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رابطة الجهاز الهضمي والكبد الكويتية

Is there a scoring and monitoring system available for IBD?

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Disclosure

Bram Verstockt discloses

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- speaker's fees from Abbvie, Agomab, Alfasigma, Biogen, Bristol Myers Squibb, Celltrion, Eli Lily, Falk, Ferring, Galapagos, Materia Prima, Johnson and Johnson, Pfizer, Sandoz, Takeda, Tillots Pharma, Truvion and Viatris.

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- stock options Vagustim and Thethis Pharma.

Intended Learning Outcomes

By the end of this session, the learner will be able to:

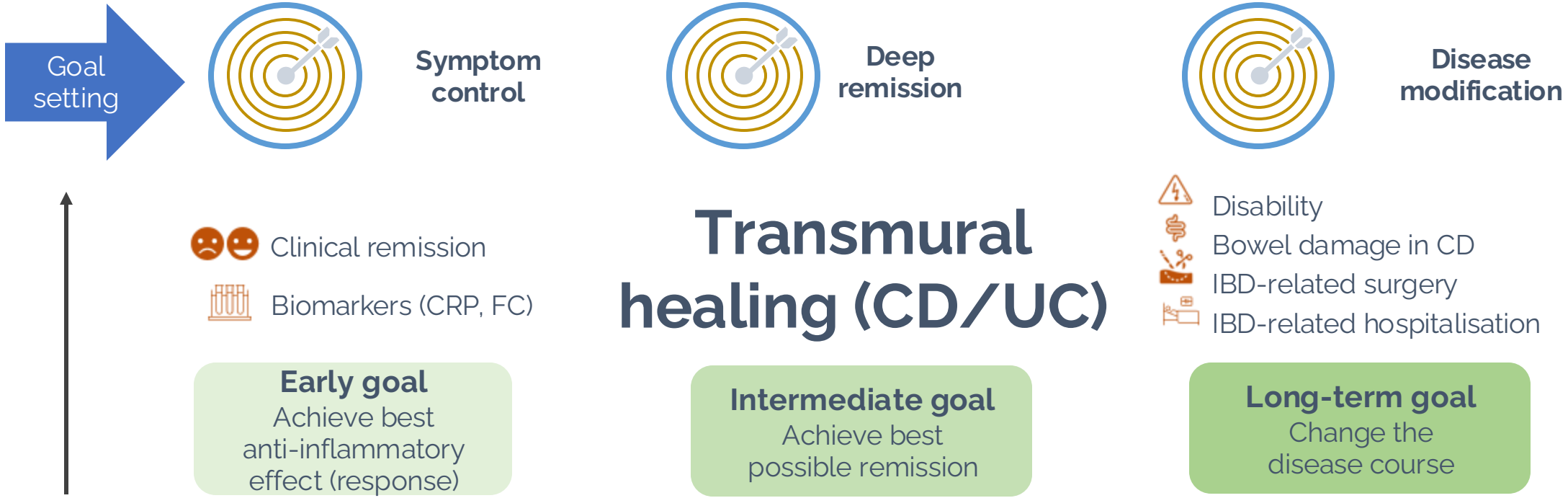
1. Explain the rationale behind IUS scoring systems and how they are applied in both clinical practice and research settings to assess disease activity, guide treatment decisions, and provide standardized documentation of findings.

2. Evaluate the reliability and validity of different IUS scoring systems by comparing their performance, reproducibility, and correlation with reference standards such as endoscopy, cross-sectional imaging, and clinical indices.

3. Utilize IUS scoring systems to:

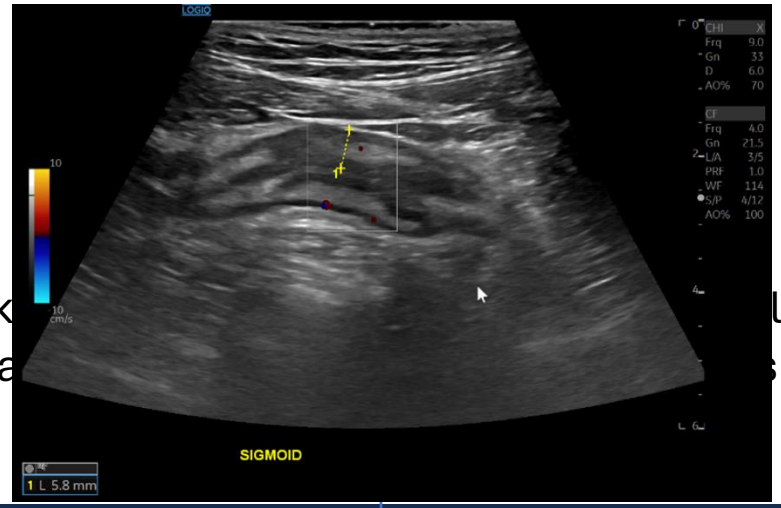
    - Quantify disease activity in Crohn's disease and ulcerative colitis.
    - Monitor treatment response over time by documenting changes in ultrasound parameters and generating objective scores that reflect mucosal and transmural healing.

Monitoring, a key aspect in IBD care



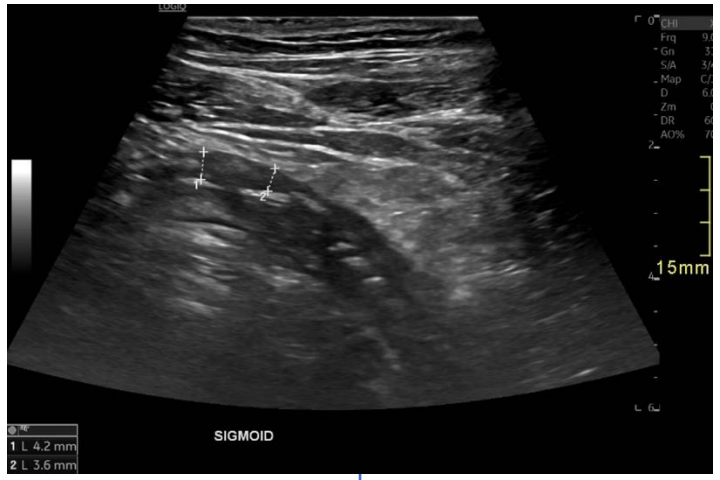
1. Peyrin-Biroulet L, et al. *Am J Gastroenterol*. 2. Le Berre C, et al. *Clin Gastroenterol Hepatol*. 2019; 3. Turner D, et al. *Gastroenterology*. 2021; 4. Le Berre C, et al. *Gastroenterology*. 2021

Why standardised scoring ?



MUC 10.1

“Thick l loss of stra sign”.



MUC 7.5

September 26th 2025

Baseline - 3rd line therapy

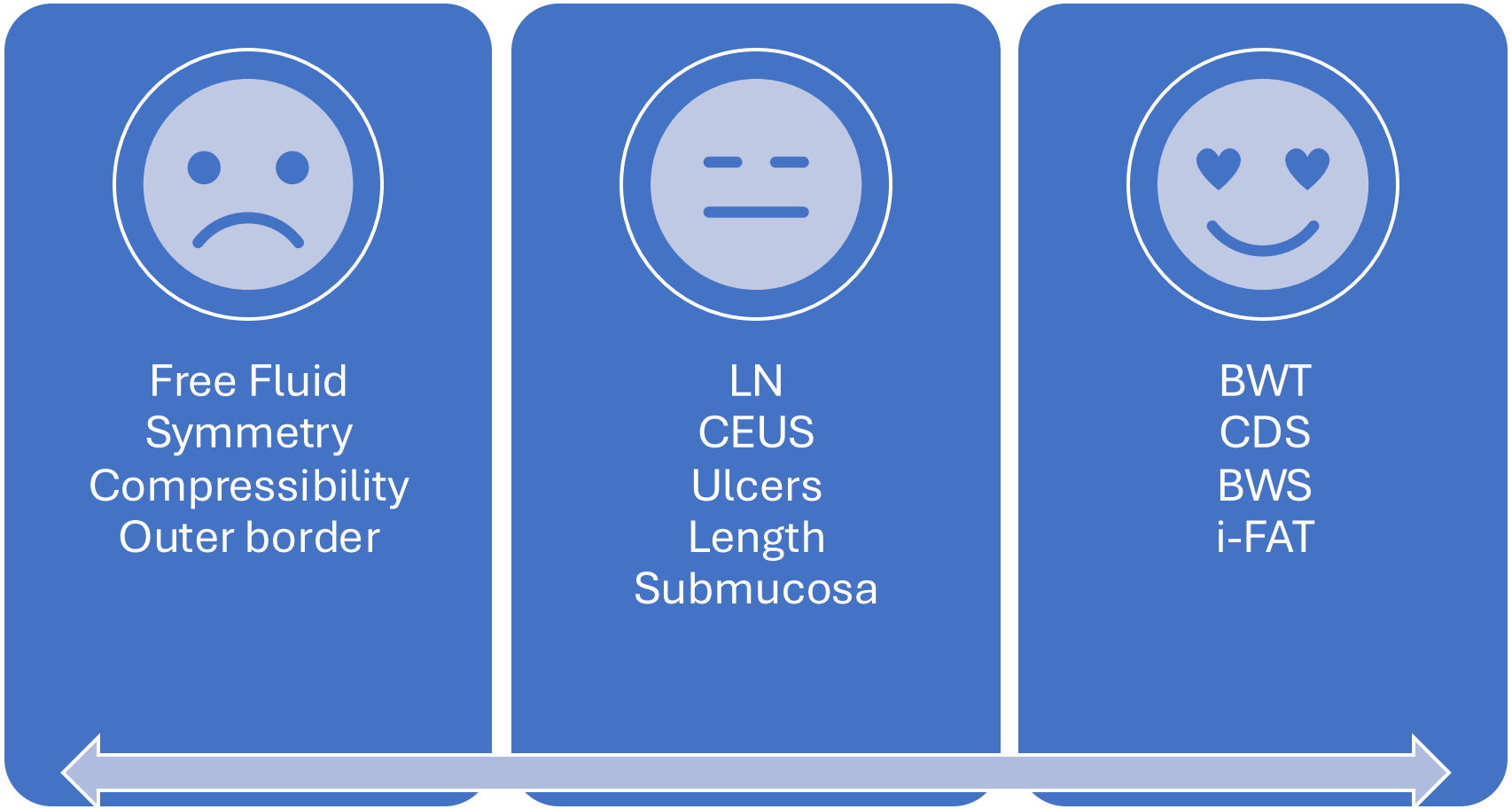
Photodocumentation
Standardised reporting

November 21st 2025

Week 8 - 3rd line therapy
Clinical improvement, residual symptoms

Kucharzik et al. *JCC* 2022.

