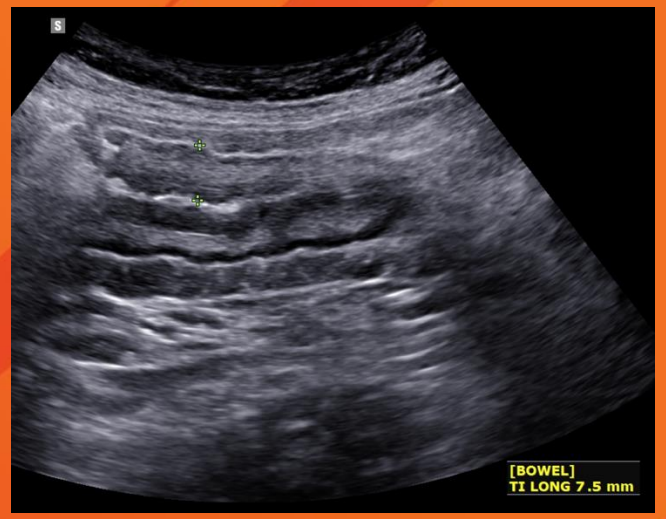
Unlocking Ultrasound's Role in IBD: Outcome Prediction, Endpoint Assessment, and Treatment Strategy



Meeting of the Minds

Cathy Lu, MD, MSc
Associate Professor
University of Calgary
Mentoring in IBD, Toronto, ON

November 14, 2025

INFLAMMATORY BOWEL DISEASE UNIT
UNIVERSITY OF CALGARY

UNIVERSITY OF CALGARY

Disclosures

- Speaker Fees – Abbvie, JnJ.
- Advisory Board/Consulting Fees – Abbvie, Agomab, Celltrion, Ferring, Fresenius Kabi, Janssen, Lilly, Merck, Pendopharm, Pfizer, Takeda

- Grant Funding- Helmsley Charitable Trust, Abbvie

Objectives

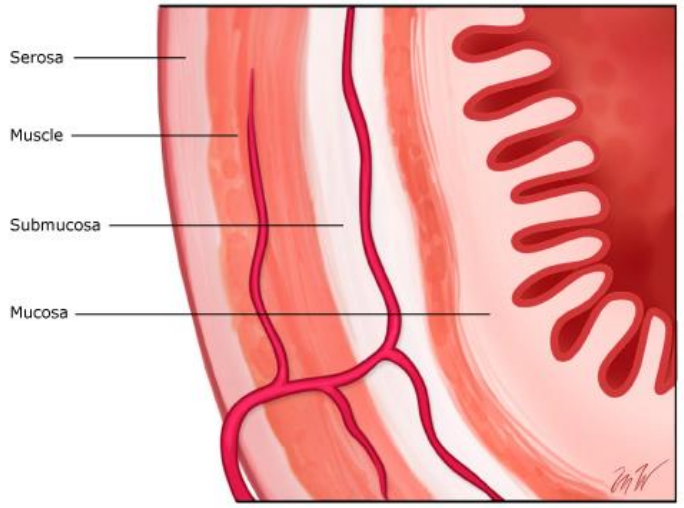
- Consider emerging evidence for intestinal ultrasound (IUS) in predicting outcomes
- Discuss endpoint evaluation and explore the role of IUS in treating to target
- Identify when IUS is incrementally useful
- How to use IUS in practice

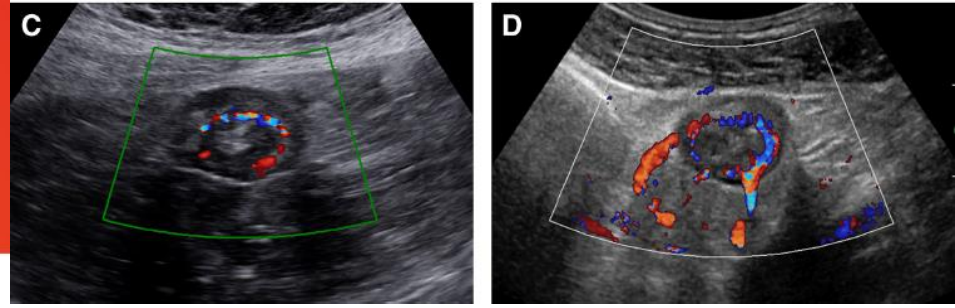
IUS 101

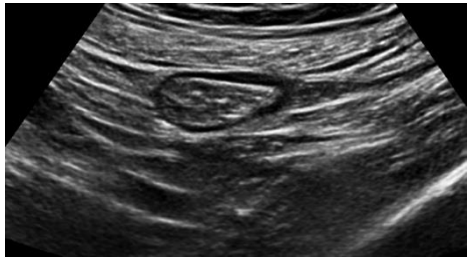
4 Key Songographic Components of Active IBD

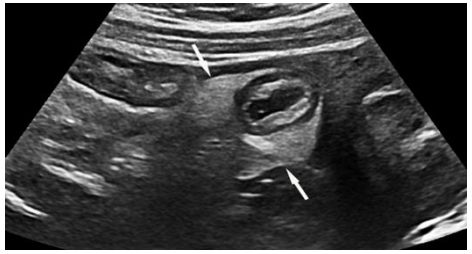
1. Bowel wall thickness*
2. Color Doppler Blood Flow*
3. Inflammatory fat
4. Loss of stratification

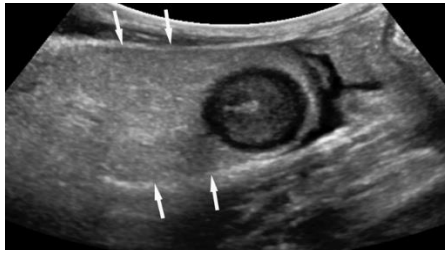
* Found in disease activity scores

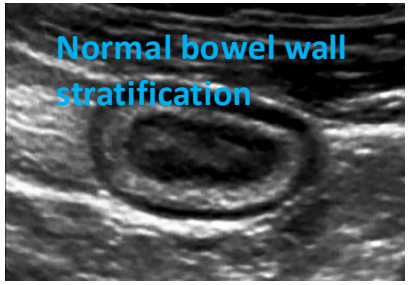


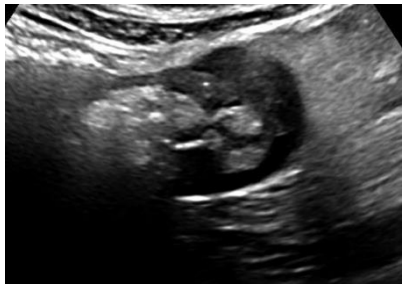


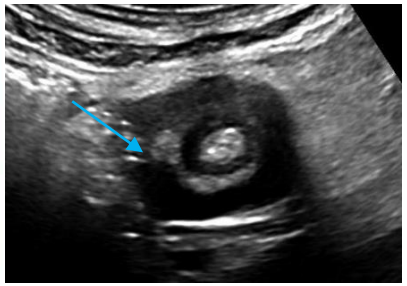


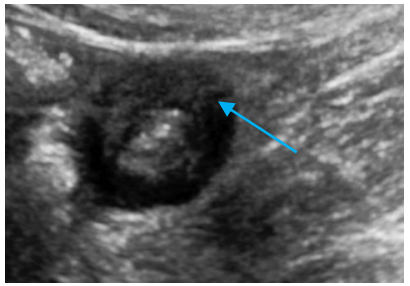












Validated IUS Scoring Indices

Parameter	Simple sonographic score (SSS) Novak 2017[1]	Simple ultrasound score (SUS-CD) Sævik 2021[2]	Simple ultrasound score Ripollés 2021[3]	Bowel ultrasound score (BUSS) Allocca 2021[5]	IBUS segmental activity score (IBUS-SAS) Novak 2021[7]	Milan Ultrasound criteria (MUC) Allocca 2018[10]	UC intestinal ultrasound index (UC-IUS) Bots 2021[12]	Civitelli Index Civitelli 2014[14]	Simple pediatric activity ultrasound score (SPAUSS) Kellar 2019[15]
BWT	✓	✓	✓	✓	✓	✓	✓	✓	✓
CDS	✓	✓	✓	✓	✓	✓	✓	✓	✓
I-FAT					✓		✓		✓
BWS					✓			✓	
Haustra							✓	✓	
Gold-standard	IC retro[1]	IC pro[2]	IC pro[3]	IC pro[5]	VAS[7]	IC pro[10]	IC pro[12]	IC pro[14]	IC retro[15]
Validated with Colonoscopy	CD[1]	CD[2]	CD[4]	CD[6]	CD[8] + UC[9]	UC[11]	UC[9+13*]	UC[13*]	----

IC = ileocolonoscopy, pro = prospective, retro = retrospective, VAS = visual analogue score

Lu C, Verstock B, Winter M, et al. APT. accepted 2025.

