international bowel
ULTRASOUND GROUP

Intestinal ultrasound in ulcerative colitis

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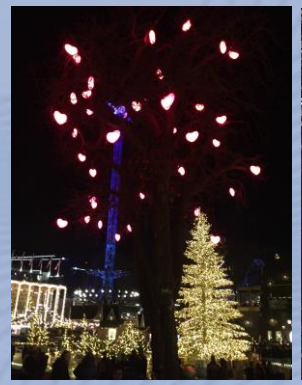
Conflicts of interest

- Gastroenterologist, MD PhD, chief physician, Helsinki University Hospital
- Consultation and lecture fees: AbbVie, BMS, Galapagos, Janssen/Johnson & Johnson, Lilly, Pfizer, Takeda, Tillotts
- Chair, IBD section of Finnish Society of Gastroenterology
- IBUS member since 2019



Main objectives

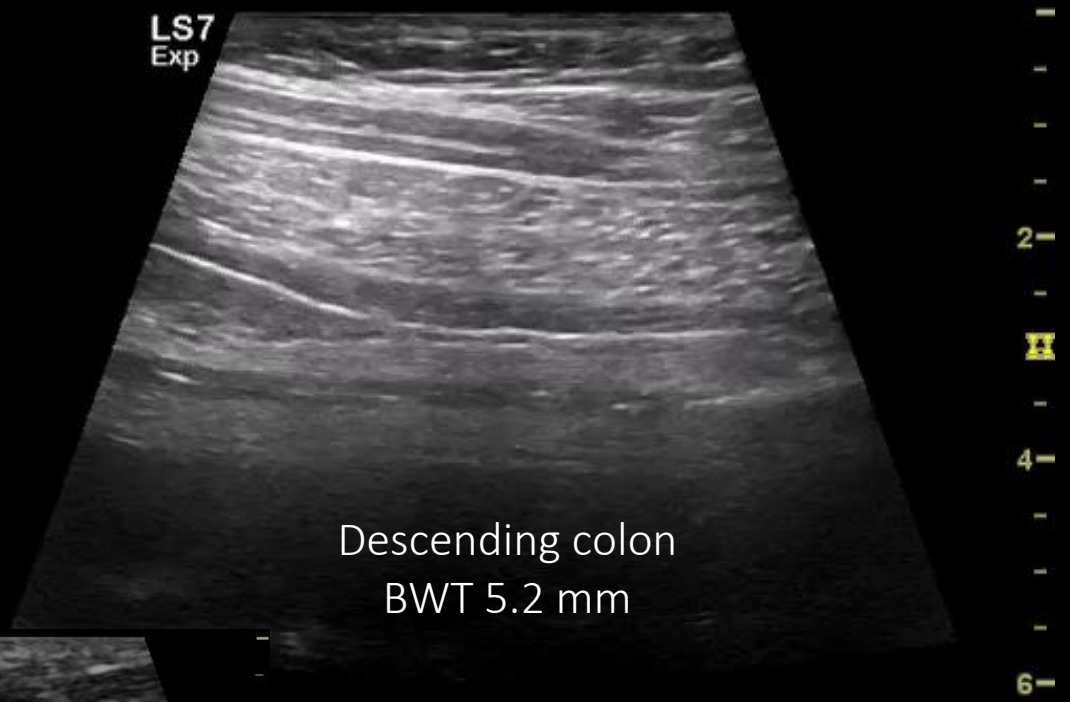
- Indications for IUS in UC
- IUS findings in UC
- Monitoring treatment response and predicting disease course

- By the end of this session, the learner will be able to:
  - Apply bowel wall thickness measurements according to standard and research criteria
  - Evaluate the overall diagnostic and monitoring performance of IUS for ulcerative colitis assessment against established reference standards
  - Understand the relative time course over which different IUS parameters typically respond to effective treatment in UC
  - Define different IUS response and remission definitions used in UC assessment and explain how they can be used to predict and monitor disease activity over time.

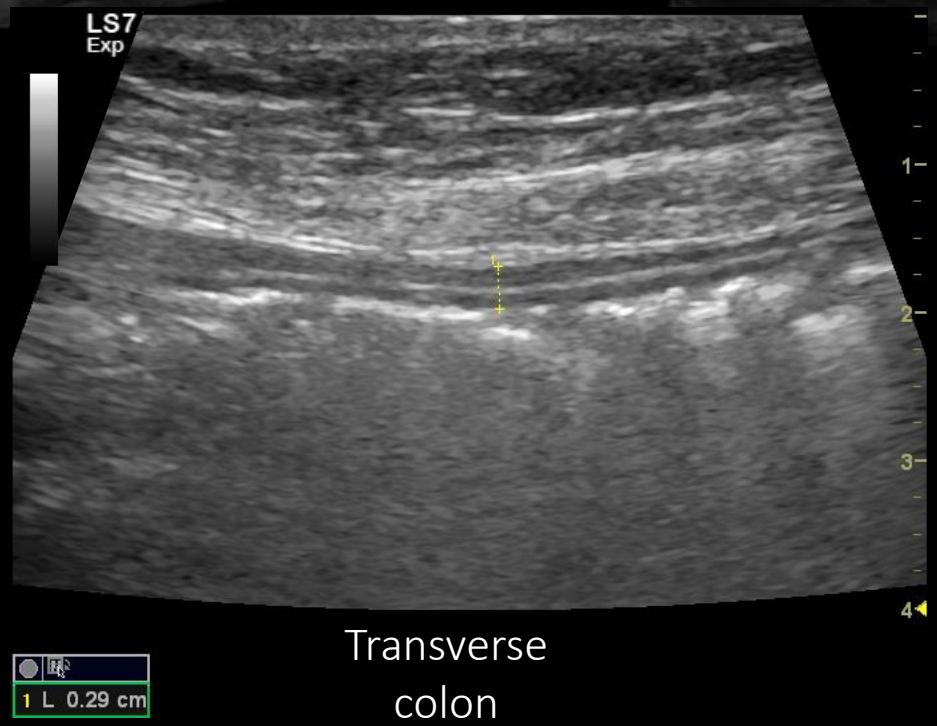
24-year-old female

- E1 UC (proctitis) diagnosis in beginning of 2025, endoscopically mild inflammation
- Rapid achievement of remission with topical 5-ASA
- 4 months from diagnosis worsening of symptoms: bloody stools, urge, diarrhea
- Only partial response from increased topical treatment
- FC 1200 µg/g, B-Hb 129 g/l, P-CRP <4 mg/l