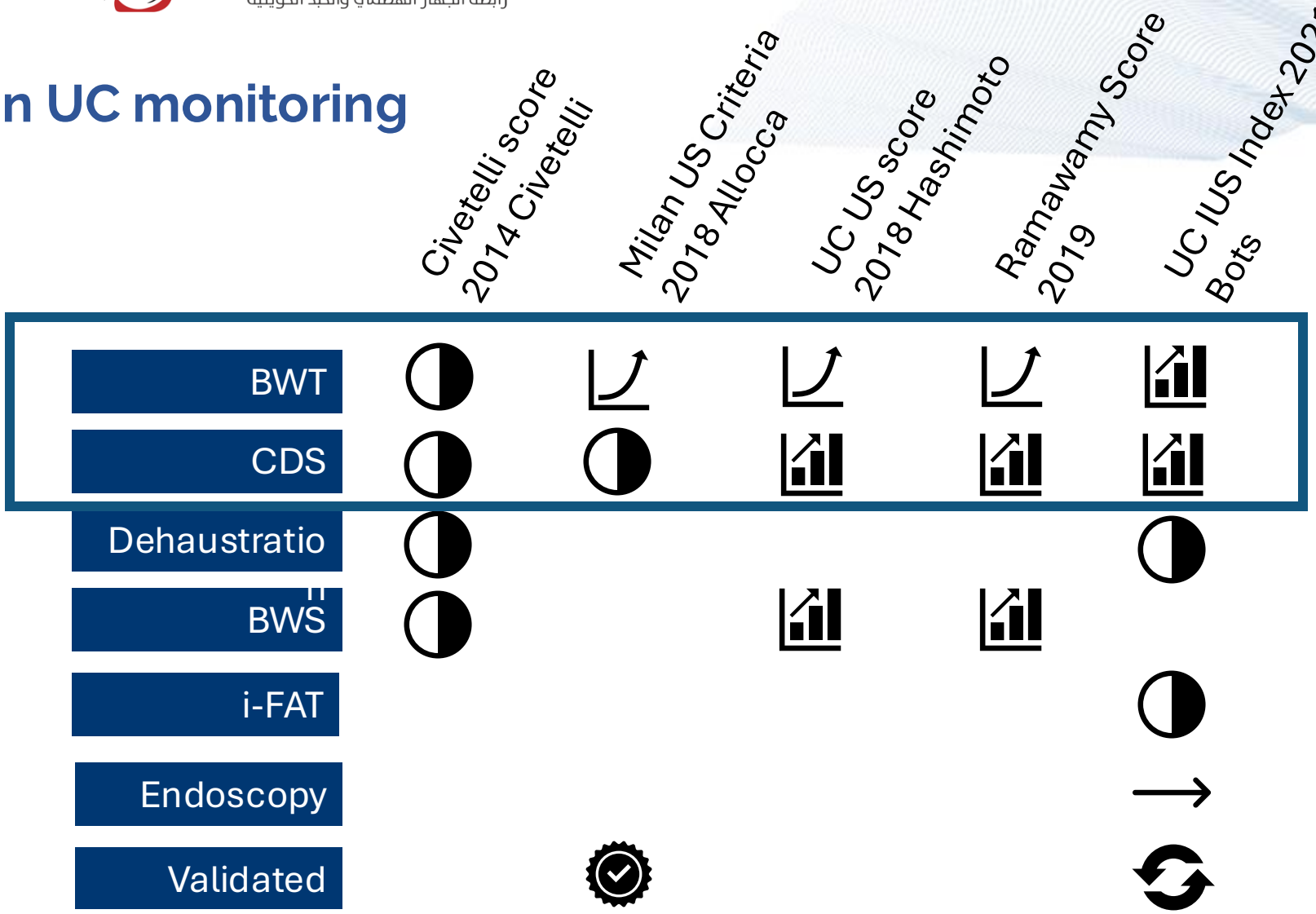
Key parameters in IBD monitoring



Goodsall T et al. *JCC* 2021, Goodsall T et al. *APT* 2021, Ilvemark J *JCC* 2021

Courtesy Rune Wilkens

Key parameters in UC monitoring



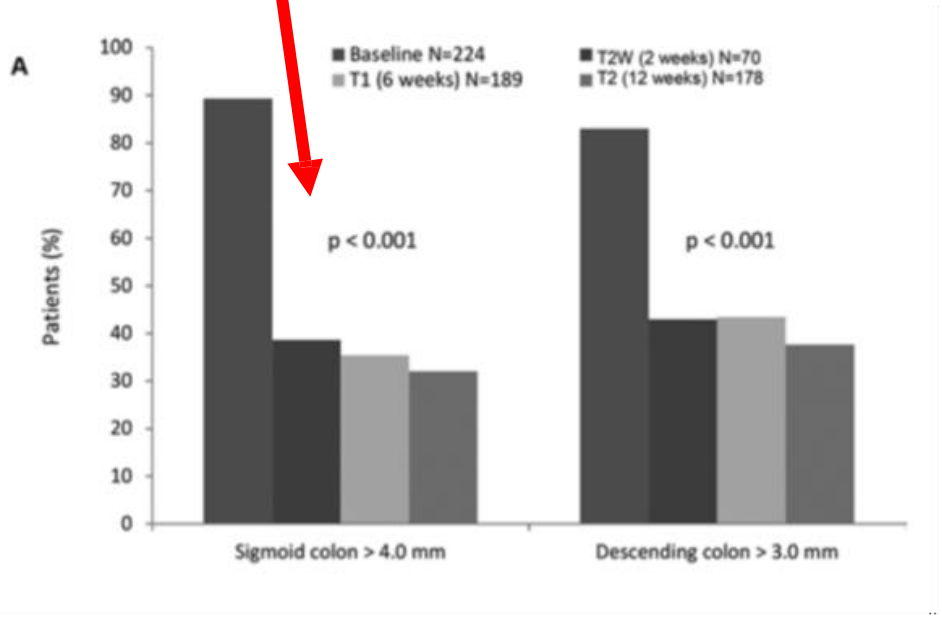
Goodsall et al. *JCC* 2021.

Novak et al. *JCC* 2021.

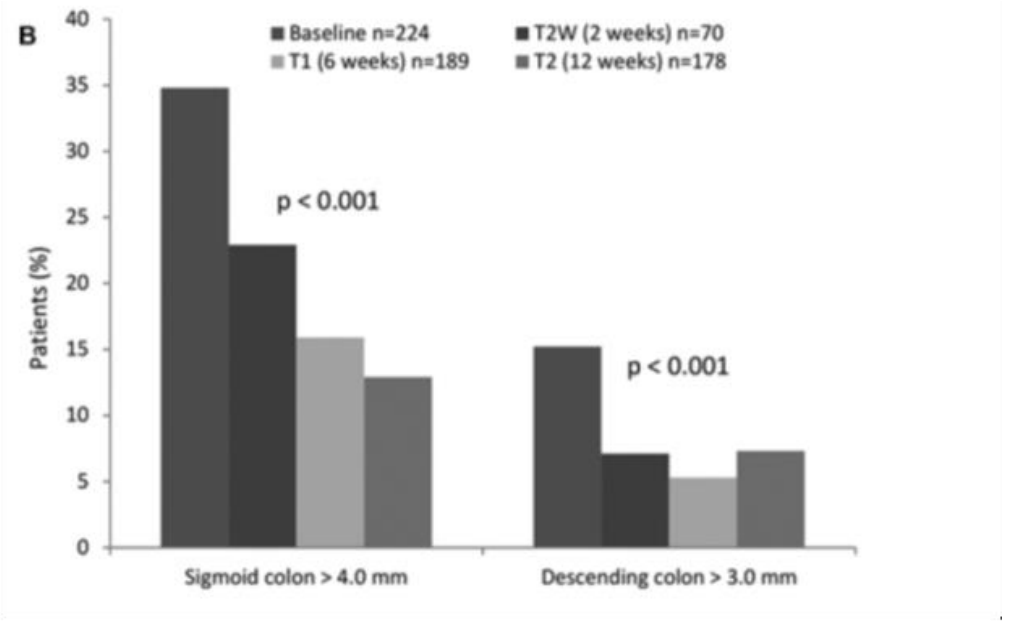
Courtesy Rune Wilkens

The responsiveness of BWT and CDS during treatment

2 weeks!!!



Proportion of patients with increased BWT

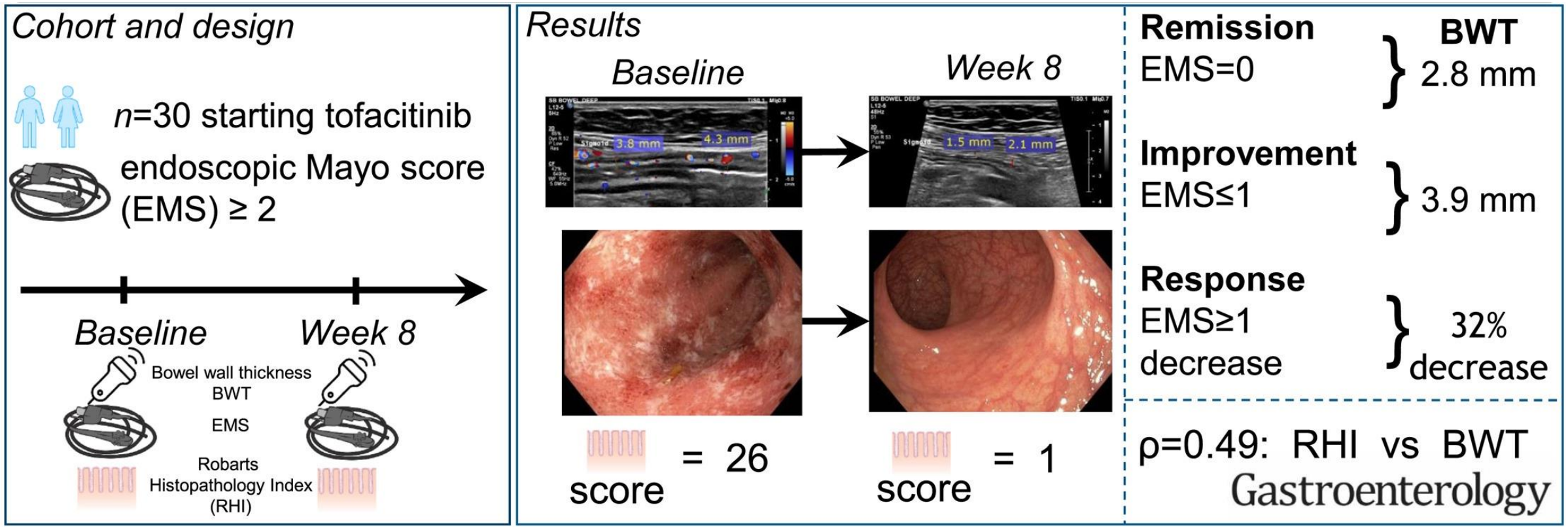


Proportion of patients with increased color doppler sigmal

TRUST & UC

Maaser et al. *Gut* 2020.

Change in BWT indicative for future endoscopic outcome

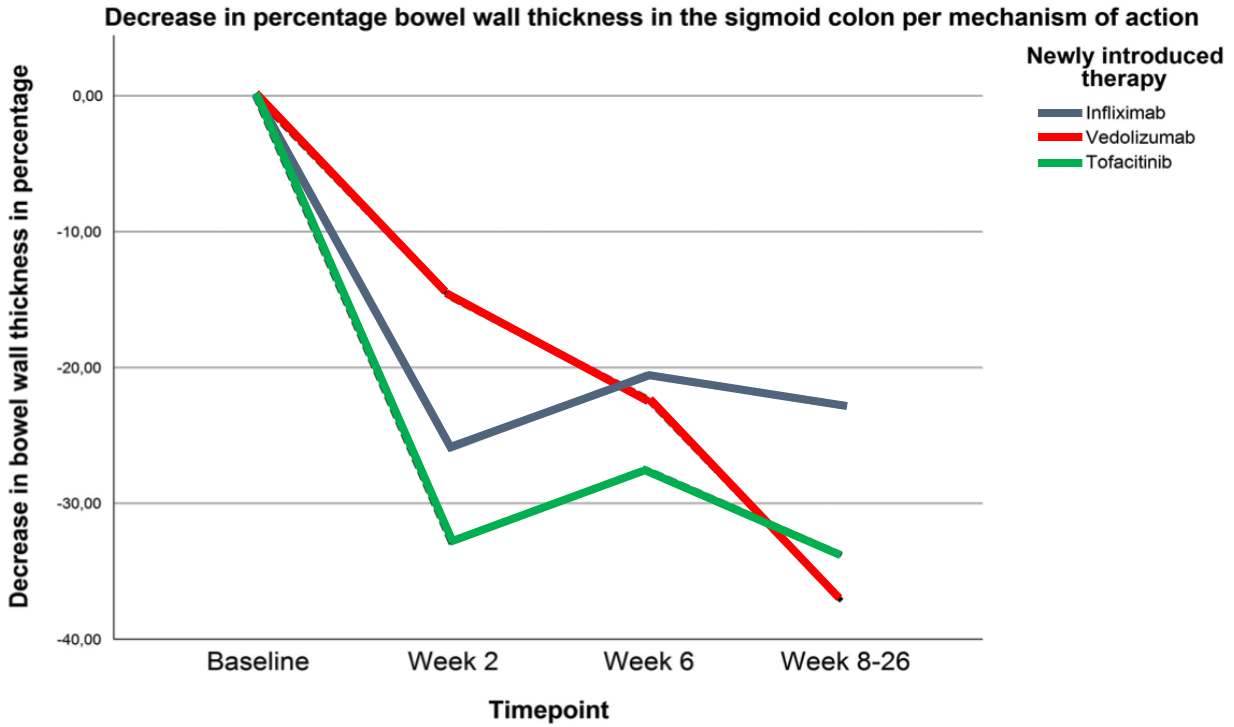


De Voogd et al. *Gastroenterology*. 2022.