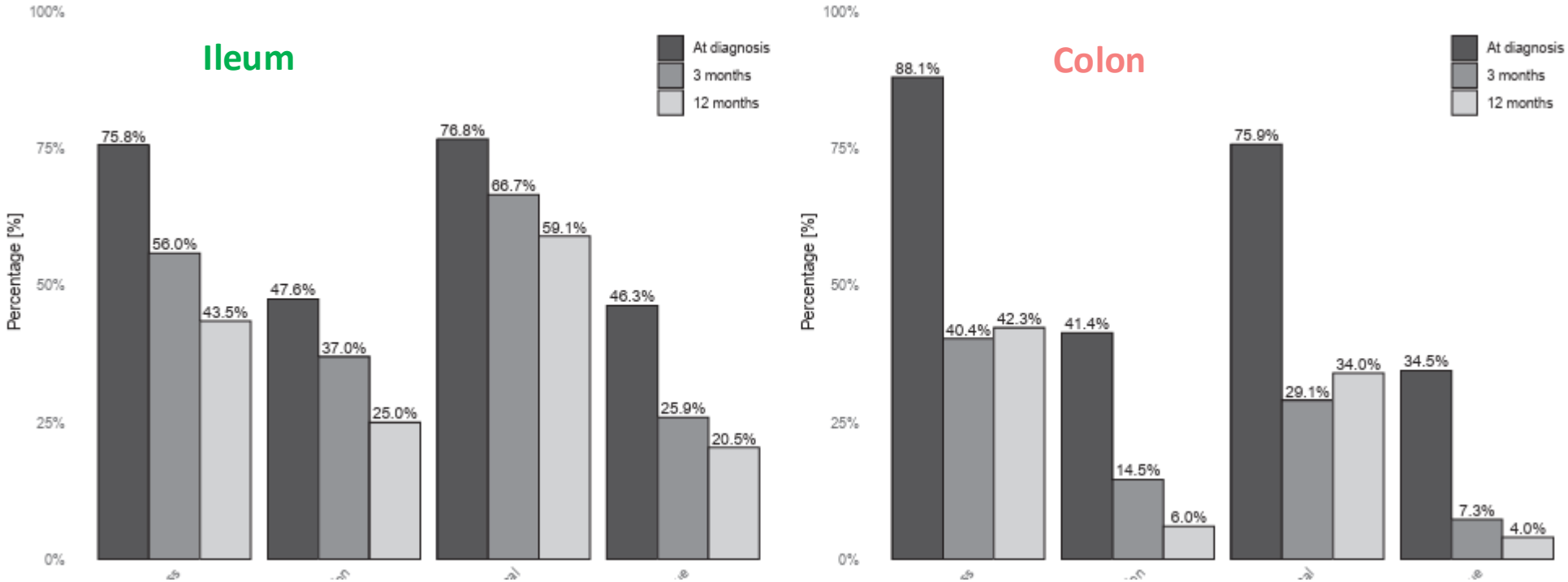
Objectives

- **Consider emerging evidence for intestinal ultrasound (IUS) in predicting outcomes**
- Discuss endpoint evaluation and explore the role of IUS in treating to target
- Identify when IUS is incrementally useful
- How to use IUS in practice

Predictive Value of IUS in Early CD

Madsen GR. et al. Clin Gastroenterol Hep. 2025

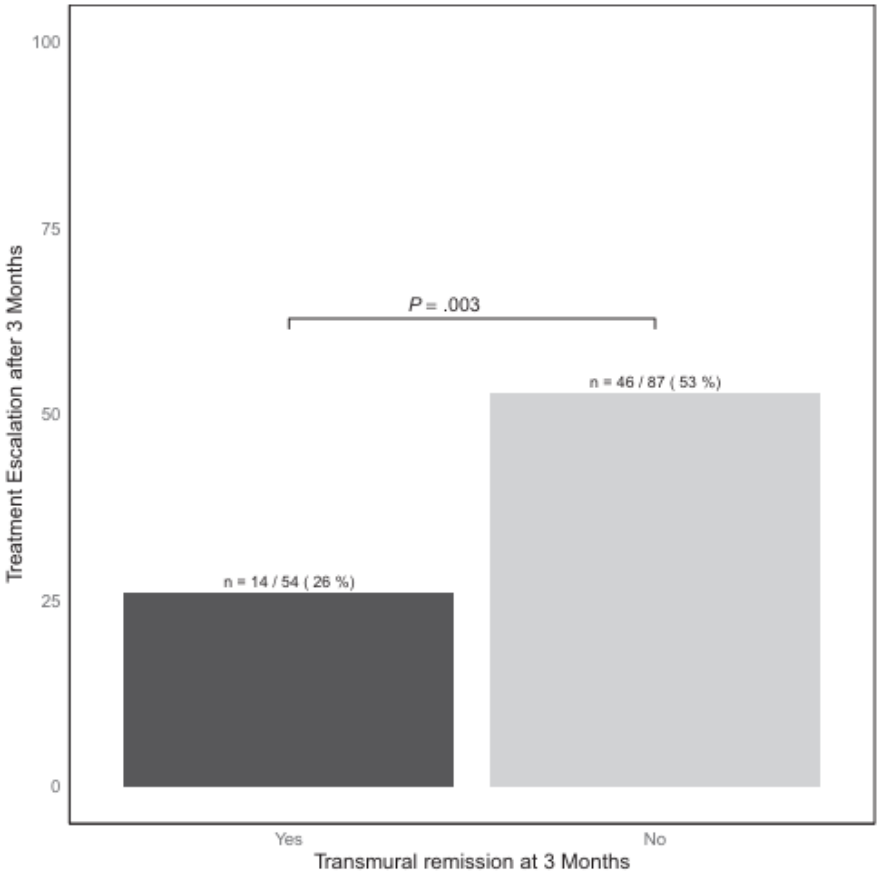
- Prospective cohort study of newly diagnosed adult CD.
- 201 patients - F/U symptoms, biomarkers (FC < 30d), IUS 3, 6, 9, 12M, endoscopy



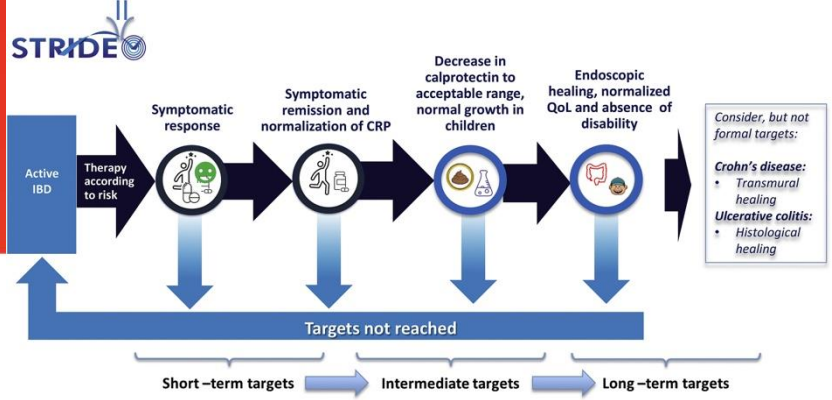
Abnormal BWT Wall strat CDS ifat

AbN BWT Wall strat CDS ifat

Predictive Value of IUS in Early CD



- TR achieved in 38% of patients
- **Lower risk of treatment escalation at 12 month F/U** (26% vs 53%, p = 0.003)



Conclusion – TR in newly dx may be a viable target

- Achieving transmural remission after 3M was associated with:

1. ↑ rate of sustained steroid free clinical remission
2. ↓ need for treatment escalation during the first year.

Madsen GR. Et al. Clin Gastroenterol Hep. 2025

Transmural Healing = Reduced Rate of Drug Switch

- Prospective study of consecutive CD patients with IUS and Fcal within 7 days.
- 112 patients - divided into 4 groups

	IUS	Fecal Cal	Proportion (%)
Transmural Healing	N	N	44.6
IUS Healing	N	> 100 ug/g	12.5
Biochemical Remission	Abnormal	< 100 ug/g (reflecting mucosal healing)	16.1
No healing	Abnormal	Abnormal	26.8

- Primary endpoint – active CD

Huet et al. Inflamm Bowel Dis. 2025

Transmural Healing = Reduced Rate of Drug Switch

Relapse-related drug discontinuation Def:

- Change in med due to CD flare (scope, IUS, or Fcal) and stool freq ≥ 3 or AP > 1)