Sigmoid colon
BWT 5.6 mm



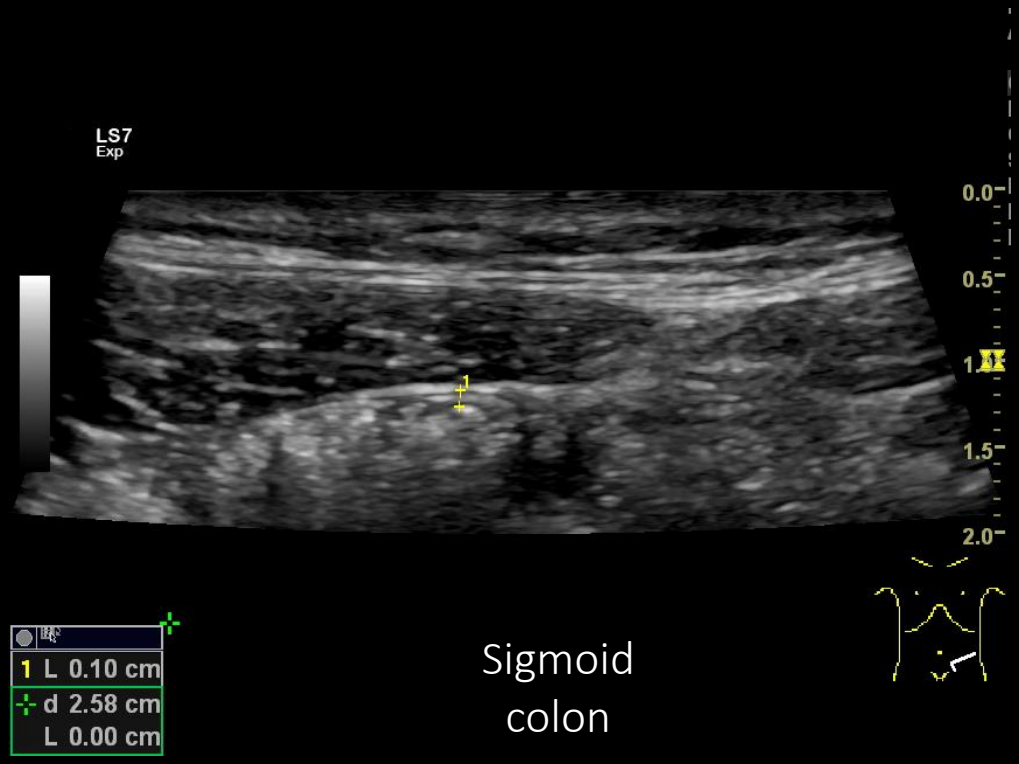
Descending colon
BWT 5.2 mm



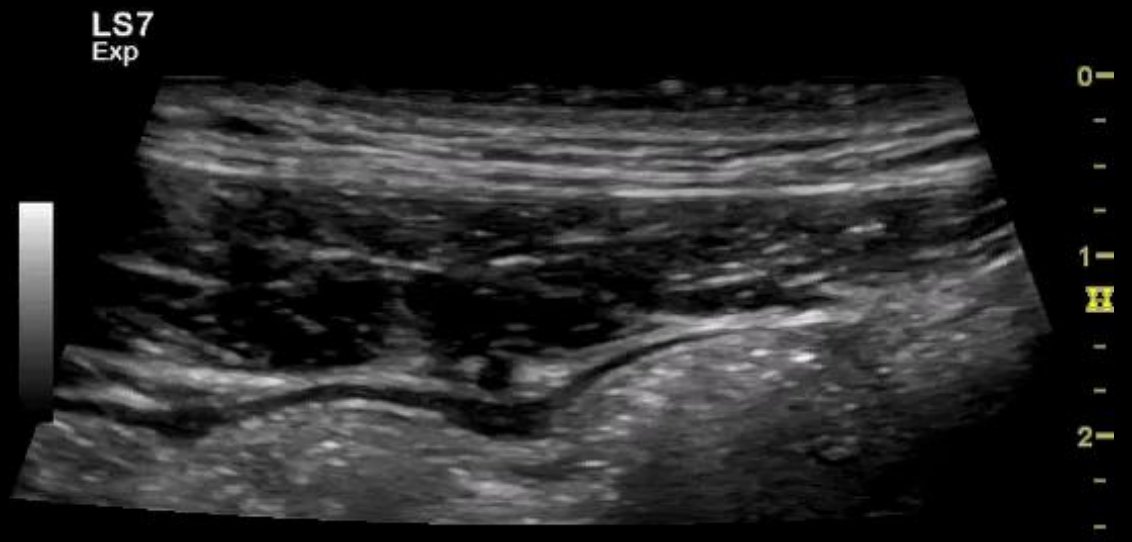
Transverse colon

E1→E2 UC
Start of oral 5-ASA
Course of budesonide MMX, tapered in 8 weeks
Gradual symptom relief

4 months later patient is feeling well, 2-3 bowel movements/day, occasional blood in stools, FC 341 µg/g