Change in BWT indicative for future endoscopic outcome

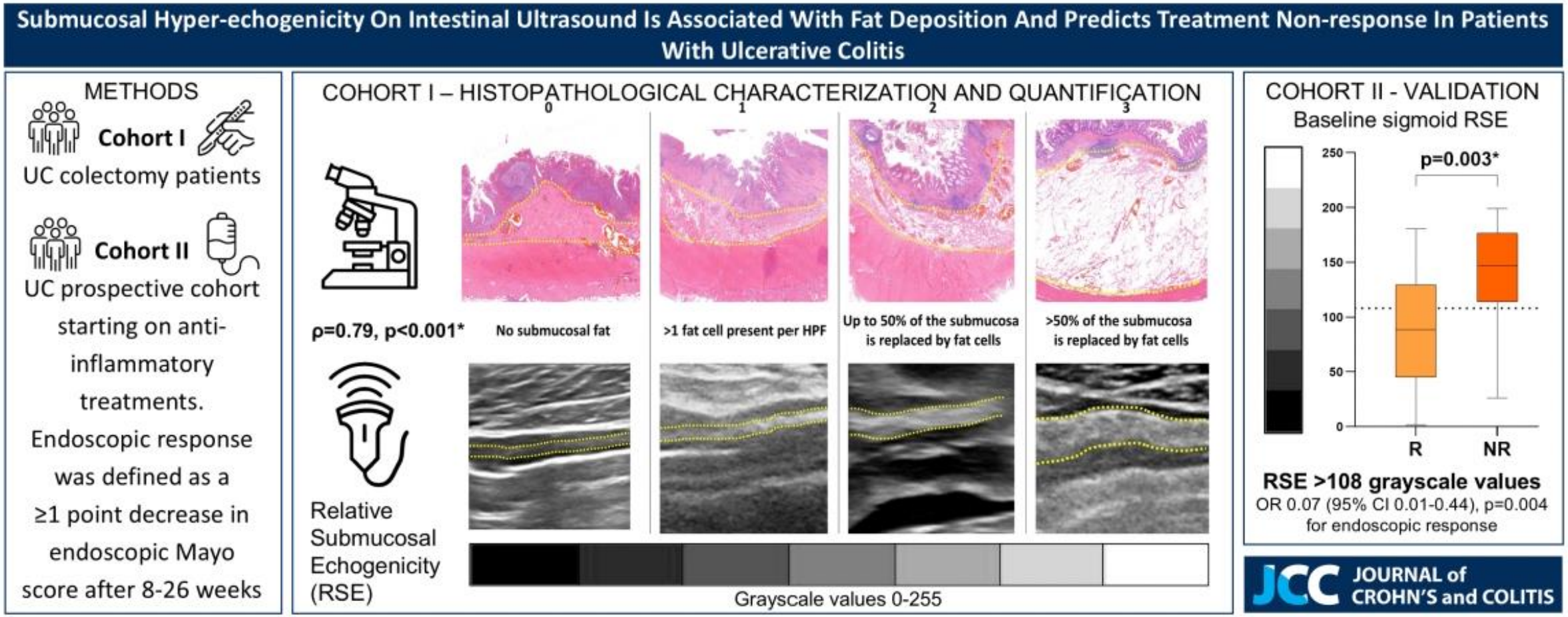
BWT was lower from **Week 6 onward** for patients achieving **endoscopic improvement**

Submucosal layer thickness predicted **endoscopic remission** (p=0.018) and endoscopic improvement at Week 6 (p=0.02)



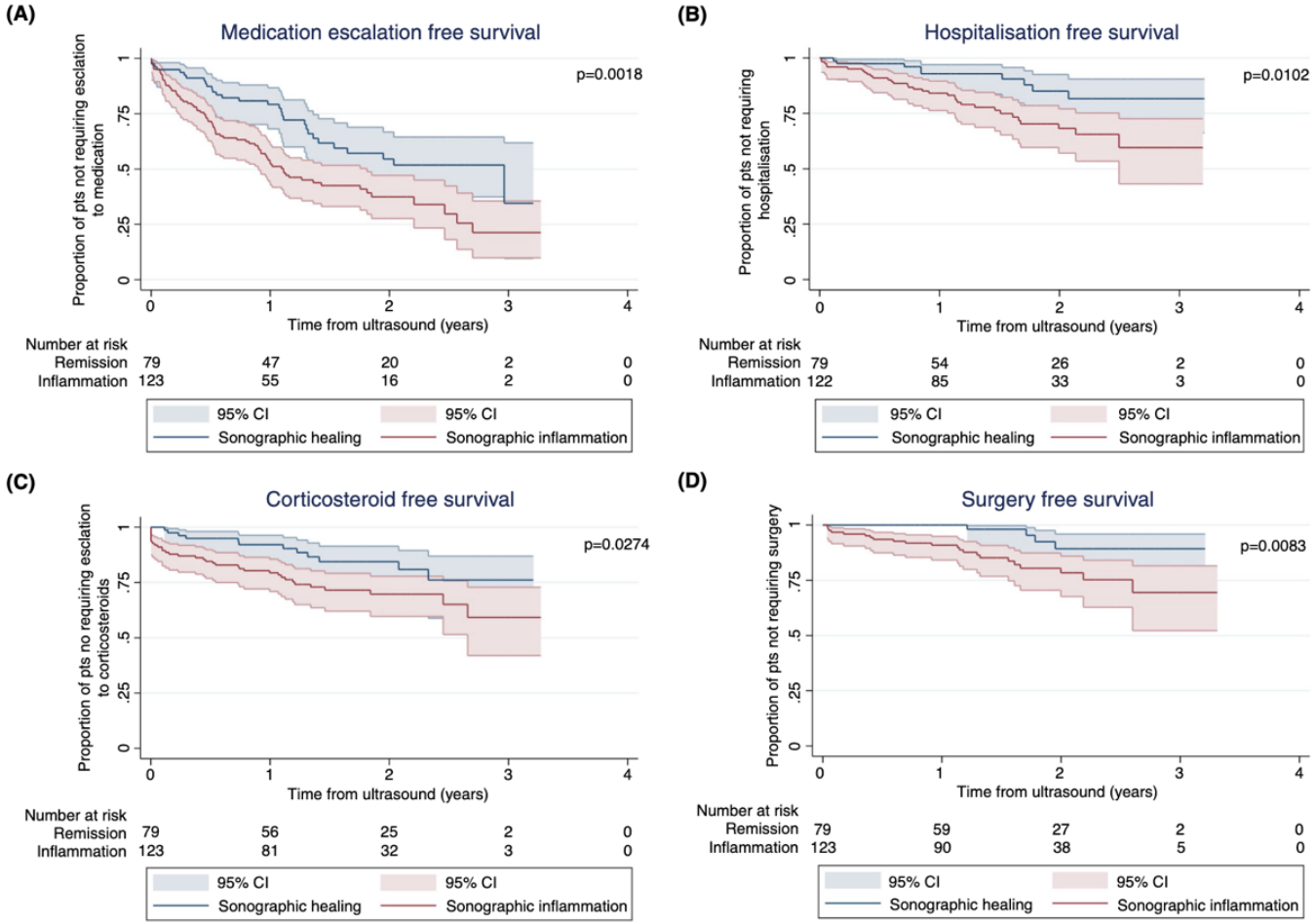
De Voogd et al. *Inflamm Bowel Dis*. 2024.

Scratching below the surface: the role of the submucosa



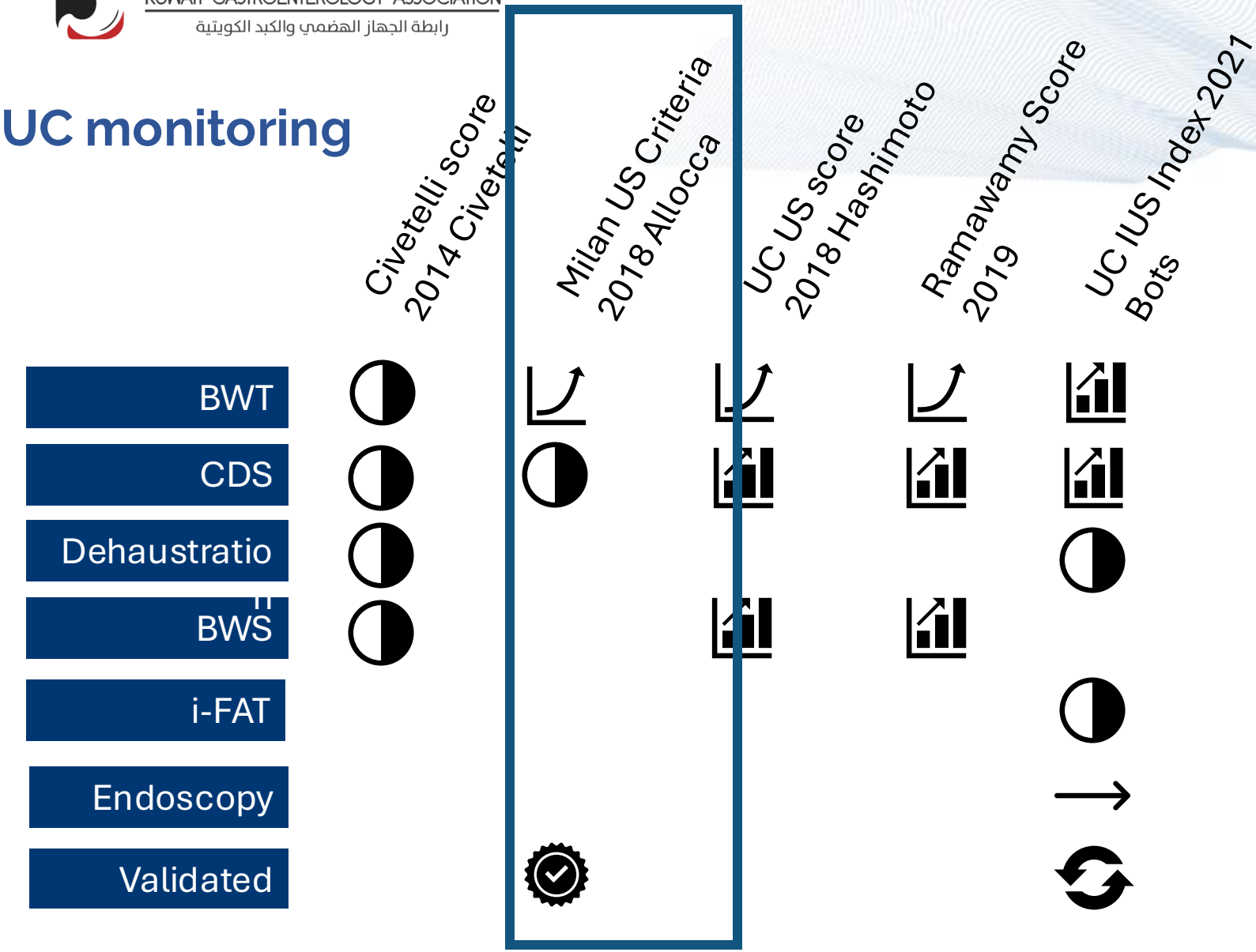
Pruijt et al. Journal Crohns Colitis 2025.

Early changes in BWT are predictive of long-term outcome



Vaughan al. *Inflamm Bowel Dis.* 2024.

Key parameters in UC monitoring



Goodsall et al. *JCC* 2021.

Novak et al. *JCC* 2021.