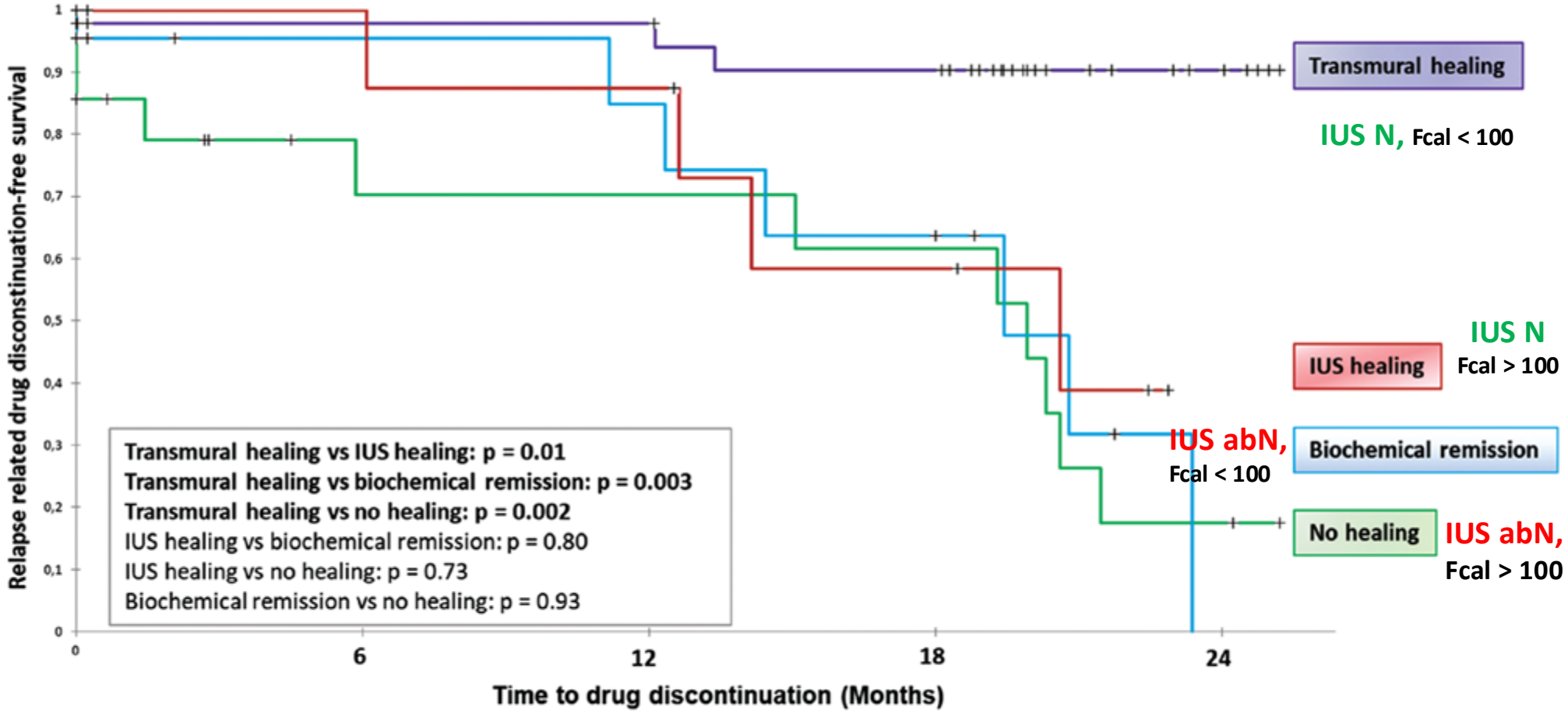
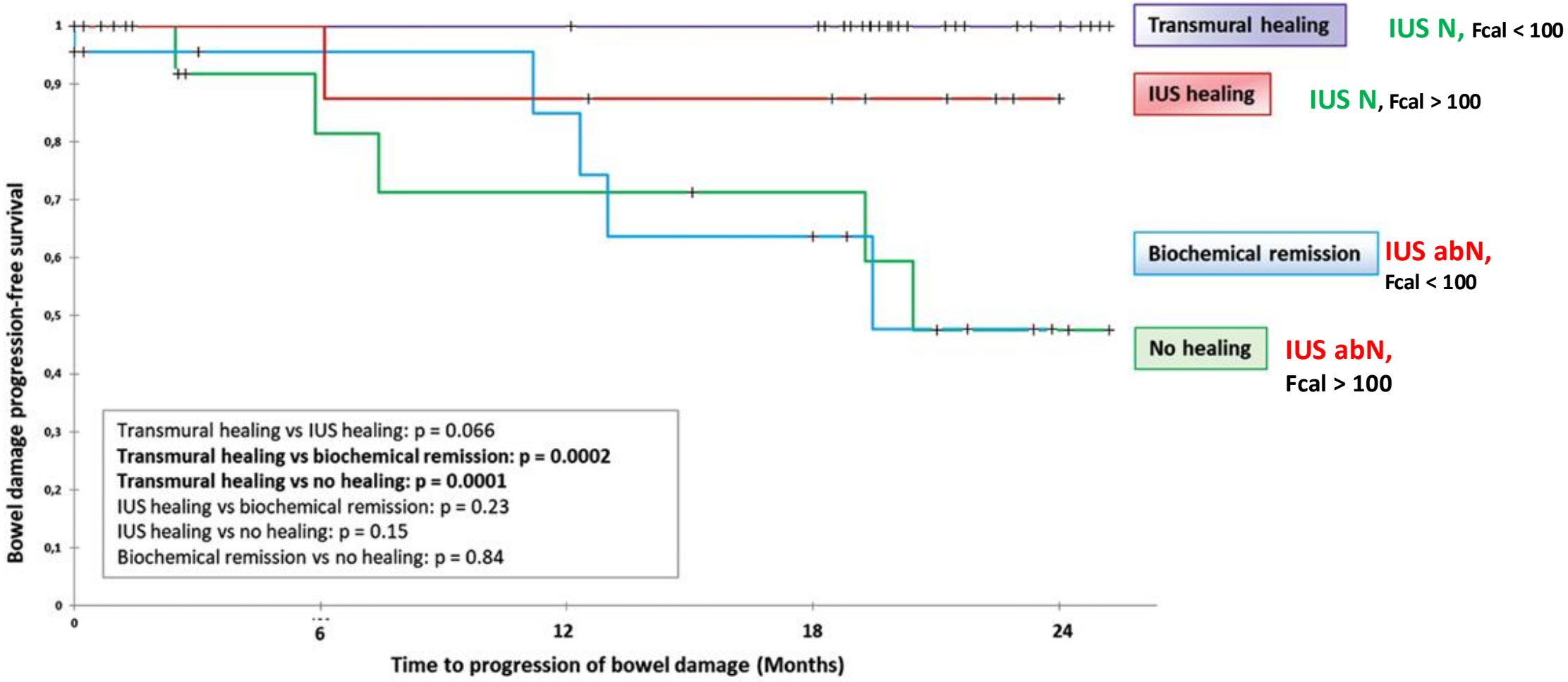


Figure 2. Kaplan–Meier curves illustrating relapse-related drug discontinuation-free survival among 112 patients with Crohn's disease according to the achievement of transmural healing, biochemical remission (reflecting mucosal healing), intestinal ultrasound healing (IUS), or no healing.

Huet et al. Inflamm Bowel Dis. 2025

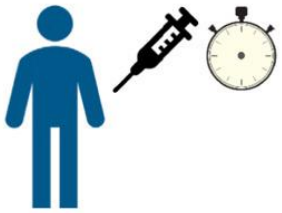
Transmural Healing = Reduced Bowel Damage



Bowel damage = need for resection, new stricture or fistula, worsened stricture; PSD or obstructive symptoms.

Higher Transmural Healing with Early Biologic Therapy

Early biological therapy



(≤ 12 months)

Late biological therapy

Transmural healing:

Early biological therapy:
aOR 3.2 (95%CI 1.4-7.7), *P*<.01

Long-term outcomes:

Bowel damage progression:
aHR 0.28 (95%CI 0.10-0.79), *P*=.02

CD-related surgery:
aHR 0.21 (95%CI 0.05-0.88), *P*=.03

Therapy escalation:
aHR 0.35 (95%CI 0.14-0.88), *P*=.02

Early Biological Therapy Within 12 Months of Diagnosis Leads to Higher Transmural Healing Rates in Crohn's Disease

Reves J, et al. CGH. 2025;23;1194-1203

Objectives

- **Consider emerging evidence for intestinal ultrasound (IUS) in predicting outcomes**

Take Home points for CD

1. **Transmural Remission progressively improves in the TI over 1 year**
2. **TR associated with:**
   - ↓ steroid use
   - ↓ need for treatment escalation during the first year.
   - ↓ need for drug switch
   - ↓ need for surgery
   - ↓ bowel damage

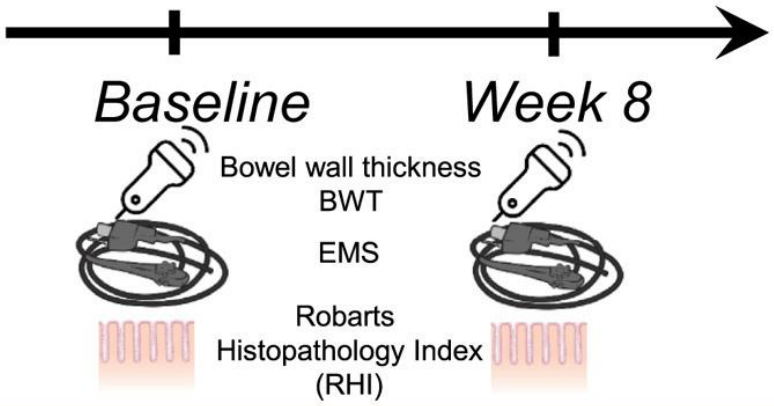
Predicting Outcomes in UC

Intestinal ultrasound is accurate to determine endoscopic response and remission in patients with moderate to severe ulcerative colitis

