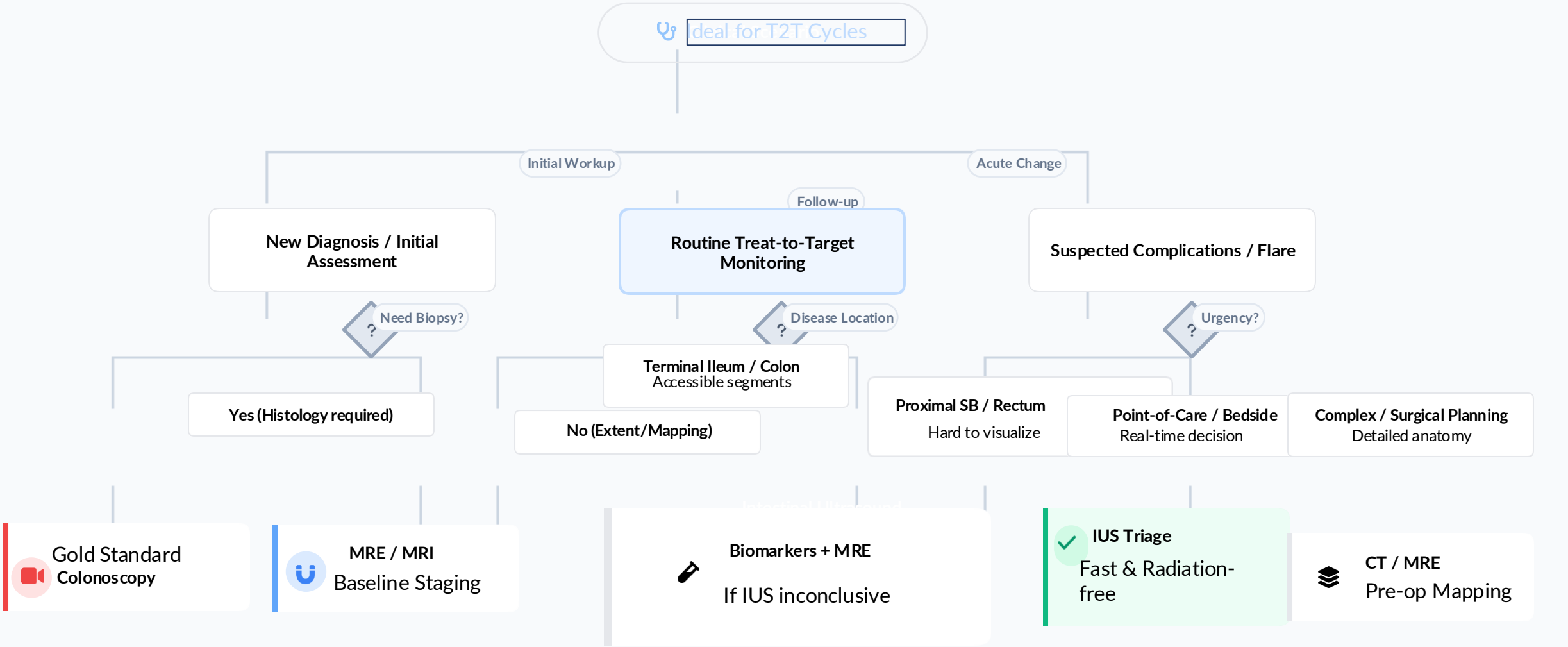
Real-world data: Nottingham NHS Trust Study (2024), n=193 patient episodes | Cost estimates based on average US healthcare reimbursement rates

Nottingham NHS Trust Study, Scand J Gastroenterol. 2024;59(6):683-689. | Saleh A, et al. Crohns Colitis 360. 2023;5:otad027.

Clinical Decision Tree: Modality Selection

Optimizing Imaging Strategy in IBD Management

Workflow Guide



Dolinger MT, et al. Clin Gastroenterol Hepatol. 2024;22:1823-1835. | Turner D, et al. Gastroenterology. 2021;160:1570-1583.

Evidence and Clinical Outcomes

Validating IUS in Treat-to-Target Strategies

Clinical Trials

Meta-Analysis

Diagnostic Accuracy for Complications

Pooled analysis of recent studies

0.81
Sensitivity

0.90
Specificity

High accuracy for detecting strictures, inflammatory masses, and fistulas comparable to MRE/CTE.

Crohn's Disease

Spotlight: **STARDUST Trial** (Ustekinumab)

46.3%
Sonographic Response
at Week 48

24.1%
Transmural Healing
Normalization of all parameters

Early Prediction Value

Lack of sonographic response at **Week 4** predicted poor endoscopic response at Week 48 (Negative Predictive Value: **73%**).