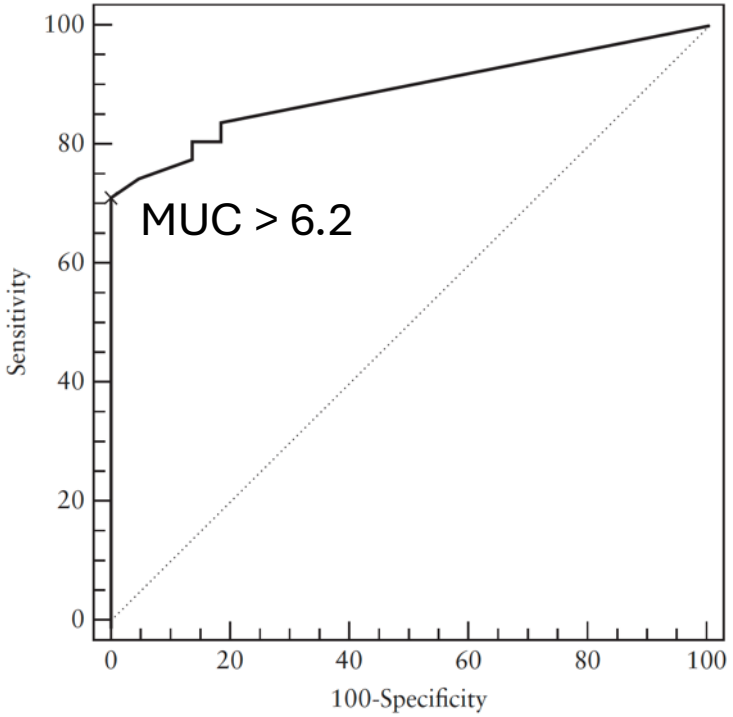
Courtesy Rune Wilkens

Milan ultrasound criteria

Humanitas Ultrasound criteria = Milan Ultrasound Criteria =

BWT (mm) x 1.4 + CDS x 2

CDS = 1 if present; CDS = 0 if absent



MUC[a] range	Observed risk of endoscopic activity[a]
<6.2	4/19 (21%)
6.3–8.1	1/2 (50%)
8.2–10.6	11/11 (100%)
>10.6	11/11 (100%)

TABLE 3 Diagnostic accuracy of Milan Ultrasound Criteria (MUC) in derivation and validation study

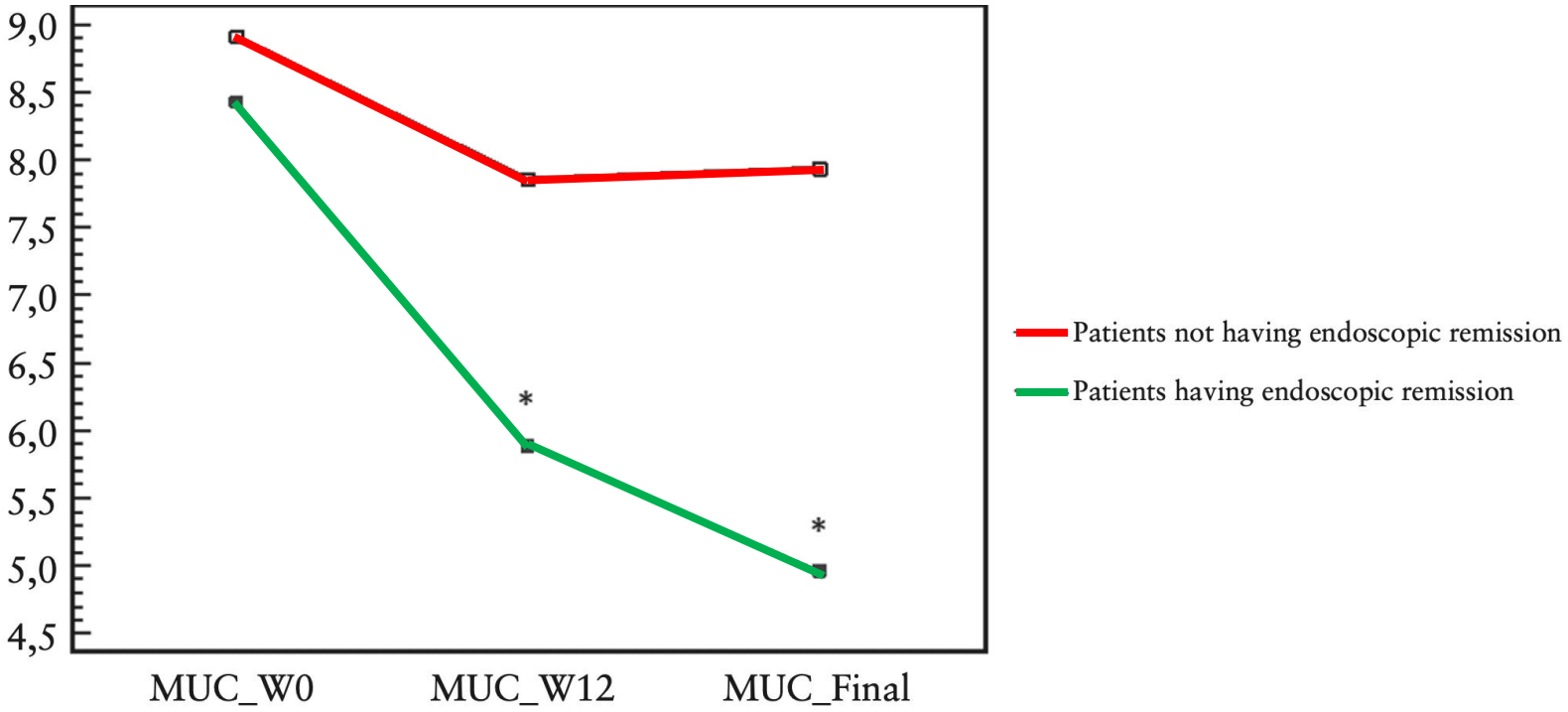
		MUC in derivation study			MUC in validation study		
	Cut-off	ROC	Sens	Spec	ROC	Sens	Spec
Active disease (Mayo endoscopic sub-score >2)	>6.2	0.891	0.71	1.00	0.902	0.85	0.94

Abbreviations: ROC, receiver operating characteristic; Sens, sensitivity; Spec, specificity.

Allocca et al. *JCC* 2018.
Allocca et al. *UEG journal.* 2021.

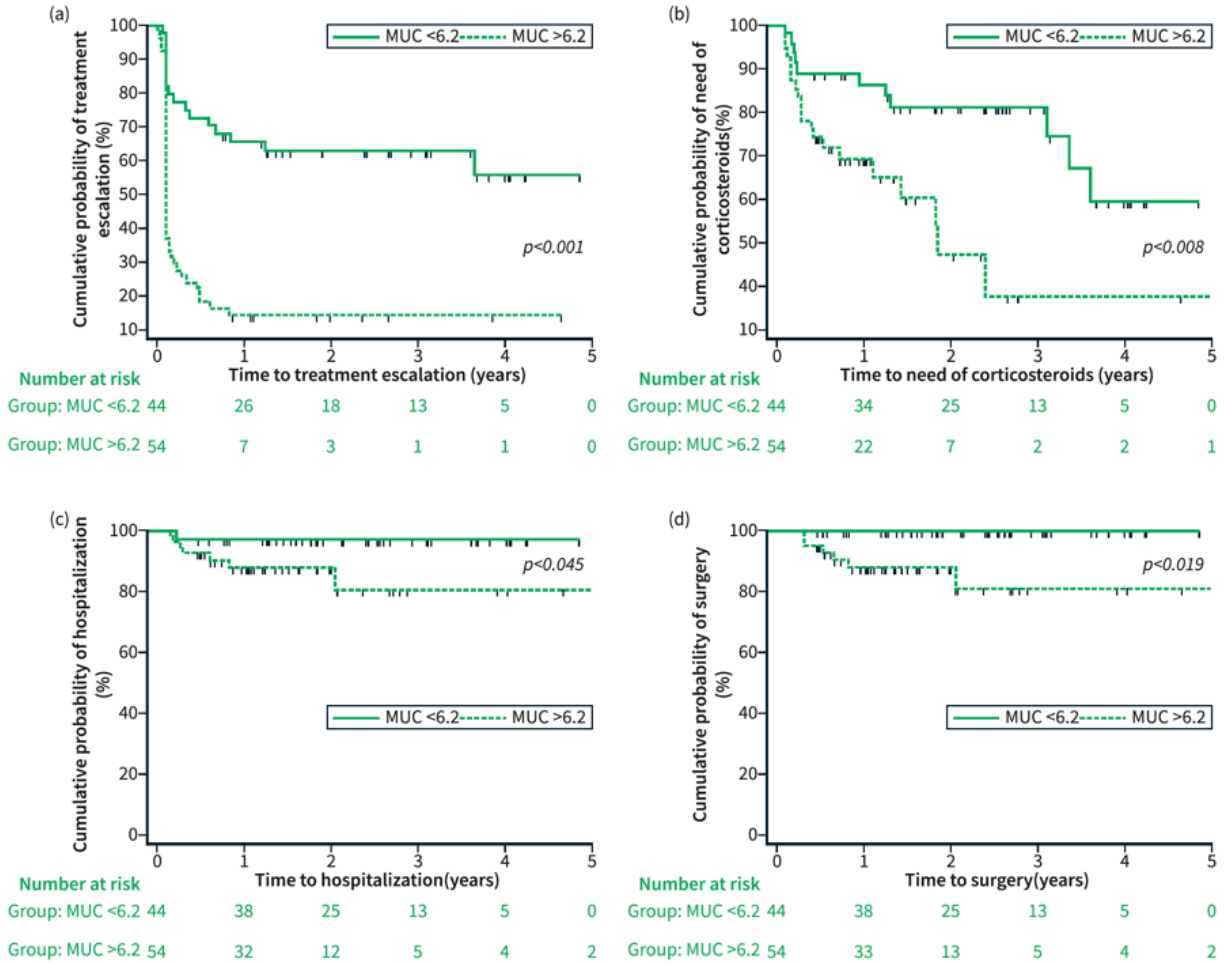
Milan ultrasound criteria

Humanitas Ultrasound criteria = Milan Ultrasound Criteria =
BWT (mm) x 1.4 + CDS x 2



Allocca et al. *JCC* 2023.

MUC has a prognostic value

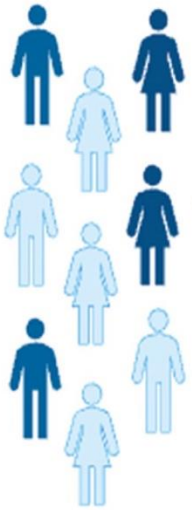


Allocca et al. *UEG journal.* 2021.

MUC has a prognostic value

At recruitment

Consecutive adult UC patients

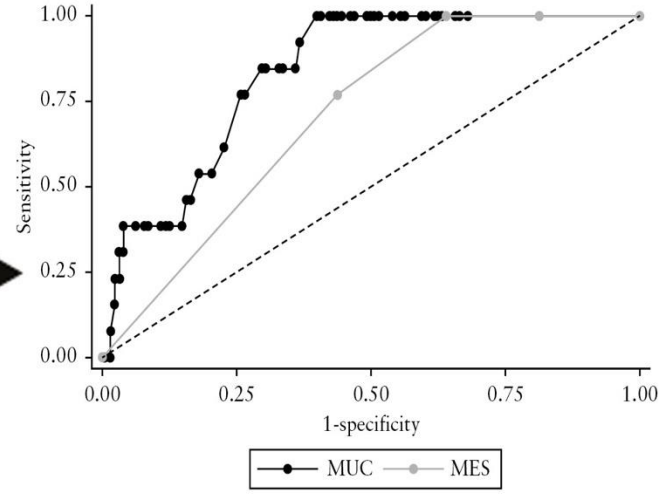


Mayo endoscopic score (MES)

Milan ultrasound criteria (MUC)

21.8 ± 14.6 months

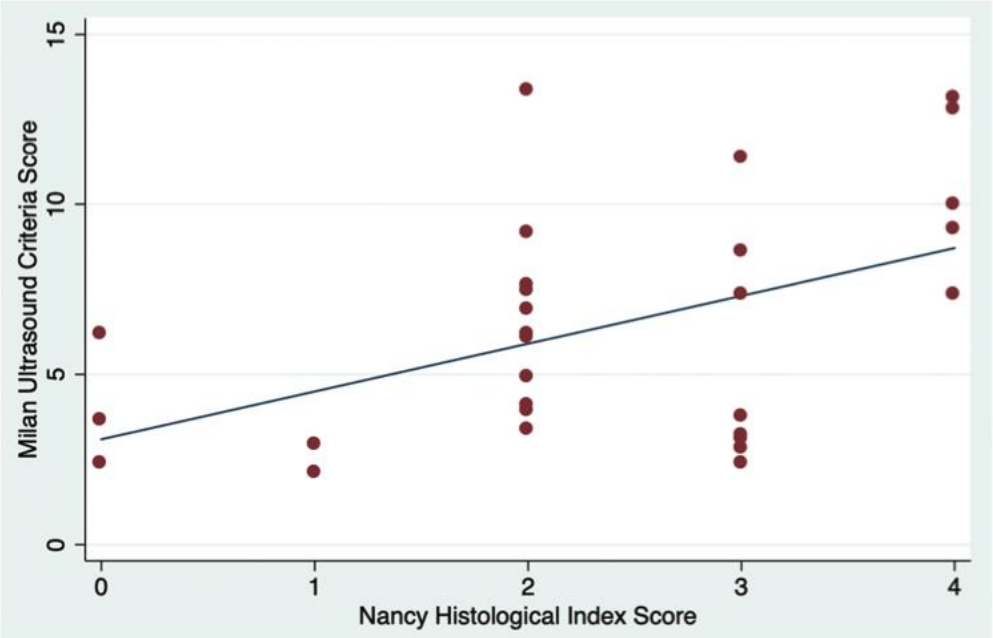
Colectomy risk



MUC > MES

Piazza et al. *JCC*. 2023.