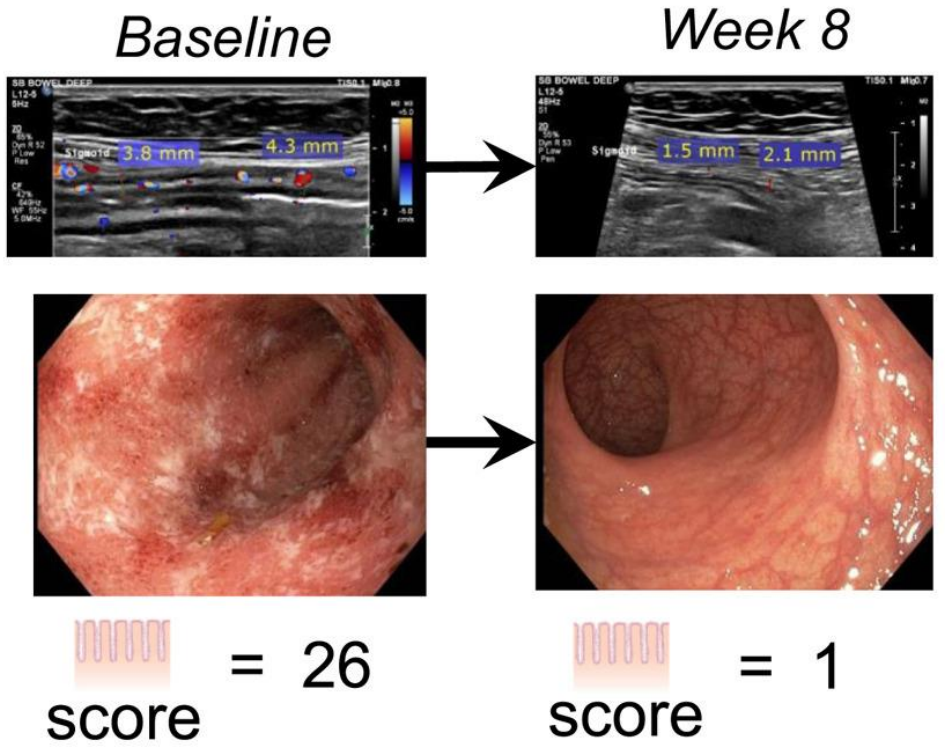
Cohort and design

n=30 starting tofacitinib

endoscopic Mayo score (EMS) ≥ 2



Results



Remission EMS=0 } **BWT** 2.8 mm

Improvement EMS≤1 } 3.9 mm

Response EMS≥1 decrease } 32% decrease

ρ=0.49: RHI vs BWT

Gastroenterology

De Voogd et al. Gastro. 2022

Transmural healing in ulcerative colitis patients improves long-term outcomes compared to endoscopic healing alone

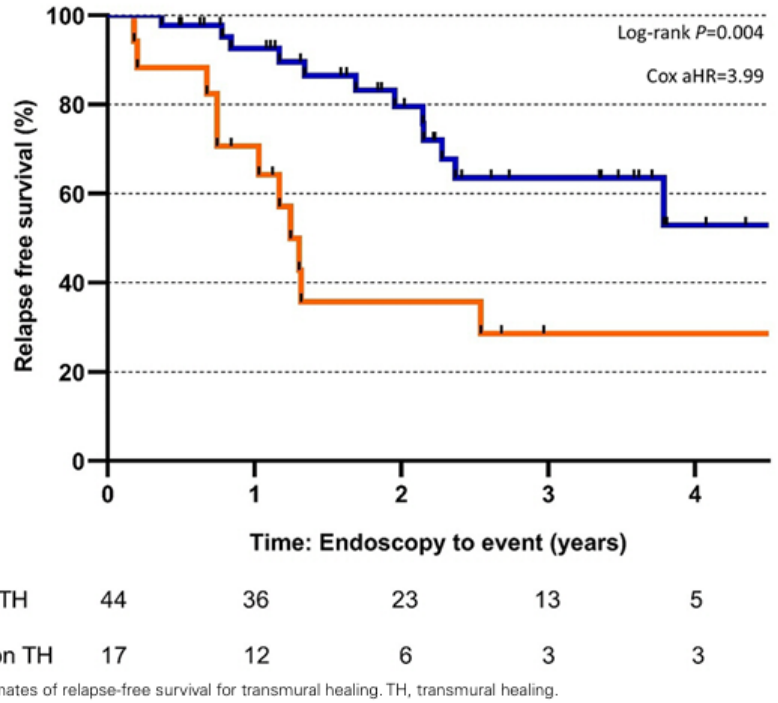
Journal of Crohn's and Colitis, 2025, **19(9)**, jjaf149
https://doi.org/10.1093/ecco-jcc/jjaf149
Advance access publication 22 August 2025
Original Article

Chong-Teik Lim[1,2,†], Christoph Teichert[1,†], Maarten Pruijt[1], Floris De Voogd[1], Geert D'Haens[1], Krisztina Gecse[1,*]

- Retrospective study of 61 UC pts on stable therapy with MES ≤ 1, IUS ≤ 6M, no med changes.
- Primary outcome – relapse free survival in patients with and without TH (BWT ≤ 3mm)

Results

- Median 20 month f/u
- On IUS, 72% had TH.
- TH sig lower relapse risk (7.5%) than EH alone (29%)
- IUS can stratify UC patients for risk of relapse



Kaplan–Meier estimates of relapse-free survival for transmural healing. TH, transmural healing.

Predictive value of Milan ultrasound criteria in ulcerative colitis: A prospective observational cohort study

ueg journal WILEY
2022; 10(2): 190-197

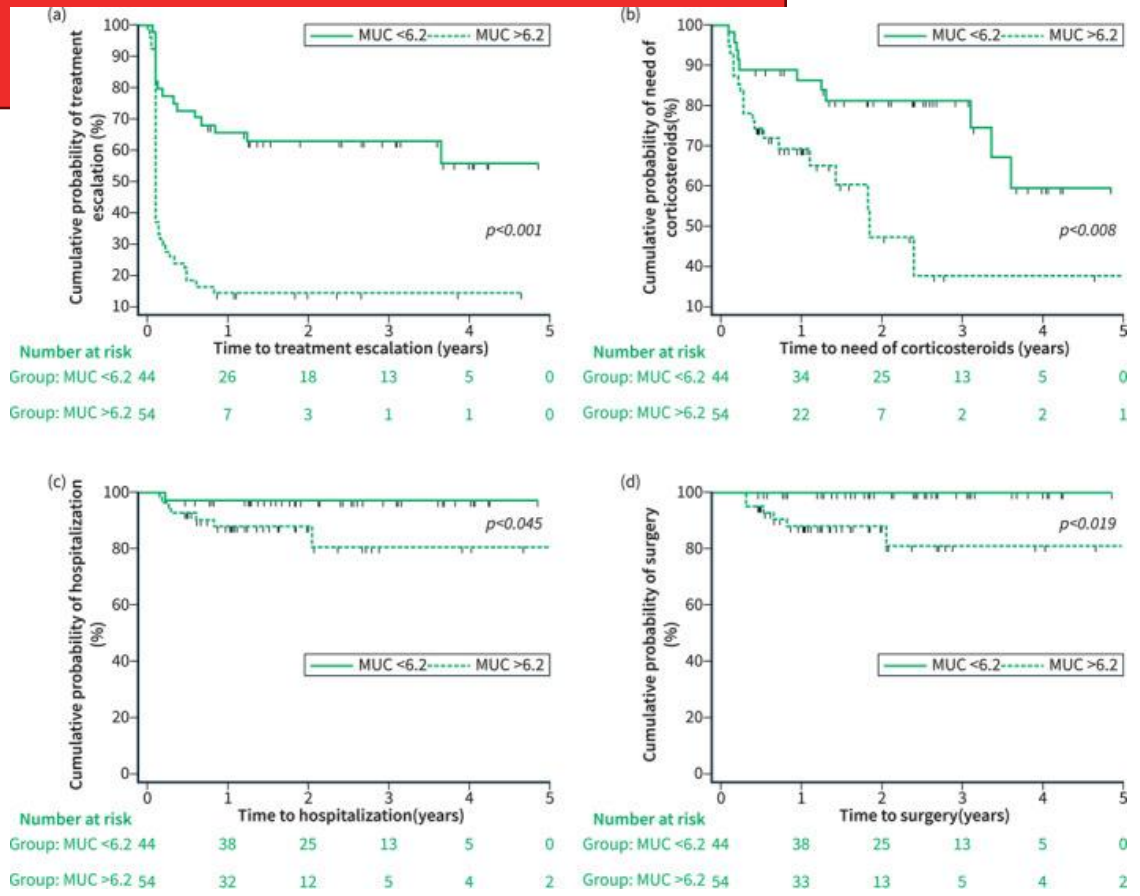
Mariangela Allocca[1] | Cecilia Dell'Avalle[2] | Vincenzo Craviotto[3] | Federica Furfaro[3] | Alessandra Zilli[1] | Ferdinando D'Amico[1,2] | Stefanos Bonovas[2,3] | Laurent Peyrin-Biroulet[4] | Gionata Fiorino[1] | Silvio Danese[1]

- Prospective study of 91 UC pts on stable therapy with MES ≤ 1, IUS ≤ 6M, no med changes
- Primary outcome – predictive value of MUC score on outcomes

MUC = 1.4 x BWT (mm) + 2 x BWF = 1 if present, or BWF = 0 if absent.