Ulcerative Colitis

Systematic Review (2025): 18 Prospective Studies

48 Hours

BWT ≥4mm predicts rescue therapy — AUC 0.77

BWT <3mm = **0%** colectomy risk in 1 year

2 Weeks

BWT ≤3.6mm predicts remission — AUC 0.87

Predicts endoscopic remission at 8-26 weeks

Clinical Utility

Early dynamic BWT changes (≥20-25% reduction) are the strongest predictors of treatment success, enabling rapid optimization.

Josefsen S, et al. J Clin Med. 2025;15(1):35. | Kucharzik T, et al. Clin Gastroenterol Hepatol. 2023;21:153-163. | Maaser C, et al. Gut. 2020;69:1629-1636.

Advantages & Future Directions

Optimizing Care & The Road Ahead

Outlook

The IUS Advantage

Non-Invasive & Safe

Radiation-free and requires no bowel preparation. Ideally suited for repeated monitoring and special populations (e.g., pregnancy).

Patient-Centered

Real-time visualization helps patients understand their disease. Reduces anxiety and wait times associated with radiology scheduling.

Environmental Sustainability

Significantly lower carbon footprint and medical waste compared to endoscopy or heavy cross-sectional imaging (MRI/CT).

Future Directions & Integration

Implementation

Expanding training pathways (e.g., IBUS curriculum) for gastroenterologists. Developing clear billing codes and clinic workflow integration.

Standardization

Global adoption of structured reporting templates. Defining consensus definitions for "Ultrasound Remission" and "Transmural Healing".

T2T Integration

Formalizing algorithms that pair IUS with biomarkers (FC/CRP). Establishing specific time-to-response cutoffs for therapeutic switching.

AI & Innovation

Development of AI-assisted BWT measurement to reduce operator variability. Automated scoring systems for disease activity quantification.

Emerging Tech

Allocca M, Jairath V, et al. J Crohns Colitis. 2025;19(9):jjaf170. | Dolinger MT, et al. Clin Gastroenterol Hepatol. 2024;22:1823-1835.

Summary & Key Takeaways

Bowel Ultrasound in the Treat-to-Target Concept

Conclusion

1 The "Silent" Gap Problem

50-60% of patients in clinical remission have ongoing mucosal inflammation. Symptoms alone are insufficient for monitoring disease activity, necessitating objective biomarkers.

2 Optimal Monitoring Tool Solution

IUS is the **only modality** combining non-invasive safety, real-time results, and transmural assessment at a low cost, making it uniquely suited for frequent T2T monitoring.

3 Robust 2024-2025 Evidence Validation

Recent data confirms BWT predicts outcomes with high accuracy (AUC **0.77-0.87**) and delivers **79% cost savings** compared to MRI-based pathways (Nottingham Study).

4 Critical Decision Points Strategy

Early BWT changes at **Weeks 4-12** are predictive. Target: **≥25% reduction** for response, **<3mm** for remission. Lack of early response warrants therapeutic escalation.

5 Ready for Practice Action

Clinical pathways, decision algorithms, and training curriculums (IBUS) are now established for immediate integration into routine gastroenterology practice.

The Future is Here

Intestinal Ultrasound transforms IBD care from reactive symptom management to proactive, objective disease control.

Recommended Next Step

Adopt the "IUS First" Strategy

For routine monitoring & triage

Integrate IUS into your weekly IBD clinic workflow starting with T2T monitoring patients.

Based on synthesis of all studies presented. See comprehensive references in Appendix (Slide 17).

INTERNATIONAL BOWEL
ULTRASOUND GROUP

Three Numbers to Remember in Intestinal Ultrasound

1

3 mm

Ultrasound Remission Threshold

Bowel Wall Thickness ≤ 3 mm

Suggests

Transmural healing

Minimal or absent inflammation

Treatment target in many IUS monitoring studies

Practical ultrasound remission target in Treat-to-Target monitoring.

2

25%

Early Treatment Response

≥25% reduction in BWT

Meaning

Early sonographic response

Predicts improved long-term outcomes

Assessed typically 8–12 weeks after therapy initiation

Supported by studies such as STARDUST and other IUS cohorts.