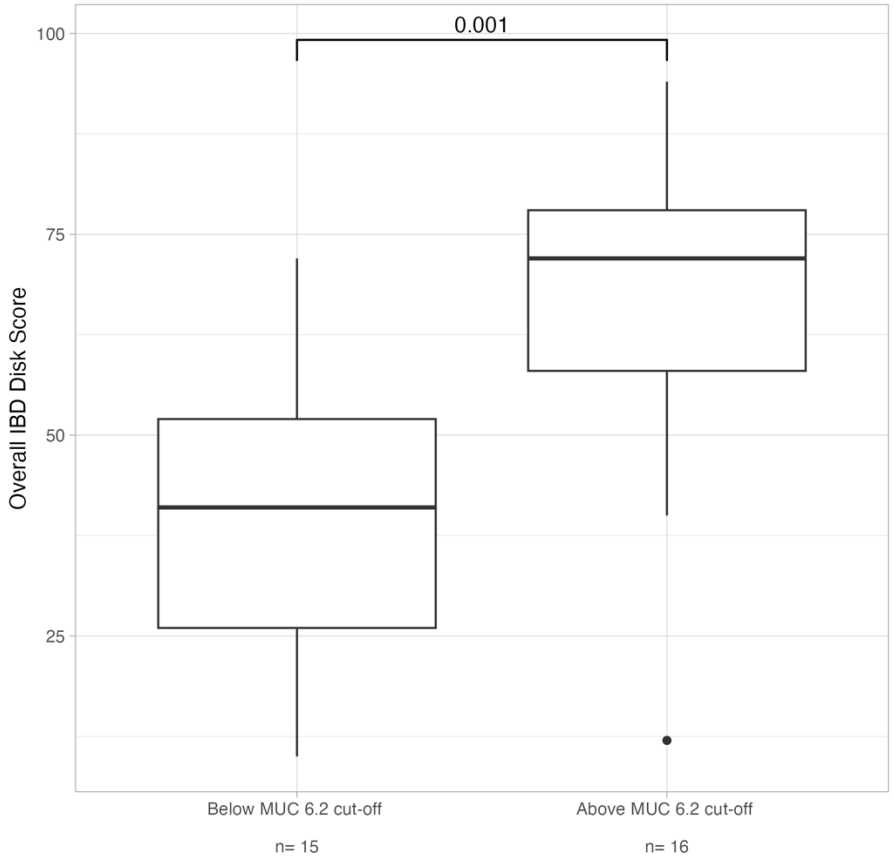
MUC is correlated to histological disease activity

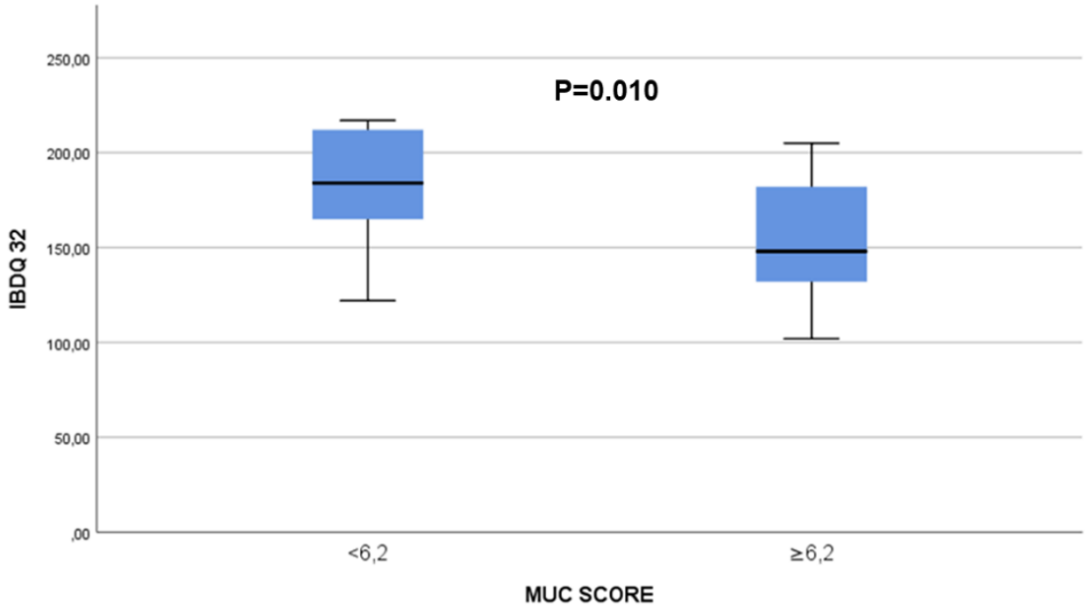


Comparison	*P*	Sensitivity (%)	Specificity (%)	Positive Predictive Value (%)	Negative Predictive Value (%)
MUC >6.3	.048	55	100	100	31
Calprotectin >50 ug/g	.127	92	40	88	50
Calprotectin >100 ug/g	.022	79	80	95	44
Composite of MUC and calprotectin[a]	.007	88	80	95	57

Goodsall et al. *Inflamm Bowel Disease.* 2024.

MUC is linked to quality of life





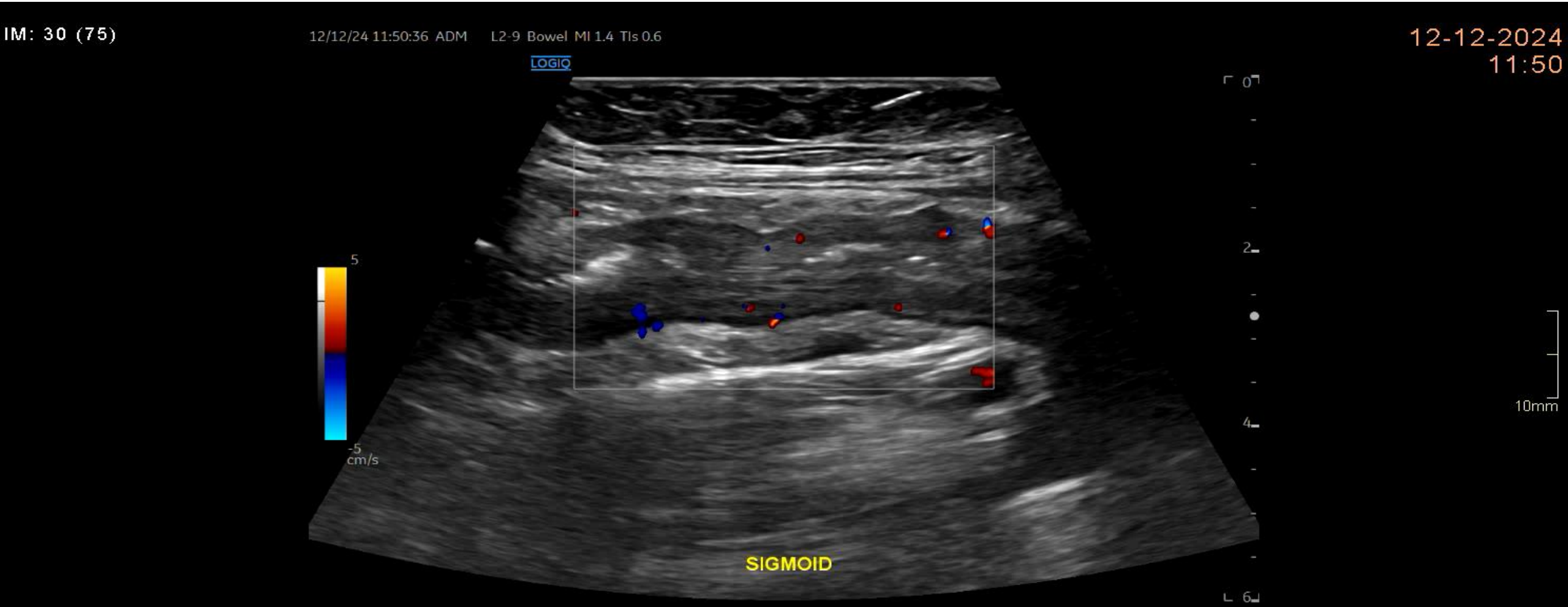
Eggermont et al. ECCO 2025. P0453.

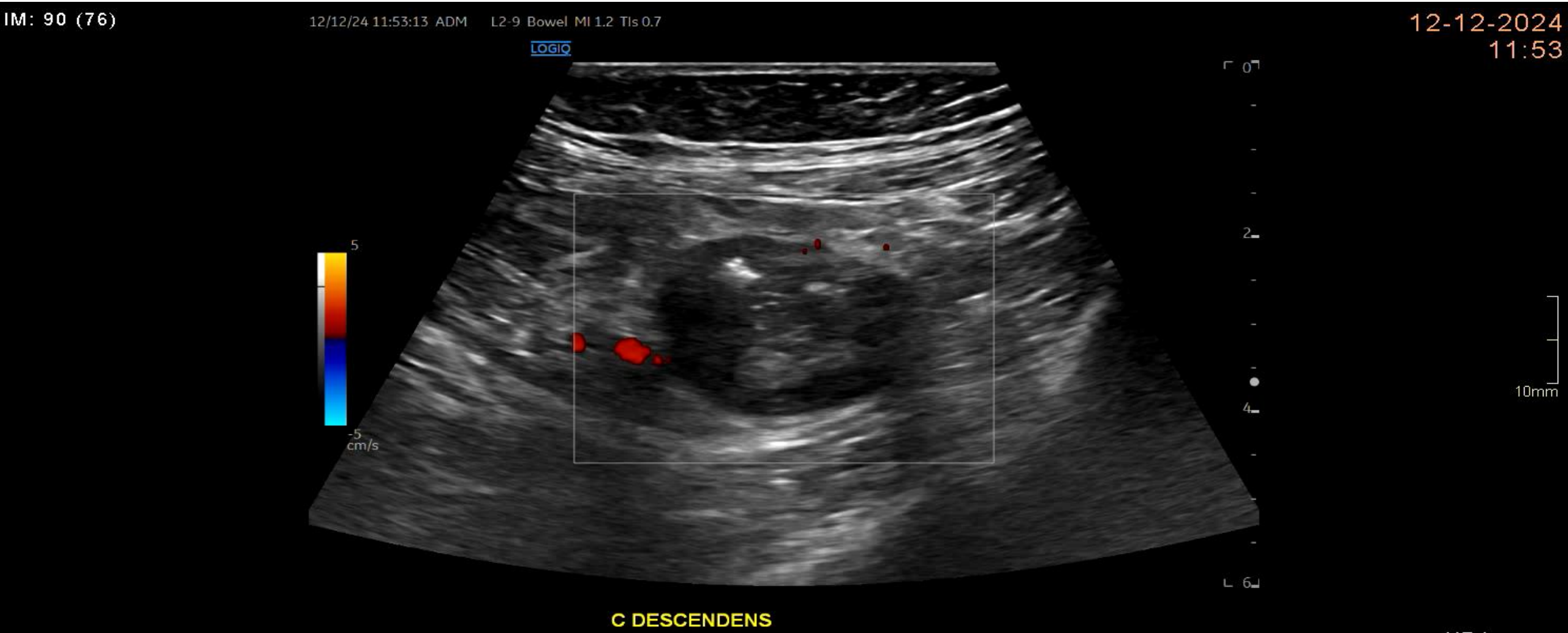
Parra Izquierdo et al. ECCO 2025. P0353.