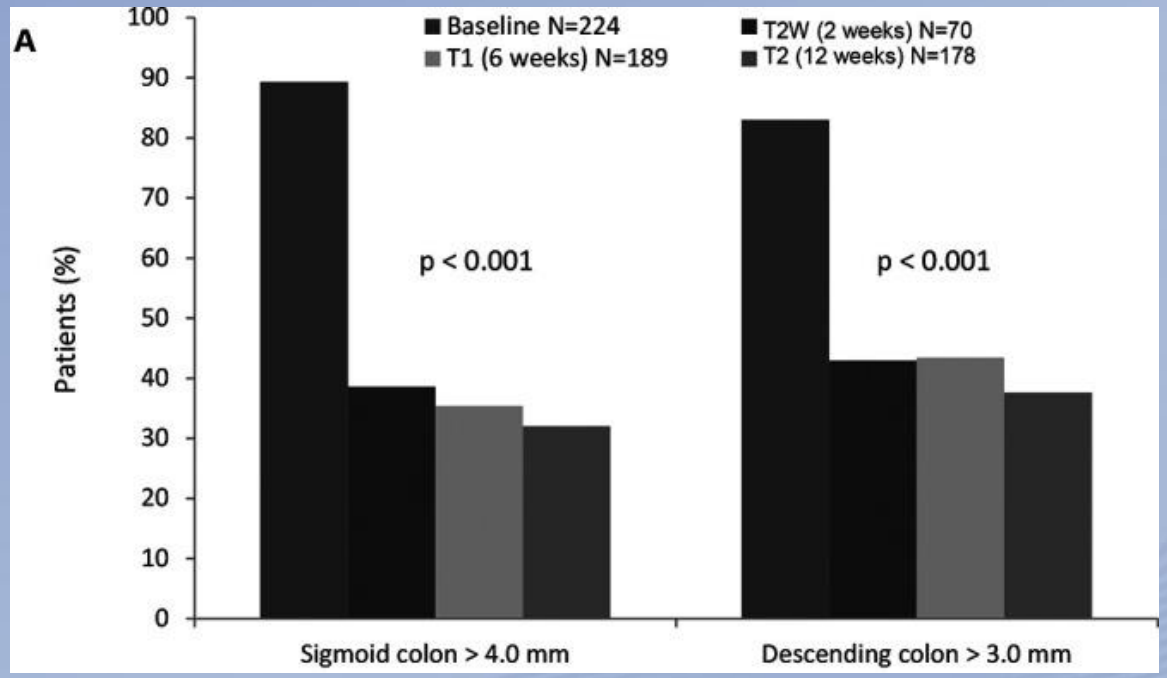


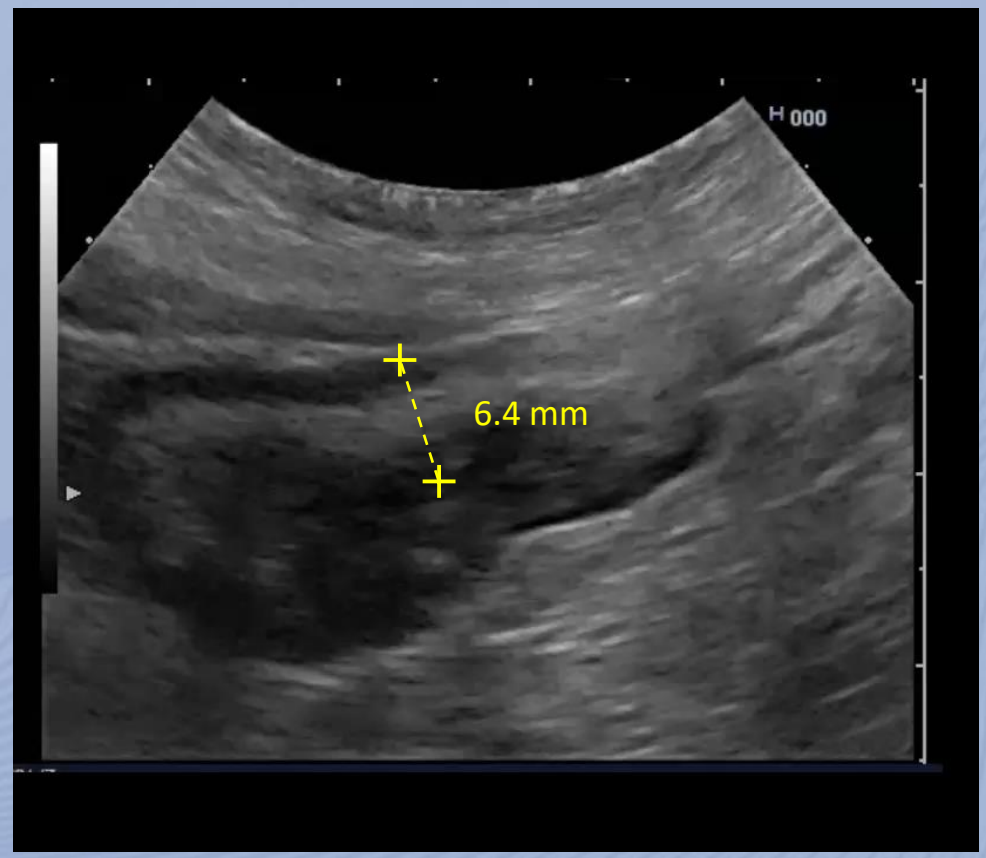
Sigmoid colon



Sigmoid colon

Bowel wall thickness is central in active UC

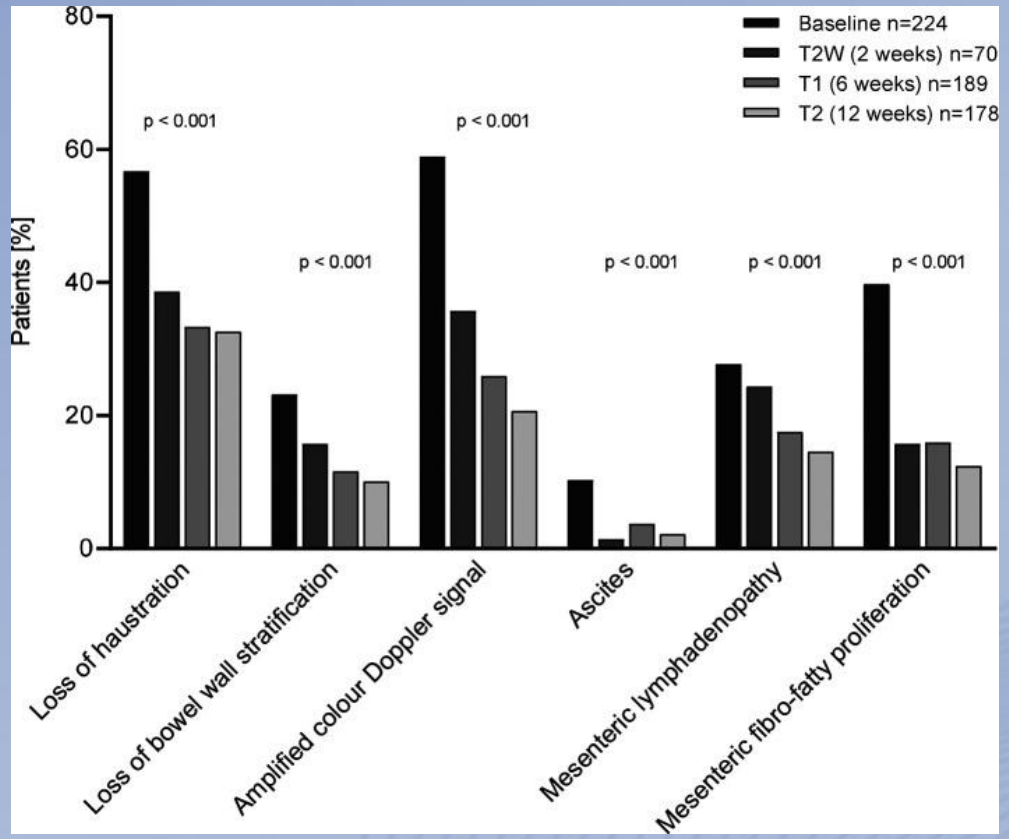




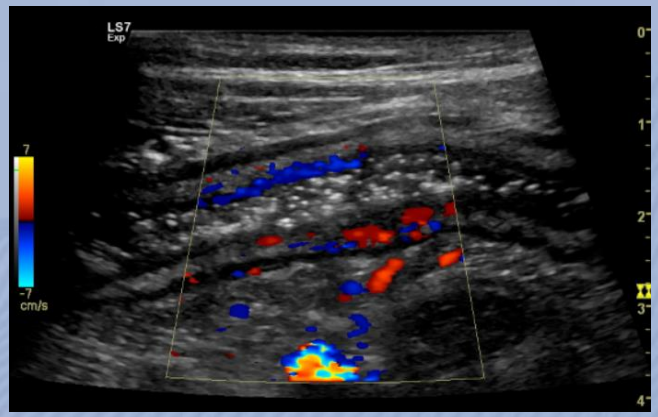
Bowel wall thickness (BWT) increased in clinically active UC in 88.5%