3

5 mm

Postoperative Recurrence Risk

BWT ≥ 5–5.5 mm (Neo-terminal ileum / anastomosis)

Suggests

High probability of severe postoperative recurrence

Correlates with Rutgeerts ≥ i3 endoscopic score

Reference: Rispo et al., Inflamm Bowel Dis 2018

References & Key Studies

Comprehensive Bibliography

Appendix

Latest 2025 Studies

Allocca M, Jairath V, et al. International consensus on the use of intestinal ultrasound in inflammatory bowel disease trials. *J Crohns Colitis.* 2025; 19(9):jjaf170.
Consensus: 35 experts defined standardized endpoints: ≥25% BWT reduction = response, BWT ≤3mm = remission.

Tan WL, et al. Point-of-Care Intestinal Ultrasound Impacts Inflammatory Bowel Disease Care and Reduces the Need for Additional Investigations. *J Gastroenterol Hepatol.* 2025; 40(10):2472-2481.
Impact: IUS reduced stool tests by 51%, imaging by 22%, and endoscopy by 39%.

Innocenti T, et al. Systematic Review of Available Intestinal Ultrasound Scores for Inflammatory Bowel Disease and Update on Validation Studies. *Inflamm Bowel Dis.* 2025; 31(11):3194-3212.
Validation: Review of 23 scores; pooled sensitivity 68-100%, specificity 57-100%, accuracy 72-91%.

Recent Evidence (2024-2025)

Josefsen S, et al. Transabdominal Intestinal Ultrasonography in Monitoring and Predicting Outcomes in Ulcerative Colitis—A Systematic Review. *J Clin Med.* 2025; 15(1):35.
Key Finding: BWT ≥4mm at 48h predicts rescue therapy (AUC 0.77).

Substantial cost savings of ultrasound-based management... *Scand J Gastroenterol.* 2024; 59(6):683-689.
Key Finding: UK real-world study showing 79% cost savings with IUS pathway vs MRE.

Recent Accuracy Studies (2023-2024)

Diagnostic accuracy of bowel ultrasonography in patients... *Ann Gastroenterol.* 2024; 37(1):12-20.
Metrics: Sensitivity 88.6%, Specificity 86%, PPV 94% for detecting active IBD.

Randhawa A, Guzowski T. Intestinal Ultrasound: Envisioning a New Future for Crohn's Disease Management. *ACG Case Rep J.* 2024; 11:e01234.
Accuracy: IUS sensitivity 85%, specificity 91% vs MRI (80%, 82%) and CT (81%, 88%).

Landmark Clinical Trials

Kucharzik T, et al. (STARDUST) Early ultrasound response and progressive transmural remission after treatment with ustekinumab in Crohn's disease. *Clin Gastroenterol Hepatol.* 2023; 21(1):153-163.e12.

Maaser C, et al. (TRUST&UC) Intestinal ultrasound for monitoring therapeutic response in patients with ulcerative colitis: results from the TRUST&UC study. *Gut.* 2020; 69(9):1629-1636.

Colombel JF, et al. (CALM) Effect of tight control management on Crohn's disease (CALM): a multicentre, randomised, controlled phase 3 trial. *Lancet.* 2017; 390(10114):2779-2789.

Taylor SA, et al. (METRIC) Diagnostic accuracy of magnetic resonance enterography and small bowel ultrasound for the extent and activity of newly diagnosed and relapsed Crohn's disease: a multicentre trial. *Lancet Gastroenterol Hepatol.* 2018; 3(8):548-558.

Foundational Concepts

Baars JE, et al. Majority of patients with inflammatory bowel disease in clinical remission have mucosal inflammation. *Inflamm Bowel Dis.* 2012; 18(9):1634-1640.
Key Insight: 50-60% discordance between symptoms and mucosal inflammation.

Turner D, et al. (STRIDE-II) STRIDE-II: An Update on the Selecting Therapeutic Targets in Inflammatory Bowel Disease (STRIDE) Initiative of the International Organization for the Study of IBD (IOIBD). *Gastroenterology.* 2021; 160(5):1570-1583.
Guideline: Defined modern T2T targets including endoscopic healing.

Novak KL, et al. Expert Consensus on Optimal Acquisition and Development of the International Bowel Ultrasound Segmental Activity Score [IBUS-SAS]. *J Crohns Colitis.* 2021; 15(4):609-616.
Standardization: Defined key IUS parameters and scoring.

Dolinger MT, et al. AGA Clinical Practice Update on the Role of Intestinal Ultrasound in Inflammatory Bowel Disease: Commentary. *Clin Gastroenterol Hepatol.* 2024; S1542-3565(24)00454-3.
Guideline: Expert commentary on IUS implementation in US practice.

international bowel
ULTRASOUND GROUP

Thank You

Dr. Anda Les, MD, PhD

Fundeni Clinical Institute
Bucharest, Romania