Case 1

- **46y old woman**
  - 07/2020: distal proctitis R/ topical 5ASA
  - 02/2021: left-sided flare R/ systemic 5ASA + corticosteroids in tapering dose
  - 2021-2024: clinical and endoscopic remission
  - 11/2024: left-sided colitis R/ etrasimod

- **December 12th 2024**
  - > 15 stools a day, 90% with blood
  - urgency +++
  - lost 5 kg
  - infections ruled out


IM: 30 (75)
12/12/24 11:50:36 ADM
L2-9 Bowel MI 1.4 TIs 0.6
LOGIQ
12-12-2024
11:50
5
-5
cm/s
0
2
4
6
10mm
SIGMOID
Age at study: 046Y
UZ Leuven
UZLGEIGEUS01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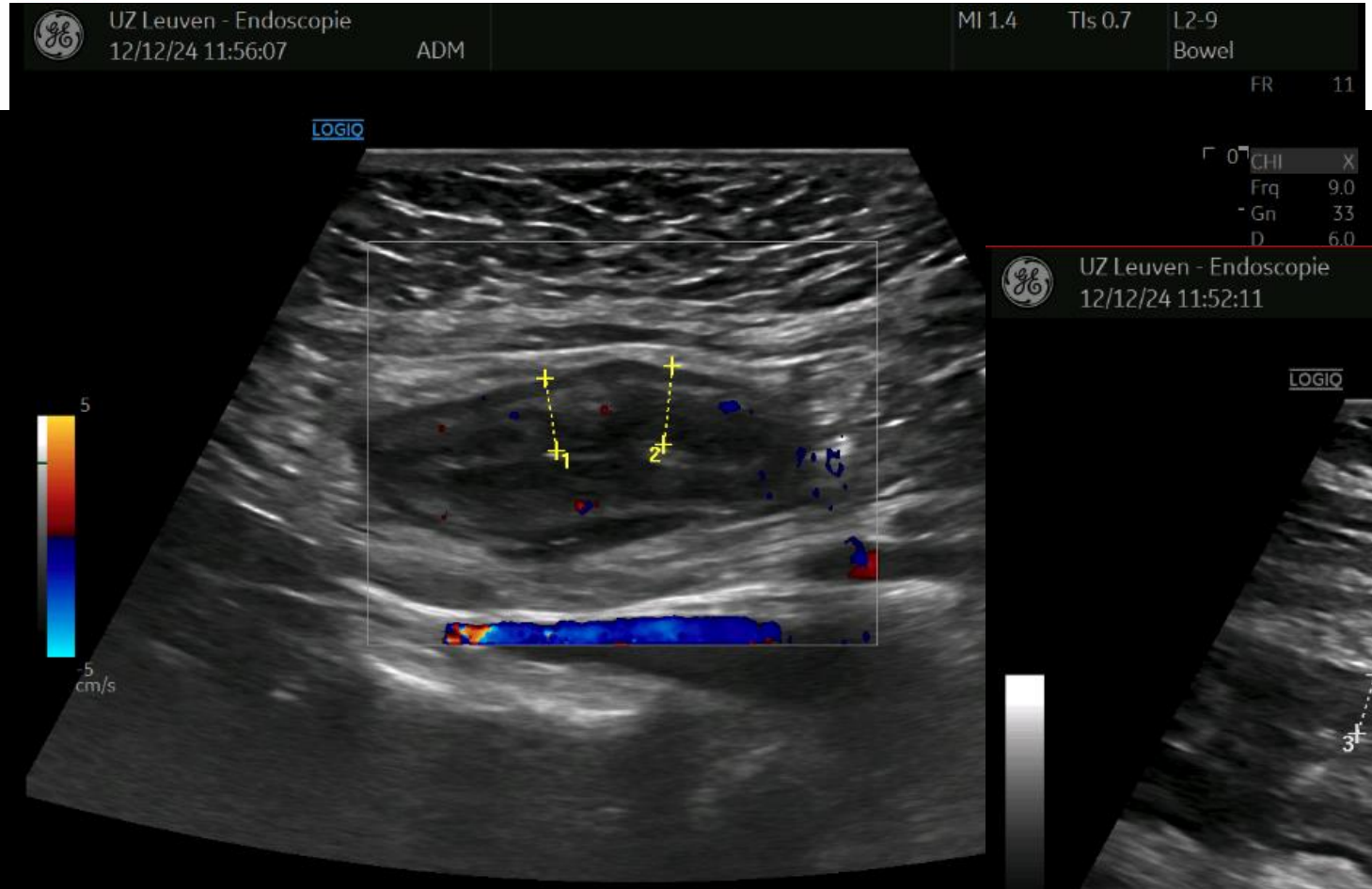
12/12/24 11:53:13 ADM
L2-9 Bowel MI 1.2 TIs 0.7
LOGIQ
12-12-2024
11:53
5
-5
cm/s
0
2
4
6
10mm
C DESCENDENS
Age at study: 046Y
UZ Leuven
UZLGEIGEUS01



C TRANSVERSUM

C DESCENDENS

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IUS Report December 12th 2024

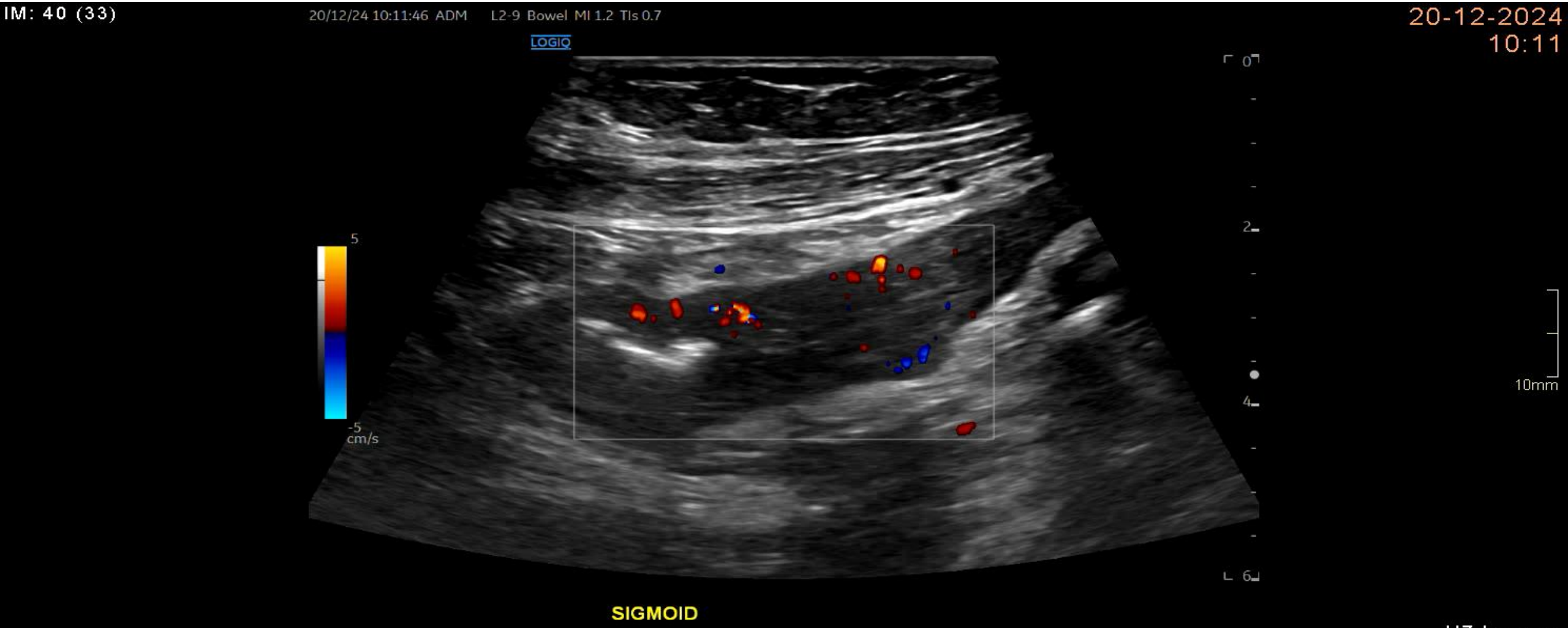
- **Ileum**
  - BWT 1.5 mm
  - Limberg score 0
- **Ascending colon**
  - BWT 4.9 mm
  - Limberg score 1
- **Transverse colon**
  - BWT 6.4 mm
  - Limberg score 2
  - Loss of stratification
  - iFat
- **Descending colon**
  - BWT 4.9 mm
  - Limberg score 3
  - Loss of stratification
  - Ulcerations
  - iFat
- **Sigmoid**
  - BWT 4.0 mm
  - Limberg score 3
  - Loss of stratification
  - Ulcerations
  - iFat

BWT (mm worst affected segment) x 1.4 + CDS : 6.4mm x 1.4 + 1 x 2

MUC 10.96

Case 1

- **December 20th 2024**
  - Admission due to acute severe colitis despite high dose steroids po + etrasimod (refused admission before)
  - CRP 104.8 mg/L
  - Albumin 27g/L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L2-9 Bowel MI 1.2 TIs 0.7
LOGIQ
20-12-2024
10:11
5
-5
cm/s
0
2
4
6
10mm
SIGMOID
Age at study: 046Y
UZ Leuven
UZLGEIGEUS01


IM: 80 (474)
20/12/24 10:14:30 ADM L2-9 Bowel MI 1.1 TIs 0.6
LOGIQ
20-12-2024
10:14
0
2
4
6
10mm
C DESCENDENS
Age at study: 046Y
UZ Leuven
UZLGEIGEUS01


IM: 140 (419)
20/12/24 10:17:42 ADM L2-9 Bowel MI 1.1 TIs 0.6
LOGIQ
20-12-2024
10:17
0
2
4
6
10mm
C TRANSVERSUM
Age at study: 046Y
UZ Leuven
UZLGEIGEUS01


UZ Leuven - Endoscopie
20/12/24 10:14:47
ADM
MI 1.1
TIs 0.6
L2-9
Bowel
FR 48
LOGIQ
CHI
Frq 9.0
Gn 33
S/A 3/4
Map C/3
D 6.0
Zm 0
DR 60
AO% 70
1 L 4.5 mm
2 L 4.6 mm
C DESCENDENS


UZ Leuven - Endoscopie
20/12/24 10:09:28
ADM
MI 1.1
TIs 0.6
L2-9
Bowel
FR 48
LOGIQ
CHI
Frq 9.0
Gn 33
S/A 3/4
Map C/3
D 6.0
Zm 0
DR 60
AO% 70
1 L 5.9 mm
2 L 6.1 mm
SIGMOID

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IUS Report December 20th 2024

- **Ileum**
  - BWT 1.5 mm
  - Limberg score 0

- **Ascending colon**
  - BWT 4.7 mm
  - Limberg score 2
  - iFat

- **Transverse colon**
  - BWT 4.6 mm
  - Limberg score 3
  - Loss of stratification
  - iFat

- **Descending colon**
  - BWT 4.6 mm
  - Limberg score 3
  - Loss of stratification
  - Ulcerations
  - iFat

- **Sigmoid**
  - BWT 6.1 mm
  - Limberg score 3
  - Loss of stratification
  - Ulcerations
  - iFat

BWT (mm worst affected segment) x 1.4 + CDS : 6.1mm x 1.4 + 1 x 3

MUC 10.54

What would be your next step ?