Results

- Median 20 month f/u
- MUC significantly correlated with MES
- MUC > 6.2, then
- Increased need drug escalation, steroids, Hospitalization, colectomy



Objectives - Consider emerging evidence for intestinal ultrasound (IUS) in predicting outcomes

Take Home points for UC

1. **BWT improvements is reflective of endoscopic mayo score.**
2. **TR associated with:**
   - ↓ risk of UC flare

For MUC < 6.2,

- ↓ drug escalation
- ↓ steroids
- ↓ hospitalization
- ↓ risk of colectomy

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IUS Response and Transmural Remission

Transmural Remission (same in UC and CD)

- BWT ≤ 3mm
- Normal color doppler signal
- BWT up to 4mm permissible (diverticular disease)
- TR should be assessed after 26-52 weeks, may occur at 12 W.

Treatment response

- BWT ↓ > 25%, >2mm, or

↓ > 1mm and one color doppler signal

Journal of Crohn's and Colitis, 2022, 554–580
https://doi.org/10.1093/ecco-jcc/jjab173
Advance Access publication October 6, 2021
Original Article

OXFORD

JCC

Original Article

Defining Transabdominal Intestinal Ultrasound Treatment Response and Remission in Inflammatory Bowel Disease: Systematic Review and Expert Consensus Statement

Johan F. K. F. Ilvemark,[a,o] Tawnya Hansen,[b] Thomas M. Goodsall,[c,d] Jakob B. Seidelin,[a] Heba Al- Farhan,[e] Mariangela Allocca,[f,g] Jakob Begun,[h,o] Robert V. Bryant,[i] Dan Carter,[j] Britt Christensen,[k,o] Marla C. Dubinsky,[l] Krisztina B. Gecse,[m] Torsten Kucharzik,[n] Cathy Lu,[o] Christian Maaser,[p] Giovanni Maconi,[q] Kim Nylund,[r,s] Carolina Palmela,[t] Stephanie R. Wilson,[u] Kerri Novak,[o,*] Rune Wilkens,[v,w,*,o]; on behalf of the International Bowel Ultrasound [IBUS] Group

Using IUS to Treat to Target

Is an IUS endpoint better than Fcal and CRP?

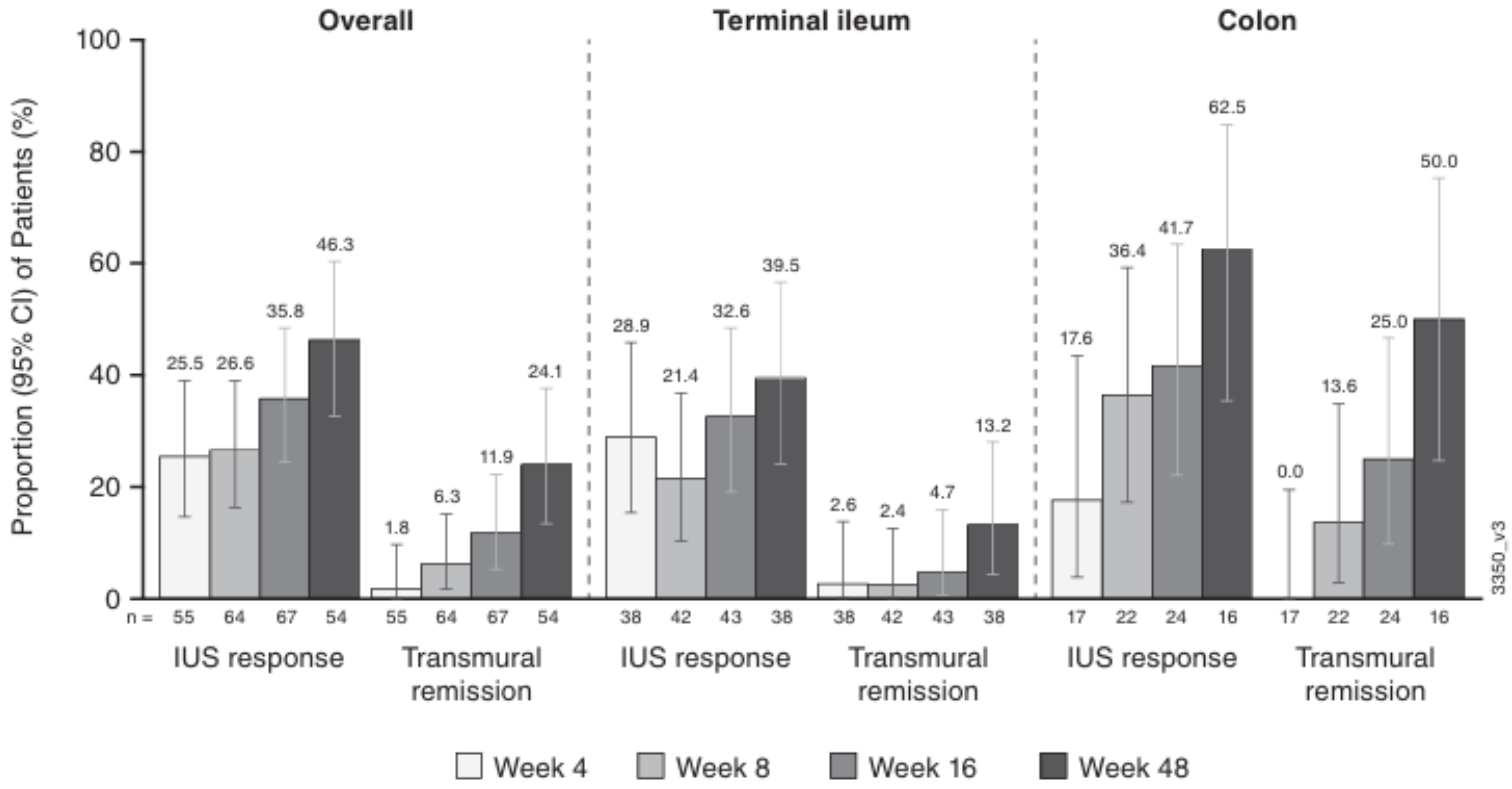
VECTORS - A Study to Evaluate Transmural Healing as a Treatment Target in Crohn's Disease (VECTORS)

ClinicalTrials.gov ID NCT06257706

Sponsor Alimentiv Inc.

Rate of Transmural Healing Depends on Timing of Assessment and CD Location

- **77 patients** were evaluated
- Most affected segments at baseline: **terminal ileum (65%) & colon (35%)**
- IUS responses as early as **Week 4**
- The most robust responses to **ustekinumab** therapy were observed in the **colon** (62.5% for IUS response at Week 48 vs. 39.5% for the terminal ileum) and in **biologic-naïve** patients (59.1% vs. 37.5% for patients previously exposed to 1 biologic therapy)



CONCLUSIONS

(ie, ≤3 mm in the colon and ≤2 mm in the ileum).

Patients with Crohn's disease treated with **ustekinumab** achieved progressive IUS response or transmural remission from **Weeks 4 to 48**

Kucharzik et al. CGH. 2023;21(1):153-163.e12

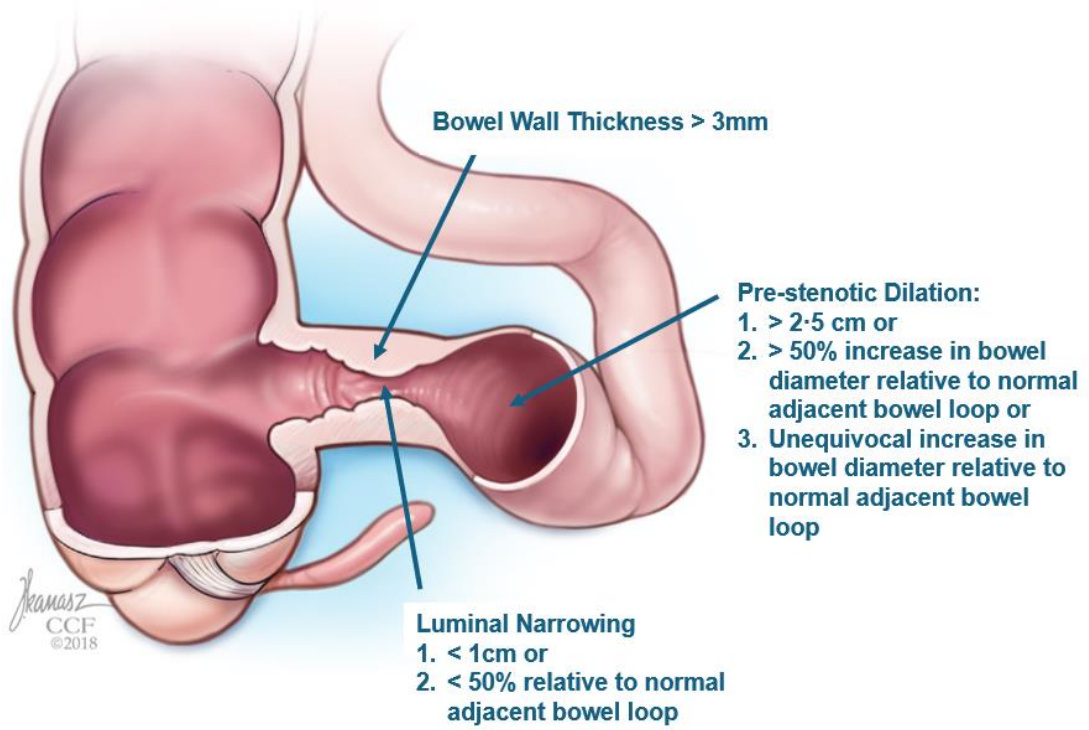
Rate of Transmural Healing Depends on Timing of Assessment and CD Location and PHENOTYPE