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

Additional IUS features in active UC



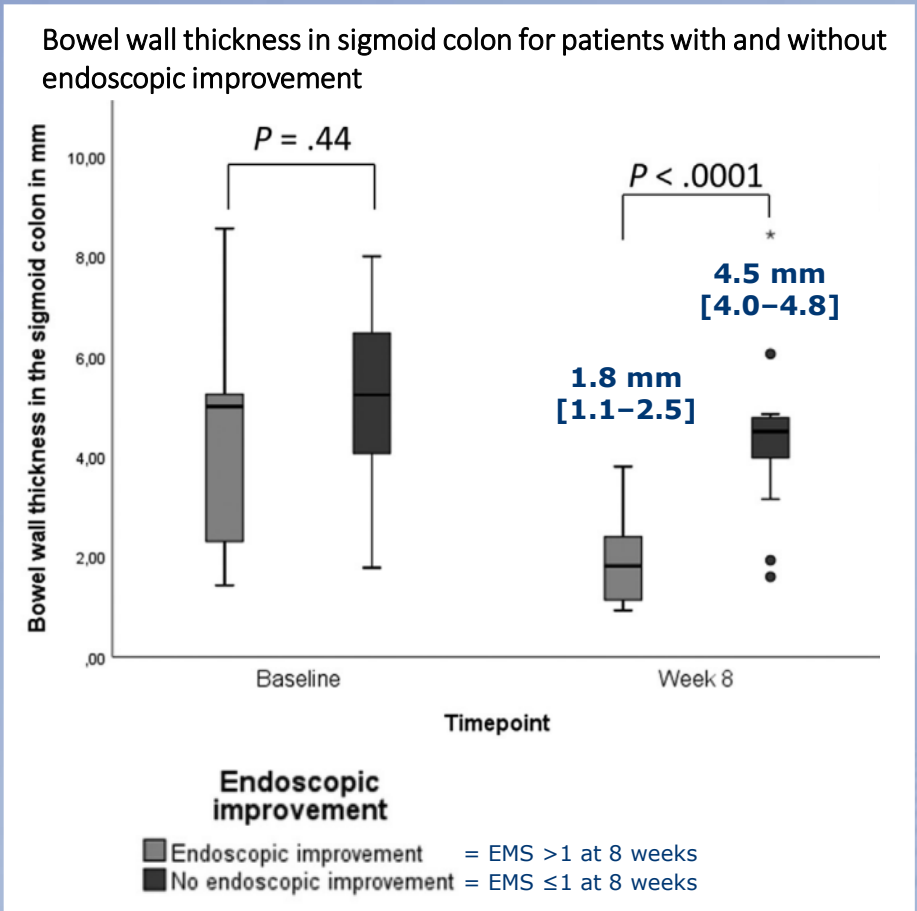
- Increased colour Doppler signal
- Loss of haustration



- Mesenteric fat proliferation
- Lymphadenopathy
- Loss of bowel wall stratification

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

IUS accuracy *vs*. endoscopy in UC

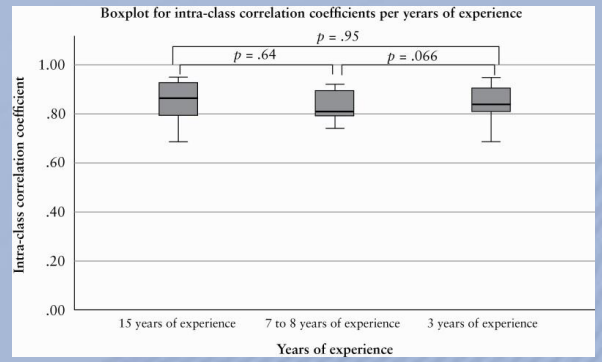


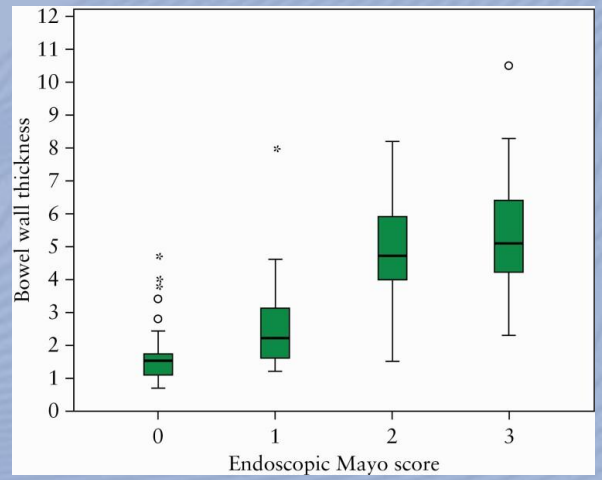
- Bowel wall thickness (BWT) highly accurate to detect treatment response when evaluated against endoscopic outcomes
- Submucosa (!) most responsive layer for endoscopic response

de Voogd *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(6):1569–1581

Further reliability in UC?

- Reproducability
  - Expert interrater reliability 0.92–0.96 for bowel wall thickness and 0.60–0.79 for colour Doppler signal
  - No significant difference according to years of experience!
- Bowel wall thickness according to endoscopic activity





Bots *et al*. Intestinal Ultrasound to assess disease activity in ulcerative colitis: development of a novel UC-ultrasound Index. *J Crohns Colitis* 2021;15(8):1264–1271
de Voogd *et al*. A reliability study: strong inter-observer agreement of an expert panel for intestinal ultrasound in ulcerative colitis. *J Crohns Colitis* 2021;(8):1284–1290

Assessment of disease extent

- Bowel wall thickness + colour Doppler assessment gives an accuracy of around 95% across all bowel segments measured

- **The rectum is an exception due to its location deep within the pelvis**
  - Poor sensitivity (15%) for IUS when transabdominally evaluating the rectum in active UC
  - Low agreement on cutoff measures for active disease