A. I would prefer an endoscopic assessment (sigmoidoscopy)

B. I know enough and I start rescue therapy

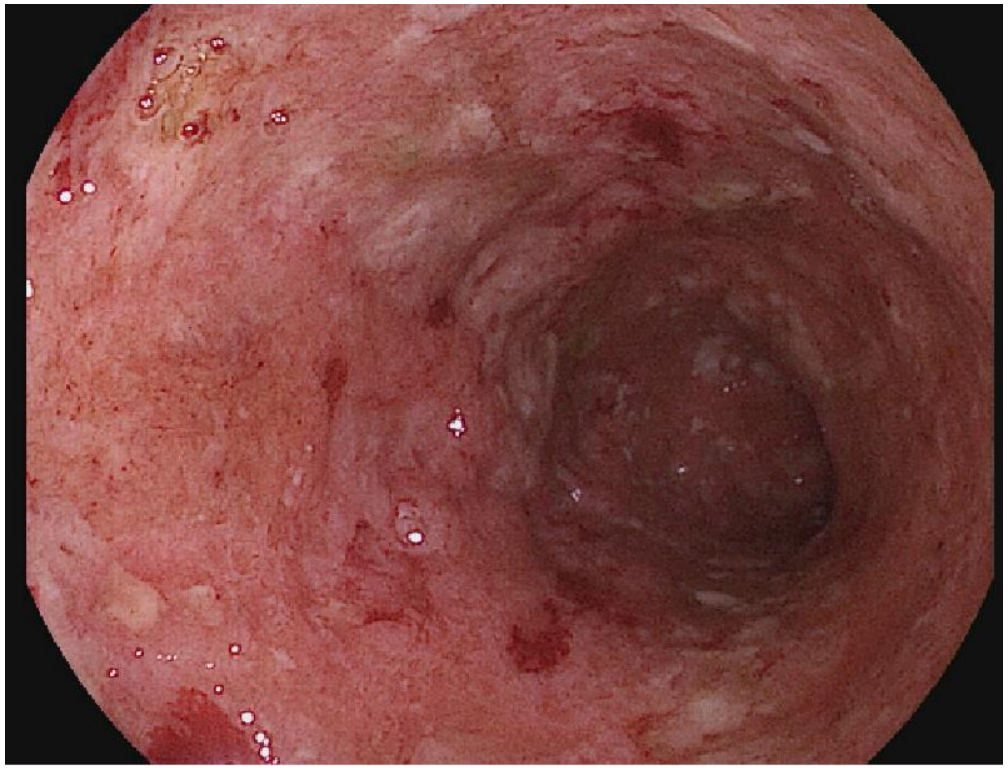
C. I know enough and refer the patient for colectomy

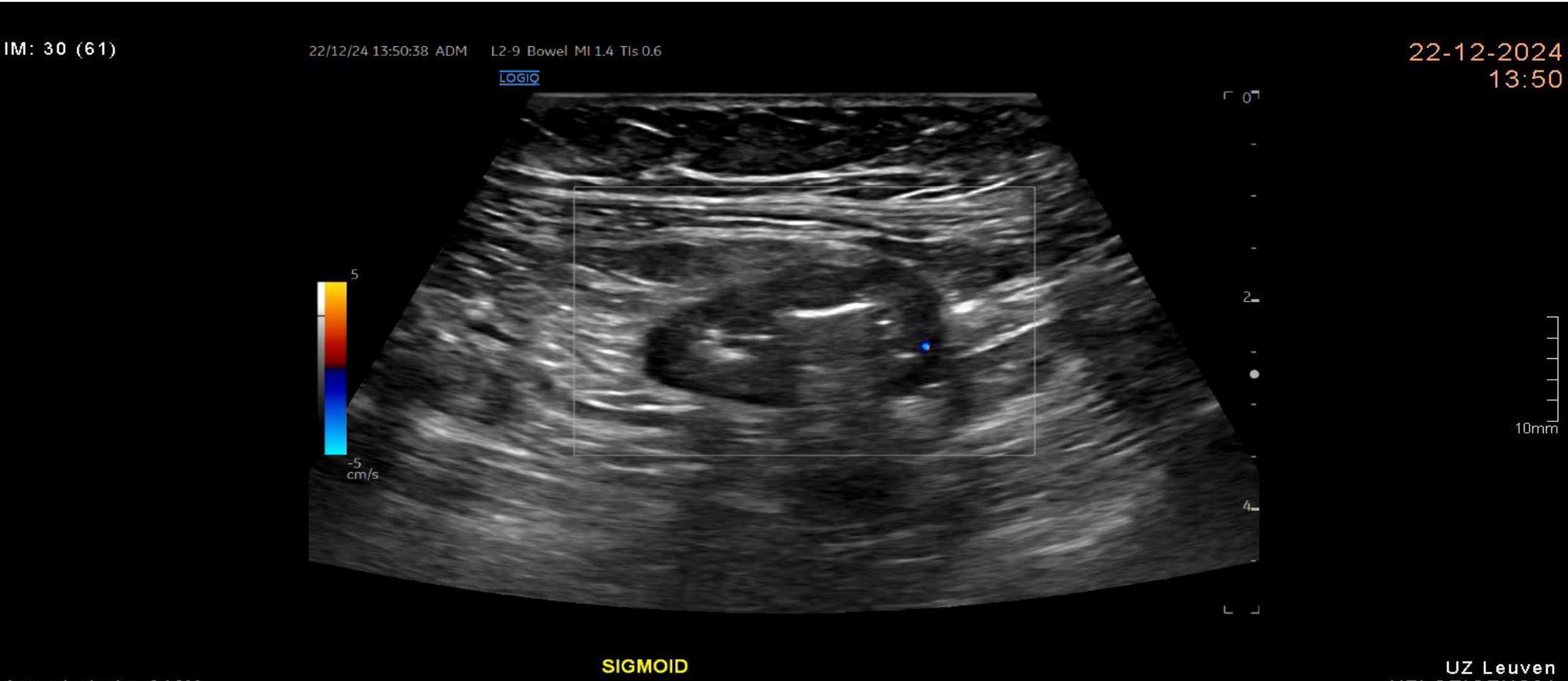
D. Other

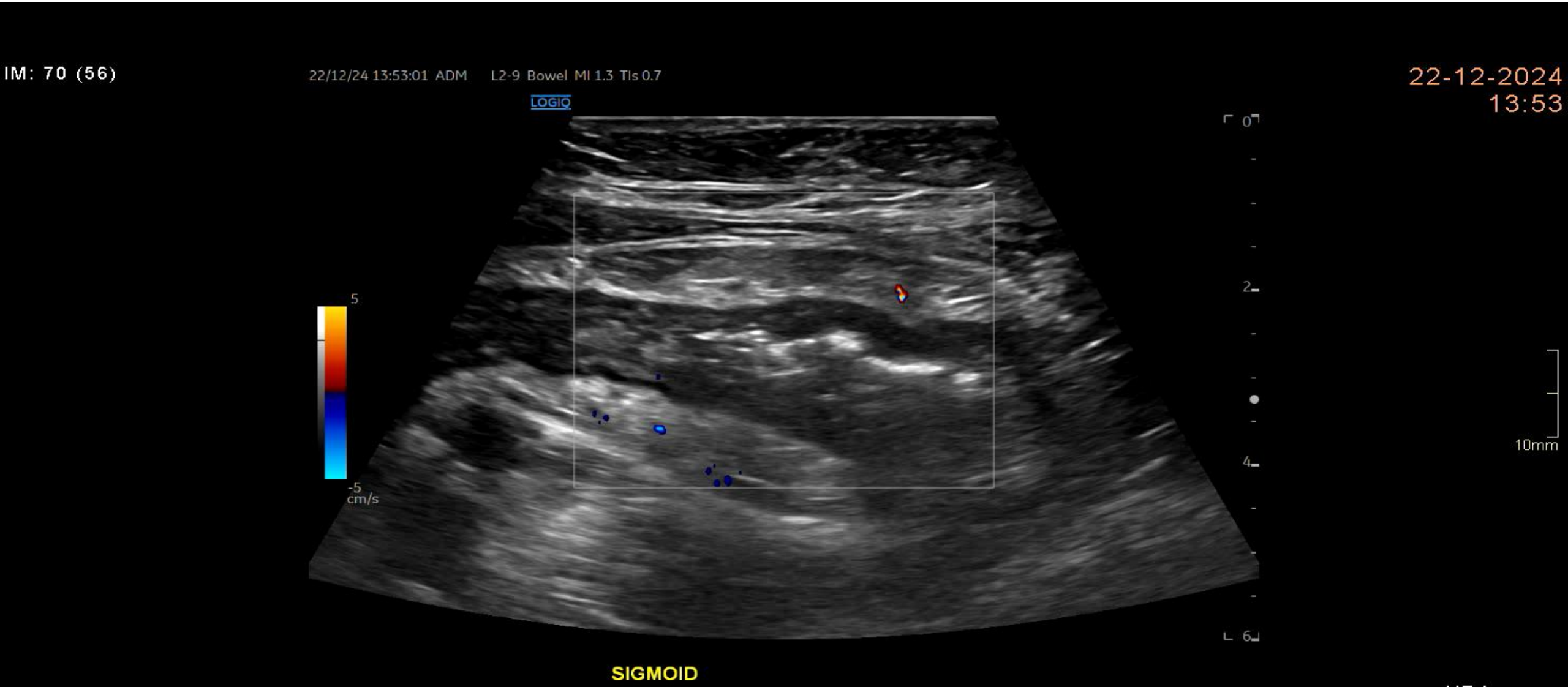
Case 1

- December 20th 2024
  - Admission due to acute severe colitis despite high dose steroids po + etrasimod
  - CRP 104.8 mg/L
  - Albumin 27g/L

- She **started on infliximab 10mg/kg + azathioprin**




IM: 30 (61)
22/12/24 13:50:38 ADM
L2-9 Bowel MI 1.4 TIs 0.6
LOGIQ
22-12-2024
13:50
5
-5
cm/s
0
2
4
10mm
SIGMOID
Age at study: 046Y
UZ Leuven
UZLGEIGEUS01


IM: 70 (56)
22/12/24 13:53:01 ADM
L2-9 Bowel MI 1.3 TIs 0.7
LOGIQ
22-12-2024
13:53
5
-5
cm/s
0
2
4
6
10mm
SIGMOID
Age at study: 046Y
UZ Leuven
UZLGEIGEUS01


UZ Leuven - Endoscopie
22/12/24 14:02:06
ADM
MI 1.1
TIs 0.6
L2-9
Bowel
FR 48
LOGIQ
CHI
Frq 9.0
Gn 33
S/A 3/4
Map C/3
D 6.0
Zm 0
DR 60
AO% 70
C TRANSVERSUM
1 L 3.6 mm
2 L 4.5 mm
3 L 4.6 mm


UZ Leuven - Endoscopie
22/12/24 13:54:58
ADM
MI 1.1
TIs 0.8
L2-9
Bowel
FR 43
LOGIQ
CHI
Frq 9.0
Gn 33
S/A 3/4
Map C/3
D 7.0
Zm 0
DR 60
AO% 70
C DESCENDENS
1 L 6.1 mm
2 L 6.6 mm

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IUS Report December 22nd 2024

- **Ileum**
  - BWT 1.5 mm
  - Limberg score 0

- **Ascending colon**
  - BWT 4.7 mm
  - Limberg score 2
  - iFat

- **Transverse colon**
  - BWT 4.6 mm
  - Limberg score 2
  - Loss of stratification

- **Descending colon**
  - BWT 6.1 mm
  - Limberg score 3
  - Loss of stratification
  - Ulcerations
  - iFat

- **Sigmoid**
  - BWT 4.9 mm
  - Limberg score 3
  - Loss of stratification
  - Ulcerations
  - iFat

BWT (mm worst affected segment) x 1.4 + CDS : 6.1mm x 1.4 + 1 x 3

MUC 10.54

What would be your next step ?

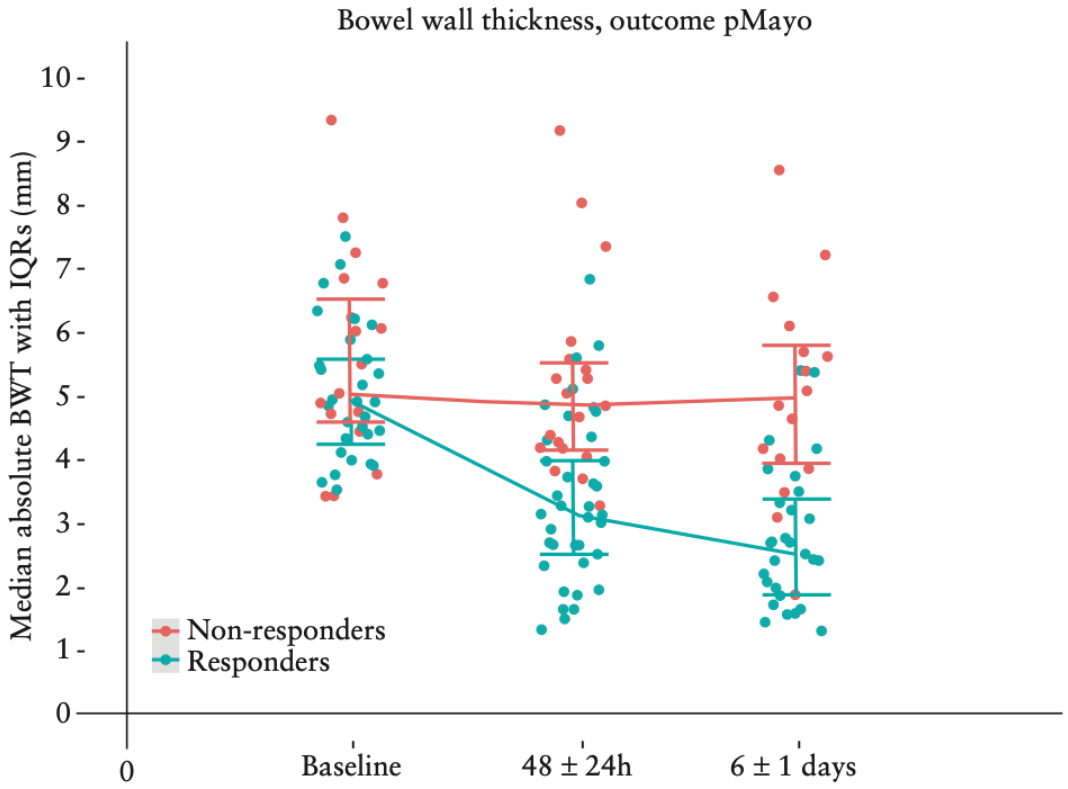
A. I would prefer an endoscopic assessment (sigmoidoscopy)