Improvement Parameters

- Stricture length ↓25%?
- BWT ↓ 25%
- Luminal narrowing ↓50%
- PSD :

1. ↓ diameter > 25%
2. PSD < 2.5cm

- Motility abnormalities



Lu et al. LGH 2024

Objectives

- Consider emerging evidence for intestinal ultrasound (IUS) in predicting outcomes
- **Discuss endpoint evaluation and explore the role of IUS in treating to target**

Take Home points

- Definitions of transmural remission and timing of assessment established.
- Ample evidence that transmural remission has positive benefits.
- RCT evidence of IUS as an endpoint eagerly awaited
- Identify when IUS is incrementally useful
- How to use IUS in practice

Objectives

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- **Identify when IUS is incrementally useful**
- How to use IUS in practice

IUS is incrementally useful ANYTIME but specifically,

- Pregnancy
- Pediatrics
- Query IBD versus IBS
- Other pathology for abdo pain: diverticulitis, abscess, inflammatory mass, appendicitis
- Long waits for CT/MR
- When patients don’t submit fecal cals
- Early post op recurrence
- Evaluating hot versus cold strictures
- Facilitate timely clinical decision making and treatment adjustments

Active Inflammatory Bowel Disease on Intestinal Ultrasound During Pregnancy Is Associated With an Increased Risk of Adverse Pregnancy and Neonatal Outcomes Independent of Clinical and Biochemical Disease Activity

Gastroenterology 2025;■:1–17

Ralley E. Prentice,[1,2,3] Emma K. Flanagan,[2,4] Emily K. Wright,[2,4] Michael T. Dolinger,[5] Zoe Gottlieb,[5] Alyson L. Ross,[2] Megan Burns,[1] Danny Con,[4,6] Edward Shelton,[1] Ray Boyapati,[1] Ilyra Aronsky,[5] Gregory T. Moore,[1,2] William Connell,[2,4] Miles P. Sparrow,[7,8] Peter De Cruz,[4,6] Michael A. Kamm,[2,4] Ilana Prideaux,[1] Rimma Goldberg,[1,3] Katerina V. Kiburg,[4] Marla C. Dubinsky,[5] and Sally J. Bell[1,3,4]

Objective

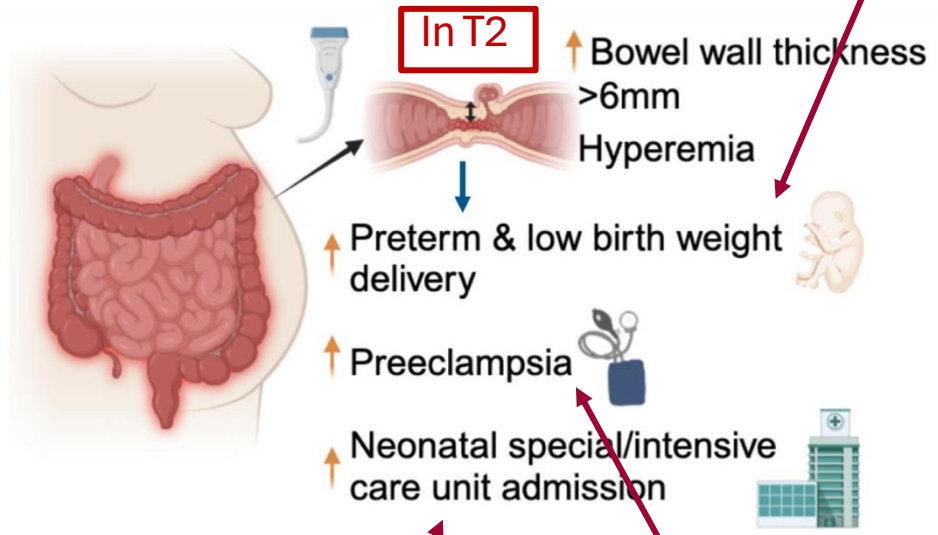
- To assess the role of IUS in predicting adverse obstetric outcomes in IBD.
- Identify agreement between FCP, IUS, and clinical disease activity.

Methods

- International, multicentre, prospective cohort study in Australia and USA (2017-2023) with both preconception and pregnant IBD patients (n=379)
- Clinical assessment (PGA) and FCP 6 months pre-conception, T1, T2, T3, and post partum (if feasible).
- IUS preconception, T1 and T2 (Performed in 225 patients)

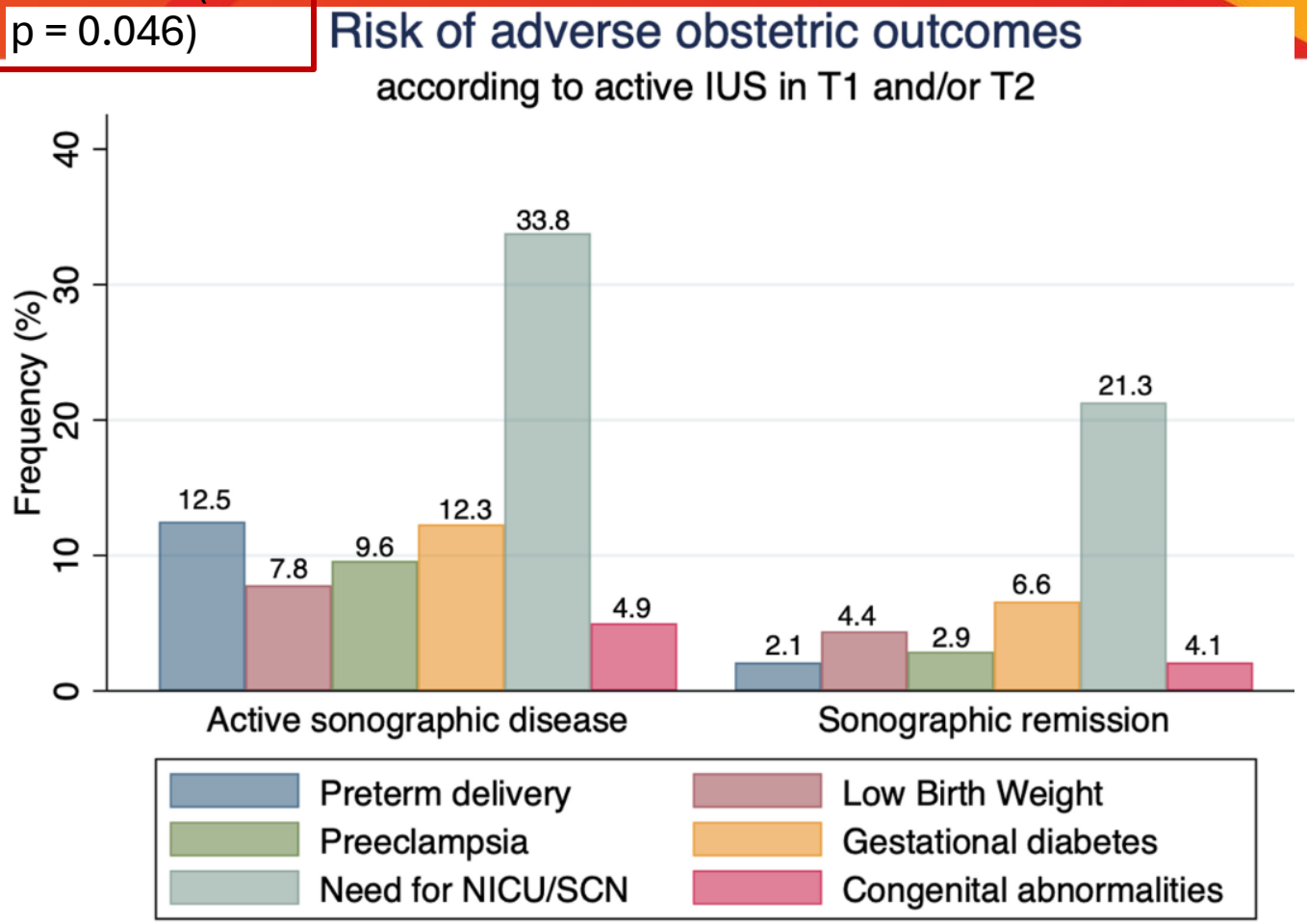
4-fold risk pre-term (RR: 4.01, p=0.018)

2 fold risk LBW (RR: 2.19, p = 0.046)



2-fold increased risk (RR: 2.42, p=0.041)

3-fold increased risk (RR: 3.46, p=0.046).