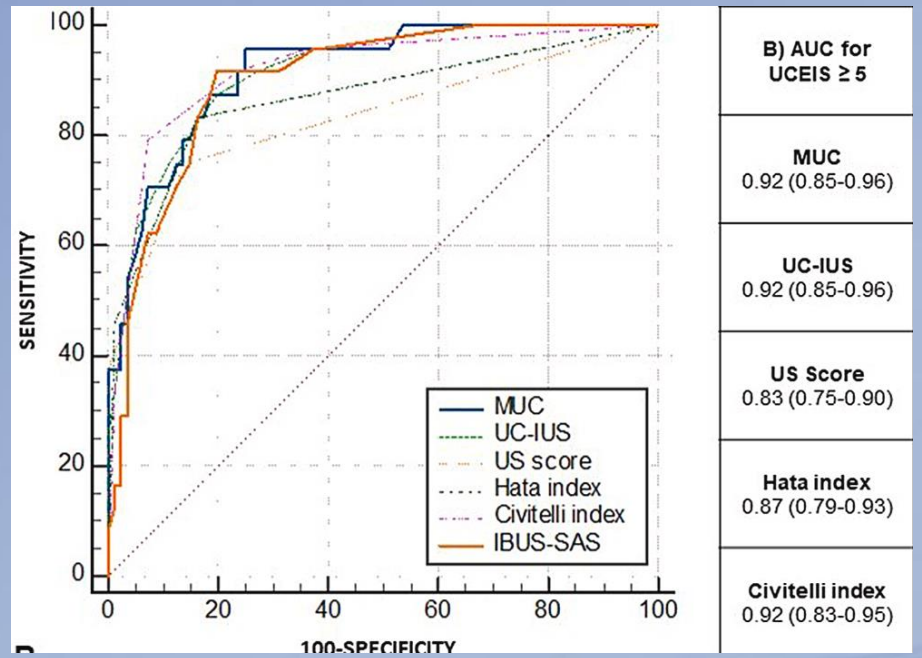
Smith *et al*. Systematic review: clinical utility of gastrointestinal ultrasound in the diagnosis, assessment and management of patients with ulcerative colitis. *J Crohns Colitis* 2020;14(4):465–479

Activity scores for UC

- UC-IUS (0–7 points)
  - **BWT** (1 if >2 mm, 2 if >3 mm, 3 if >4 mm) + **CDS** (0 if absent, 1 if spots, 2 if stretches) + **abnormal haustrations** (0 if absent, 1 if present) + **fat wrapping** (0 if absent, 1 if present)
- Milan ultrasound criteria (active disease >6.2)
  - 1.4 × **BWT** (mm) + 2 × **CDS** (1 if present, 0 if absent)
- IBUS-SAS (initially developed for CD)
  - 4 × **BWT** (mm) + 15 × **i-fat** (0 if absent, 1 if uncertain, 2 if present) + 7 × **CDS** (0 if absent, 1 if short signals, 2 if long signals inside bowel, 3 if long signals inside and outside bowel) + 4 × **BWS** (0 if normal, 1 if uncertain, 2 if focal <3 cm, 3 if extensive >3 cm)

Bots *et al*. Intestinal ultrasound to assess disease activity in ulcerative colitis: development of a novel UC-Ultrasound index. *J Crohns Colitis* 2021;15(8):1264-1271
Allocca *et al*. Predictive value of Milan ultrasound criteria in ulcerative colitis: a prospective observational cohort study. *United European Gastroenterol J* 2022;10(2):190–197
Fischer *et al*. IBUS-SAS Is a highly accurate intestinal ultrasound score for predicting endoscopic disease activity in ulcerative colitis. *United European Gastroenterol J* 2025;13(7):1253-1262

Activity scores for UC



- What to compare with?
  - Endoscopic activity (MES/UCEIS)
- What to assess?
  - Degree of activity
  - Ruling out severe disease
  - Immediate response/long-term outcomes

Bots *et al*. Intestinal ultrasound to assess disease activity in ulcerative colitis: development of a novel UC-Ultrasound index. *J Crohns Colitis* 2021;15(8):1264-1271.
Allocca *et al*. Predictive value of Milan ultrasound criteria in ulcerative colitis: a prospective observational cohort study. *United European Gastroenterol J* 2022;10(2):190–197
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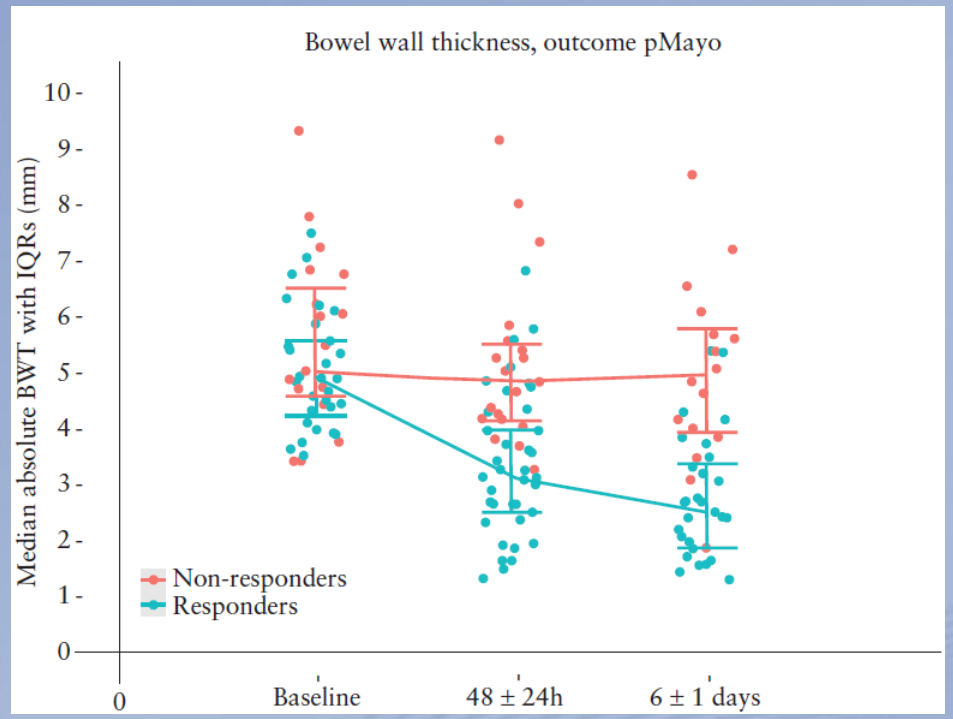
Consensus on remission and response

- UC remission
  - BWT ≤3 mm with normal/0 colour Doppler signal
- Treatment response in UC:
  - reduction of bowel wall thickness (>25% or >2.0 mm or >1.0 mm and one colour Doppler signal reduction)

Ilvemark *et al*. Defining transabdominal intestinal ultrasound treatment response and remission in inflammatory bowel disease: systematic review and expert consensus statement. *J Crohns Colitis* 2022;16(4):554–580