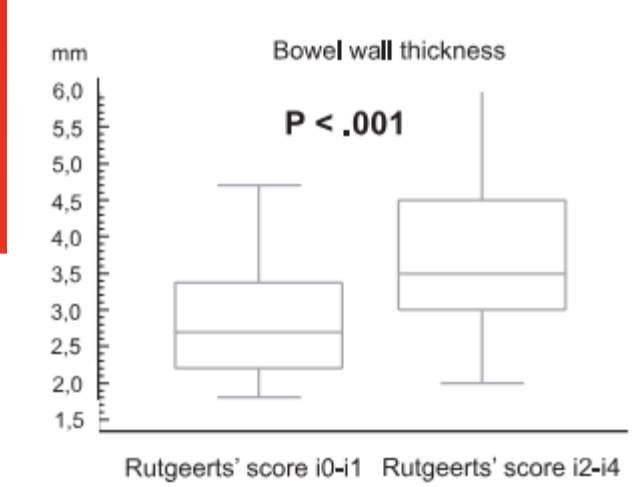


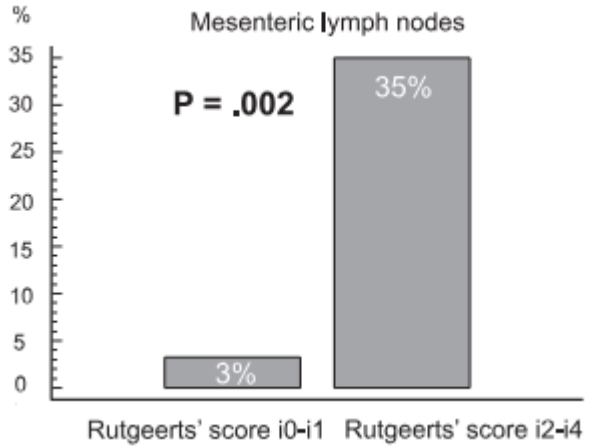
Prentice et al. Gastro 2025

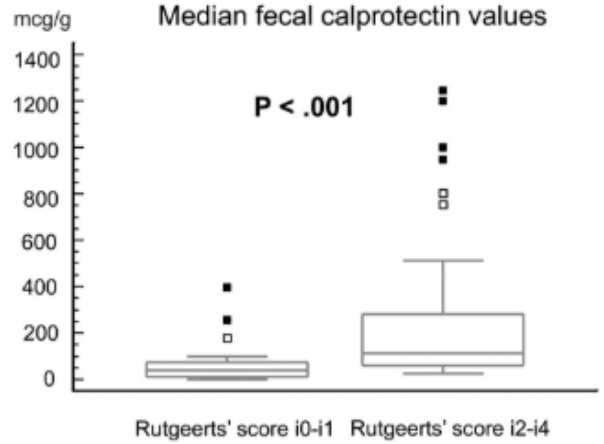
Noninvasive Assessment of Postoperative Disease Recurrence in Crohn's Disease: A Multicenter, Prospective Cohort Study on Behalf of the Italian Group for Inflammatory Bowel Disease

Federica Furfaro,[1] Ferdinando D'Amico,[1,2] Alessandra Zilli,[1] Vincenzo Craviotto,[3] Annalisa Aratari,[4] Cristina Bezzio,[5] Antonino Spinelli,[3] Daniela Gilardi,[6] Simona Radice,[1] Simone Saibeni,[5] Claudio Papi,[4] Laurent Peyrin-Biroulet,[7,8] Silvio Danese,[1,6] Gionata Fiorino,[1,6] and Mariangela Allocca[1,6]

- Prospective, multi-centre observational cohort study.
- All post op ICR patients underwent blinded IUS and Cscope within
- 1 year of surgery.
- 66% had POR.
- IUS (wall thickening ≥ 3mm) with fecal cal ≥ 50 correctly classified endoscopic recurrence with < 5% falsely classified.



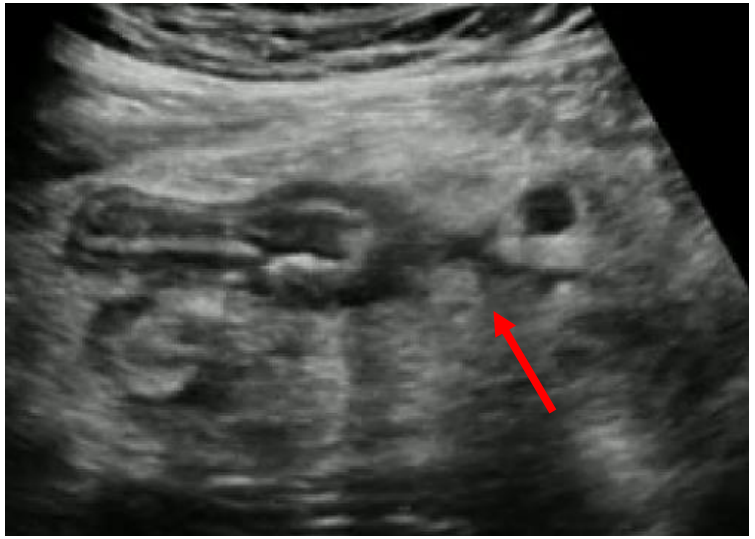




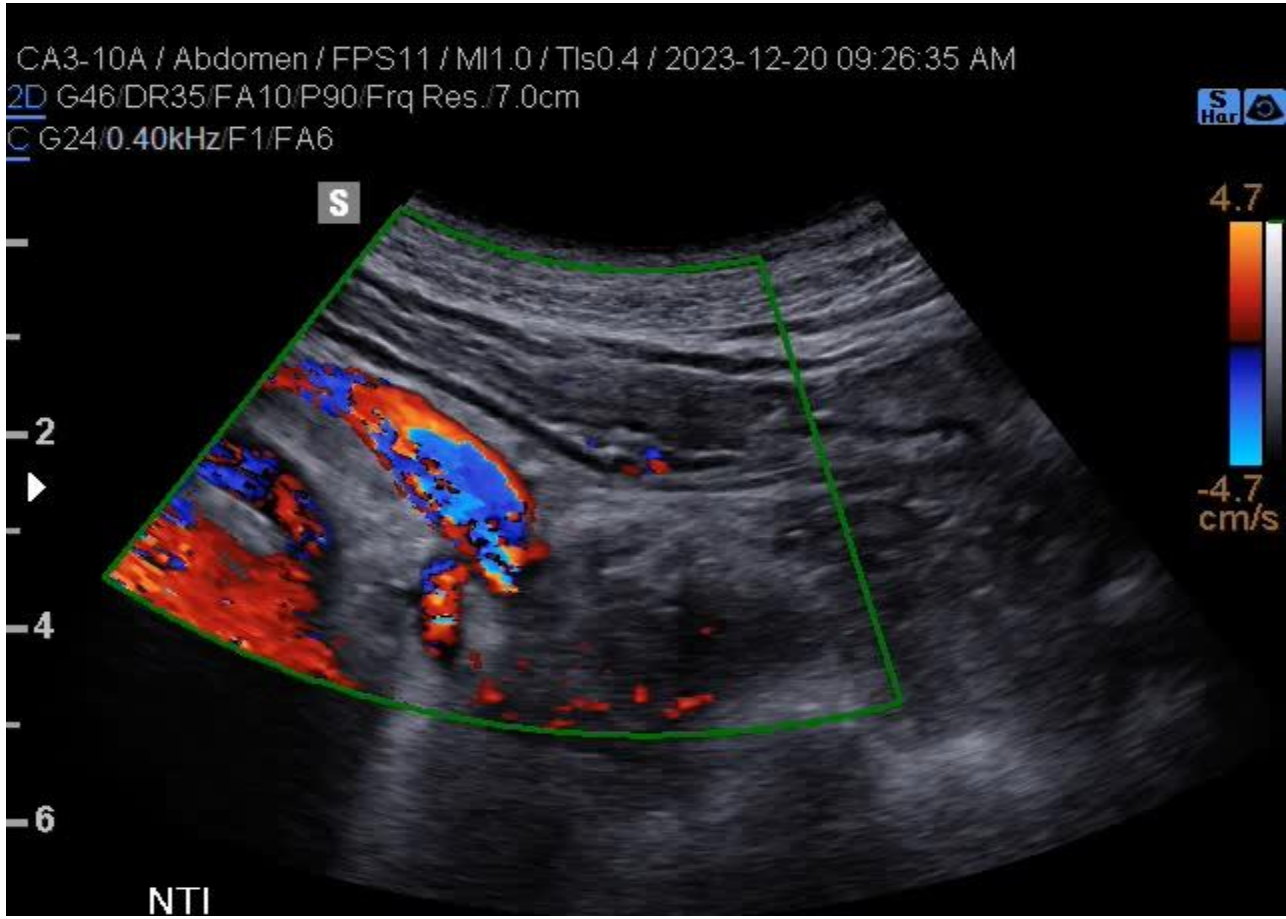
2 Weeks post 2nd ICR - end to side anastomosis

Findings

- Ileal blind ended pouch at anastomosis
- multiple sutures/staples
- multiple small tracts/severe spiculation
- lymphadenopathy
- inflammatory mass



Hot versus Cold Strictures



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- **How to use IUS in practice**

Using IUS, what do guidelines/consensus statements recommend?

CME

ACG Clinical Guideline Update: Ulcerative Colitis in Adults

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Ulcerative colitis is an idiopathic inflammatory disorder of unknown etiology that seems to be rising in incidence and prevalence throughout the world. These guidelines were developed to indicate the preferred approach to the management of adult patients with ulcerative colitis as established by valid scientific research and represent the official practice recommendations of the American College of Gastroenterology under the auspices of the Practice Parameters Committee. The scientific evidence for the recommendations made in these guidelines was evaluated using the Grading of Recommendations Assessment, Development, and Evaluation process, assessing the quality of the evidence (high, moderate, low, or very low) and assigning a strength of recommendation based on its apparent clinical benefit (strong or conditional). In instances where the available evidence was not appropriate for a formal Grading of Recommendations Assessment, Development, and Evaluation recommendation, but there was consensus of significant clinical merit, statements were developed using expert consensus (termed key concept statements). These guidelines are meant to be broadly applicable to practitioners regardless of specialty or interest and should be viewed as the preferred, but not only, approach to clinical scenarios. As opposed to standards of care, guidelines are inherently flexible, and physicians should use them as tools in choosing the best course in a specific clinical situation. These guidelines represent the state of the evidence at the time of this publication. As new evidence emerges, these guidelines will be continuously reviewed, and updates will be published as needed to assure continued validity.

KEYWORDS: practice guidelines; ulcerative colitis

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8. Disease assessment and monitoring in response to therapy and during maintenance and periods of suspected relapse may be performed with FC, CRP, endoscopic assessment with flexible sigmoidoscopy or colonoscopy, and/or intestinal ultrasound

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ECCO Guideline/Consensus Paper

ECCO-ESGAR-ESP-IBUS Guideline on Diagnostics and Monitoring of Patients with Inflammatory Bowel Disease: Part 1

Part 1: initial diagnosis, monitoring of known inflammatory bowel disease, detection of complications

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Recommendation 2 Small-bowel assessment should be performed in all newly diagnosed CD patients using MRE, IUS, or both (EL2). (85% agreement)

Recommendation 12 In patients with CD following treatment initiation or optimization, we recommend early (within 12 weeks) clinical (EL1), biochemical (EL1), and cross-sectional imaging (IUS [EL2] or MRE [EL2]) assessment of response. Endoscopic response assessment should be performed within 12 months (EL1). Results should be interpreted based on prior baseline assessment. (89% agreement)

Recommendation 14 In patients with CD in clinical remission, we suggest proactive monitoring for subclinical inflammation by PROs and objective markers of disease activity (biomarkers and cross-sectional imaging [IUS or MRE]) every 6–12 months (EL3). (86% agreement)

When should we perform IUS to evaluate targets?

ORIGINAL RESEARCH

Intestinal ultrasound for monitoring therapeutic response in patients with ulcerative colitis: results from the TRUST&UC study

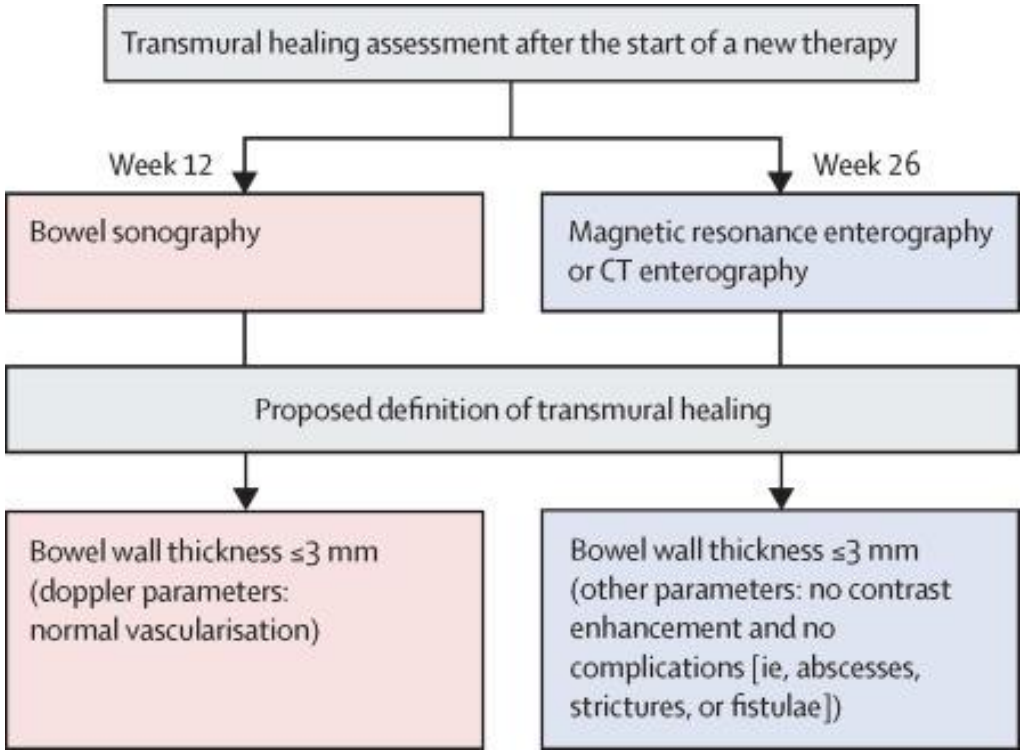
Christian Maaser [1], Frauke Petersen,[2] Ulf Helwig,[3] Imma Fischer,[4] Alexander Roessler,[5] Stefan Rath,[5] Dorothee Lang,[5] Torsten Kucharzik,[6] On behalf of the German IBD Study Group and the TRUST&UC study group

- ✓ **Performed baseline IUS**
- ✓ **Repeat at 1–2 weeks, 6–8 weeks, and as needed thereafter to monitor response to treatment in ulcerative colitis**

Review

Transmural healing as a therapeutic goal in Crohn's disease: a systematic review

Sophie Geyl MD [a c], Lucas Guillo MD [d], Valérie Laurent MD [b], Ferdinando D'Amico MD [e f], Prof Silvio Danese MD [e f], Prof Laurent Peyrin-Biroulet MD [a]



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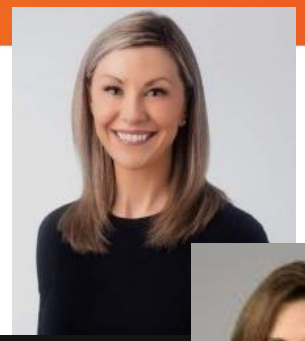
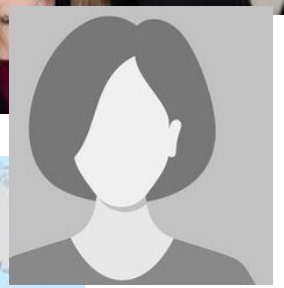
Using IUS: what to do if I don't have IUS?





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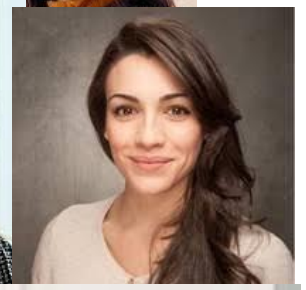

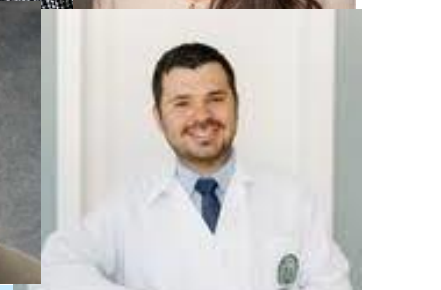

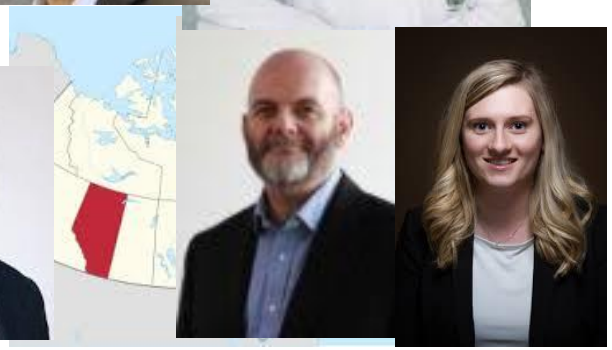

Penina Krongold

Yolande Westra

Using IUS: what to do if I don't have IUS?

IBUS Training

international bowel ULTRASOUND GROUP

Module 1 Didactic course and face-to-face hands-on workshop

Module 2 Hands-on Training

Module 3 Advanced Workshop

iUSCAN
Intestinal Ultrasound Group
of the United States and Canada

How do we expand access to IUS across Canada?

Dr. Joelle St-Pierre

CANBUS

iUSCAN
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of the United States and Canada

international bowel
ULTRASOUND GROUP

ROYAL COLLEGE
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COLLÈGE ROYAL
DES MÉDECINS ET CHIRURGIENS DU CANADA

Conclusions

✓Ultrasound = ultra-awesome

- IUS is helpful to predict clinical outcomes and evaluate achievement of transmural healing

- IUS is beneficial to our patients

Thank You!

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