IUS as a short-term UC predictor

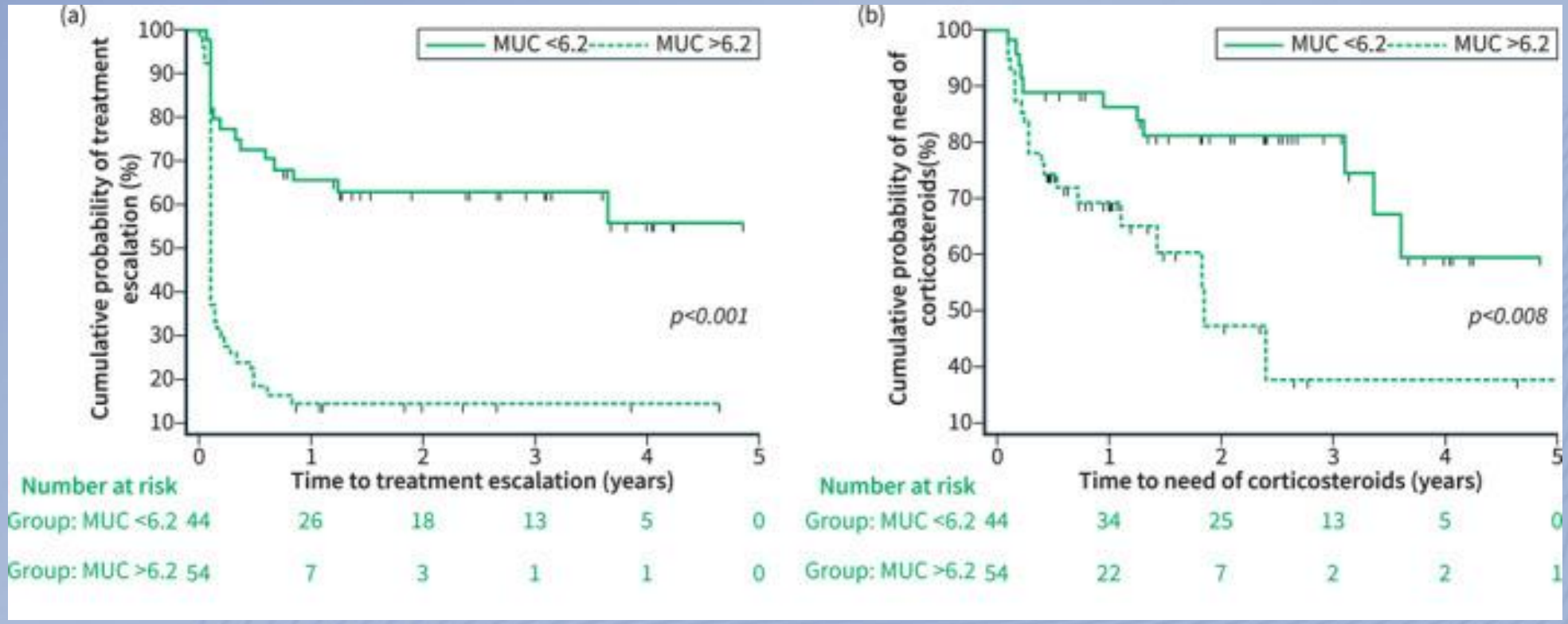


- ≥20% reduction of BWT at 48±24 h
  → 90.6% probability for response at 7 days
- ≤20% reduction of BWT at 48±24 h
  → 66.7% probability for non-response at 7 days

- ”Changes in bowel wall thickness after 48±24 h following iv corticosteroid treatment, identify responders with high accuracy and might be used as an early marker to guide accelerated rescue therapy”

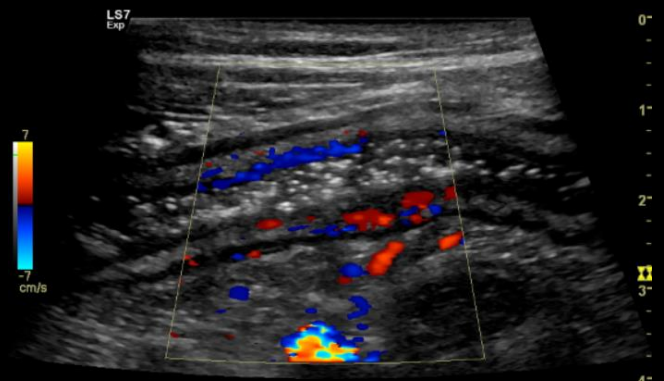
Ilvemark *et al*. Early intestinal ultrasound predicts intravenous corticosteroid response in hospitalised patients with severe ulcerative colitis. *J Crohns Colitis* 2022;16(11):1725–1734

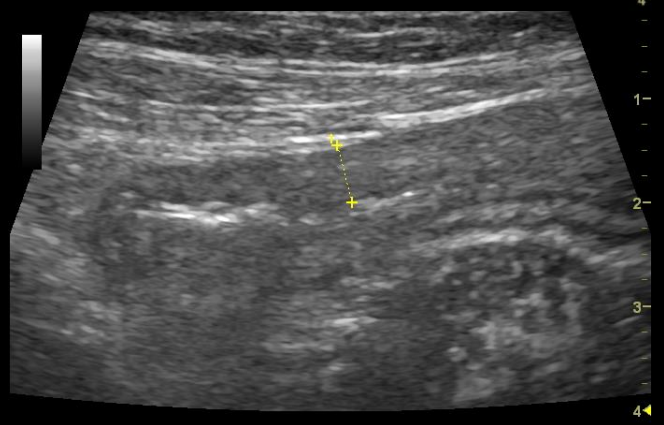
IUS as a long-term UC predictor



Allocca *et al*. Predictive value of Milan ultrasound criteria in ulcerative colitis: a prospective observational cohort study. *United European Gastroenterol J* 2022;10(2):190–197

IUS and colonoscopy at baseline

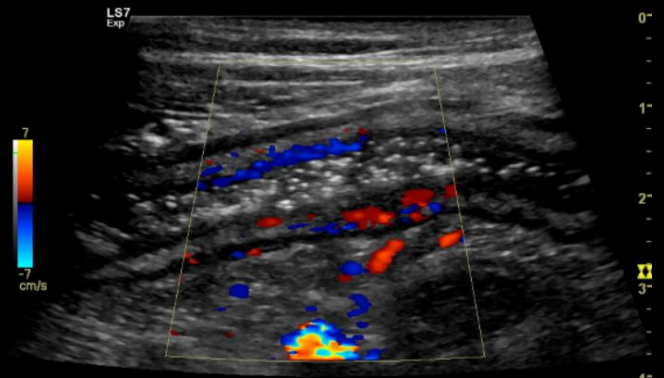


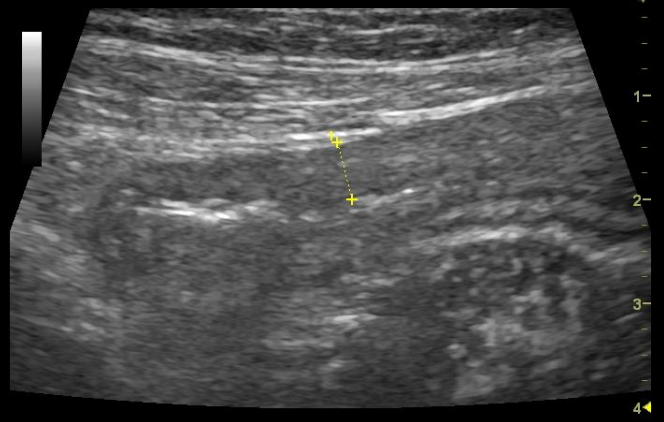


MES 3

UCEIS 6 (V2 B2 E2)

IUS and colonoscopy at baseline





UC-IUS index	
Parameters	**Points [0–7]**
Bowel wall thickness	
> 2 mm	1
> 3 mm	2
> 4 mm	3
Doppler signal	
Spots	1
Stretches	2
Abnormal haustrations	1
Fat wrapping	1

IBUS-SAS

4 × BWT (mm)

15 × i-fat
- 0 if absent
- 1 if uncertain
- 2 if present

7 × CDS
- 0 if absent
- 1 if short signals
- 2 if long signals inside bowel
- 3 if long signals inside and outside bowel

4 × BWS
- 0 if normal
- 1 if uncertain
- 2 if focal <3 cm
- 3 if extensive >3 cm

Milan ultrasound criteria = 1.4 × BWT (mm) + 2 × BWF; where BWF = 1 if present, or BWF = 0 if absent

MES 3

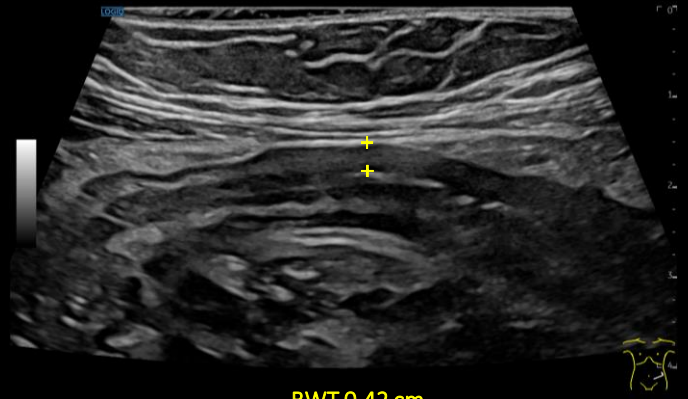
UCEIS 6 (V2 B2 E2)

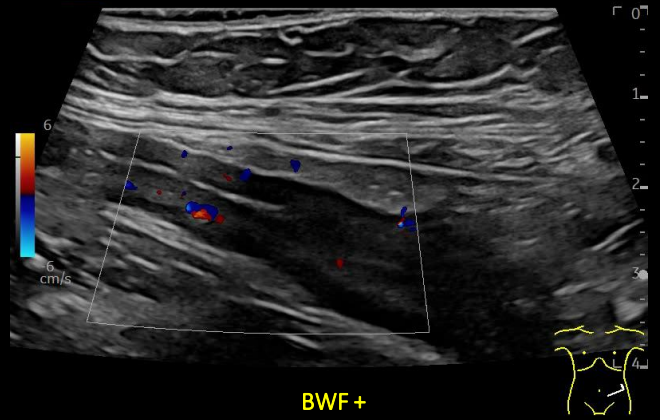
UC-IUS 6 (3+2+1+0)

IBUS-SAS 43.4 (22.4+0+21+0)

Milan (MUC) 9.84 (7.84+2)

IUS 4 months after start of infliximab





IBUS-SAS 27.8 (16.8+0+7+4)

Milan (MUC) 7.88 (5.88+2)

Monitoring guideline 2025

ECCO-ESGAR-ESP-IBUS

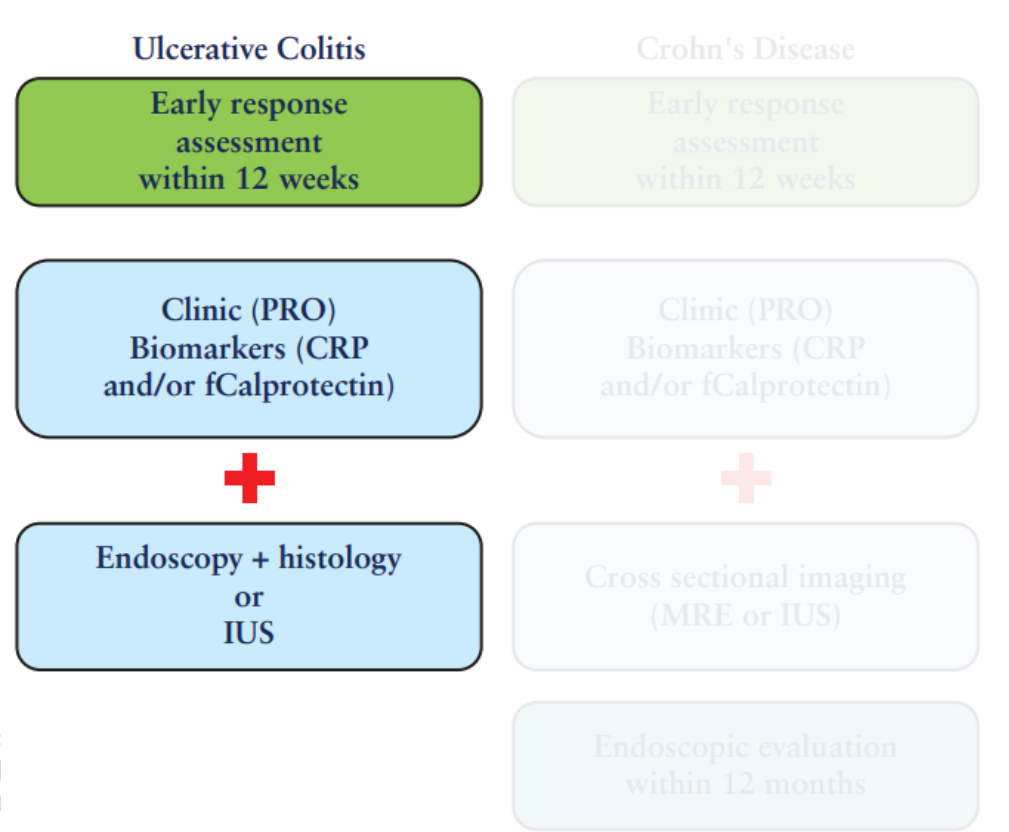


Figure 2. Monitoring of active inflammatory bowel disease (IBD) after treatment initiation or optimization.

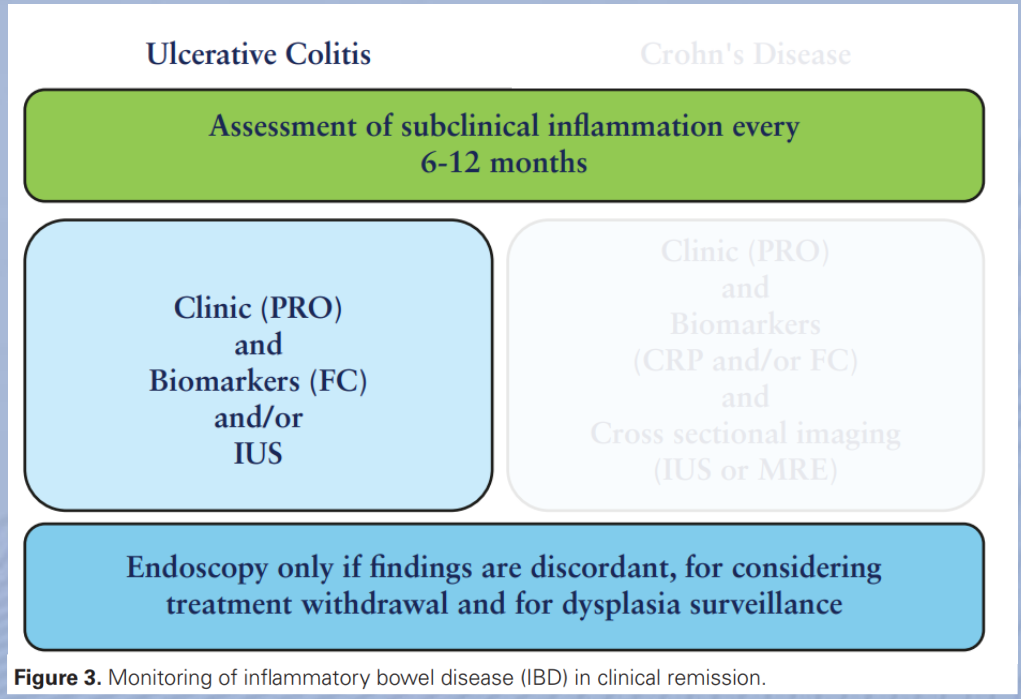


Figure 3. Monitoring of inflammatory bowel disease (IBD) in clinical remission.

Kucharzik *et al*. ECCO-ESGAR-ESP-IBUS guideline on diagnostics and monitoring of patients with Inflammatory bowel disease: Part 1. *J Crohns Colitis* 2025;19(7):jjaf106. doi: 10.1093/ecco-jcc/jjaf106. PMID: 40741688.

Monitoring the appendix in UC?

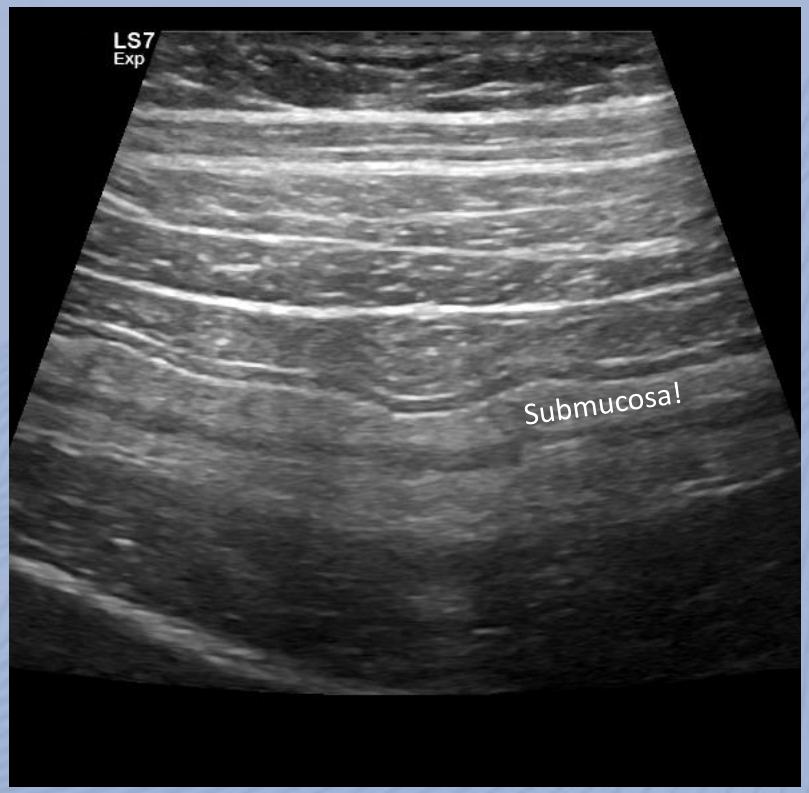
- Single-centre prospective cohort study: 35 active UC, 30 quiescent UC, 30 healthy controls: visualisation of appendix in 60–63.1%
- Appendiceal diameter significantly higher in patients with UC than healthy controls regardless of disease activity (5.5, 5.0, and 4.3 mm)
- Appendiceal diameter >6 mm (compatible with acute appendicitis) reported in active (43%) versus quiescent UC (6%) and HCs (0%), p=0.01

- Intentional IUS assessment of the appendix in all patients with UC may be informative, particularly in active cases in order to identify patients who could benefit most from a therapeutic appendectomy

Reijnties *et al.* Intestinal ultrasound detects an increased diameter and submucosal layer thickness in the appendix of patients with ulcerative colitis compared to healthy controls – a prospective cohort study. *Aliment Pharmacol Ther* 2023;57(1):127–135
Ernest-Suarez & Novak. Editorial: routine use of intestinal ultrasound in ulcerative colitis—are we missing the appendix? *Aliment Pharmacol Ther* 2023;57(2):253-254

Growing evidence showing IUS utility in UC

- Optimal UC treatment requirements:
  - Tight monitoring beyond clinical symptoms
  - T2T strategy with biomarkers and endoscopic remission as objective treatment goals
- UC traditionally thought of as a mucosal disease
  - Several studies supporting transmural and extramural ultrasonographic changes also in UC
- Recent guidelines support the use of IUS in UC to
  - determine disease extent
  - to monitor disease activity and response to therapy



Palmela & Maaser. The use of intestinal ultrasound in ulcerative colitis – more than a mucosal disease? Gastroenterology 2022;163(6):1485–1487

IUS in ulcerative colitis

- Assessing disease activity and severity
- Assessing colonic extent
- Assessing complications [strictures, lymph nodes, mesenteric hypertrophy]
- Monitoring therapeutic response
- Predicting outcomes

- **Can, and should (!), be performed at the point of care to expedite clinical decision-making and to optimize management of patients with IBD**

Smith et al. Systematic review: clinical utility of gastrointestinal ultrasound in the diagnosis, assessment and management of patients with ulcerative colitis. J Crohns Colitis 2020;14(4):465–479
Allocca et al. Point-of-care ultrasound in inflammatory bowel disease. J Crohns Colitis 2021;15(1):143–151


KEEP
CALM
AND
FOCUS ON
INTESTINAL
ULTRASOUND