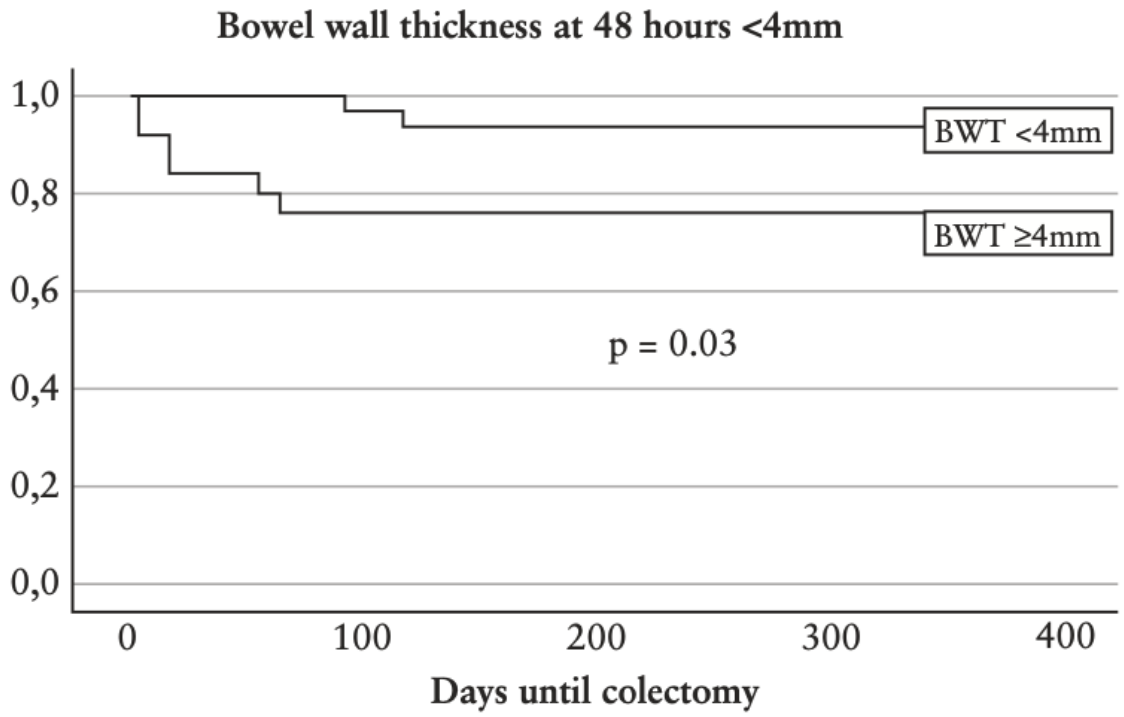
B. I know enough and I continue rescue therapy

C. I know enough and refer the patient for colectomy

D. Other

IUS in the context of ASUC



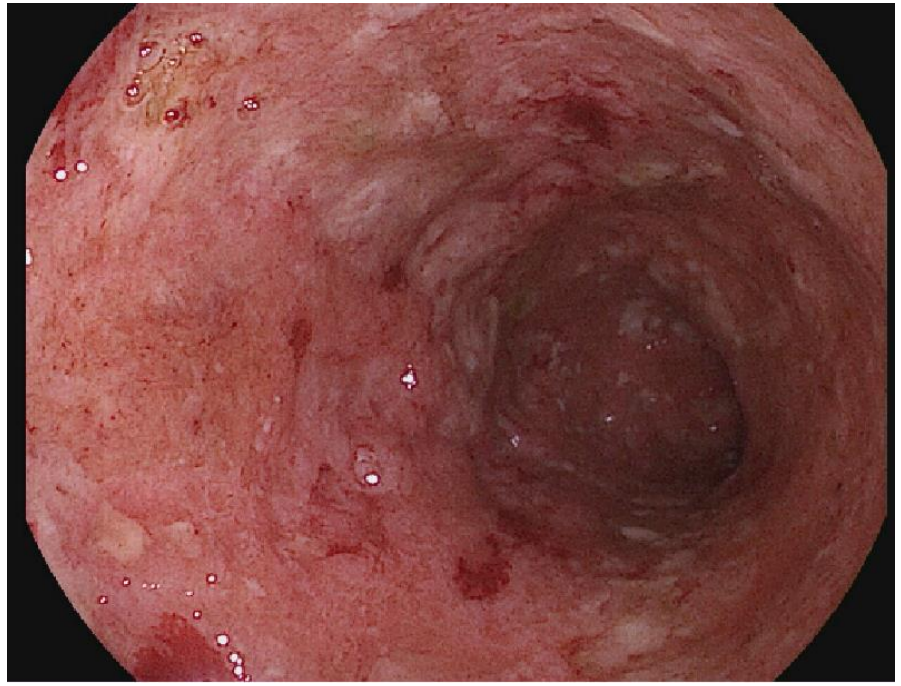


Ilvemark et al, *JCC 2022*.
Ilvemark et al, *JCC 2024*.

Case 1

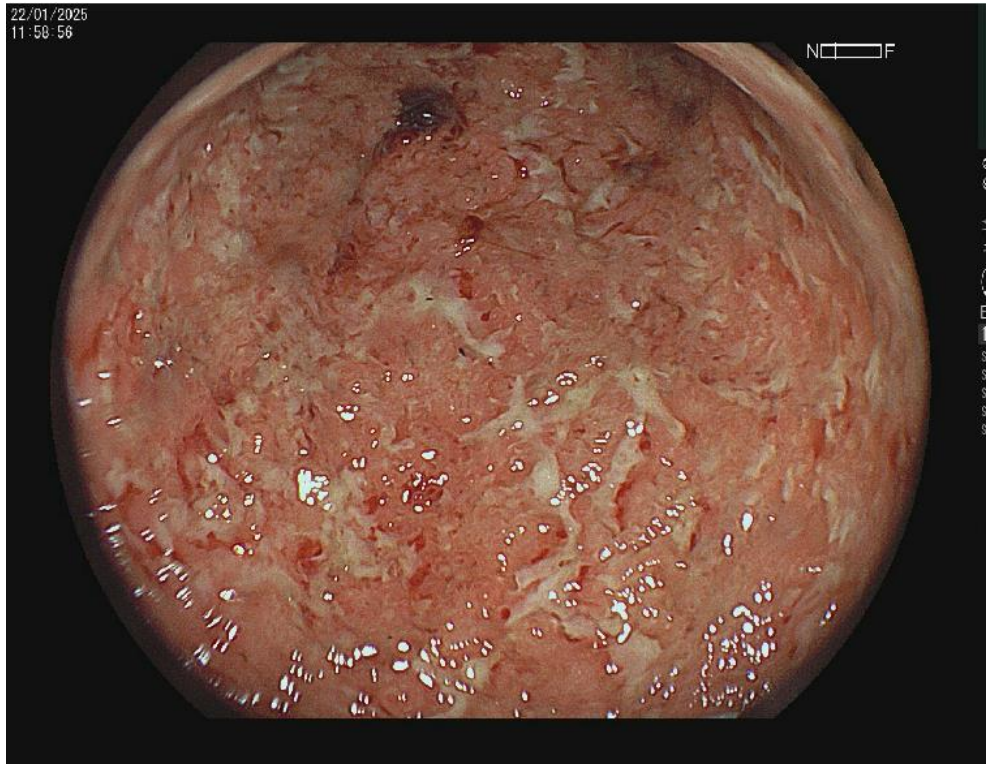
- December 20th 2024
  - Admission due to acute severe colitis despite high dose steroids po + etrasimod
  - CRP 104.8 mg/L
  - Albumin 27g/L

- She started on infliximab 10mg/kg + azathioprine
  - Clinical response
  - Biochemical response: CRP 104.8mg/L > 7.6mg/L on Dec 27th
  - IUS: MUC unchanged
  - Continued infliximab
    - 2nd infusion on Dec 27th 10mg/kg
    - 3rd infusion on Jan 9th 10mg/kg



Case 1

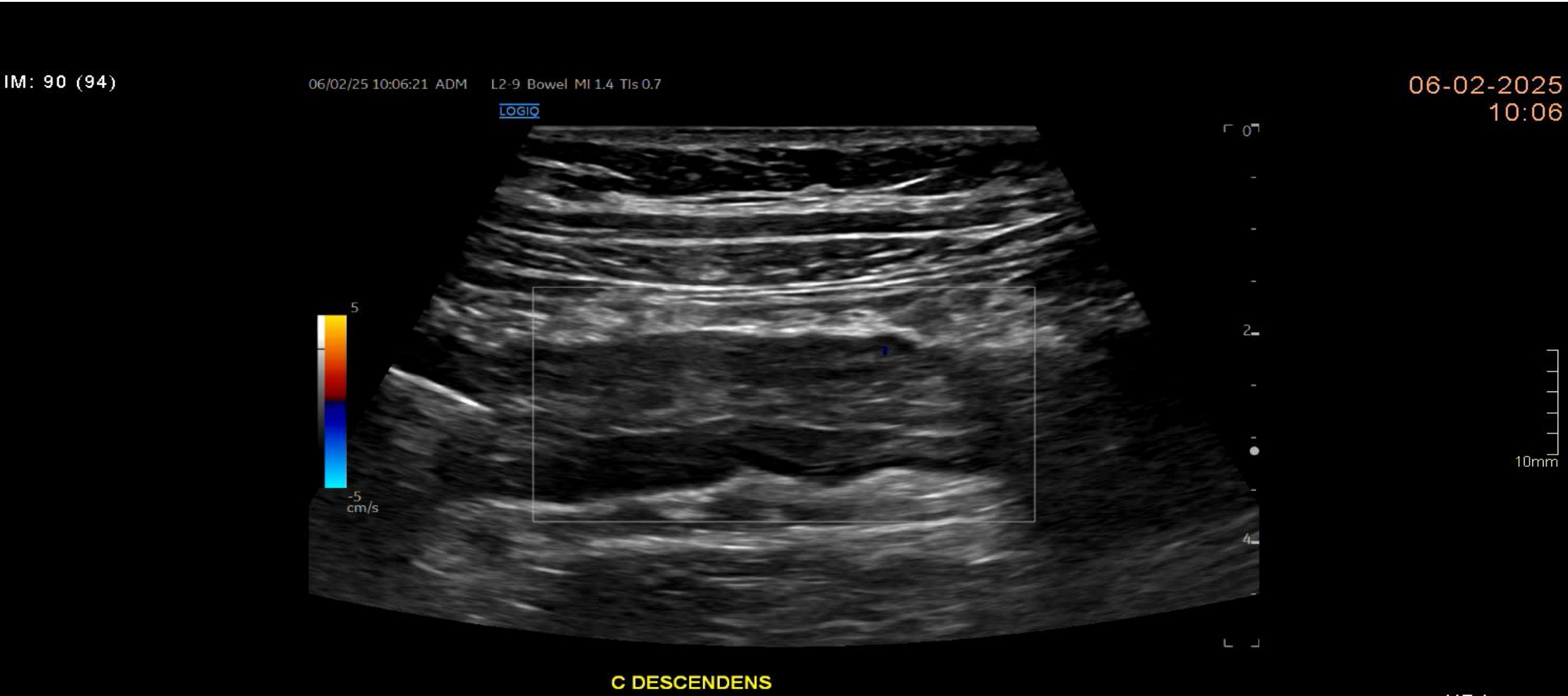
- **January 22nd 2025**
  - Re-admission due to recurrent acute severe colitis despite high dose IFX combo
  - CRP 123.9 mg/L
  - Albumin 20.8g/L
  - Adequate infliximab level



- She refused colectomy
- She started upadacitinib 45mg
  - Quick clinical improvement
  - Quick biochemical improvement

Case 1

- **February 6th 2025**
  - Outpatient visit
  - Clinical remission
  - CRP 23 mg/L (< 123.9 mg/L)
  - Albumin 36.3 g/L (< 20.6 g/L)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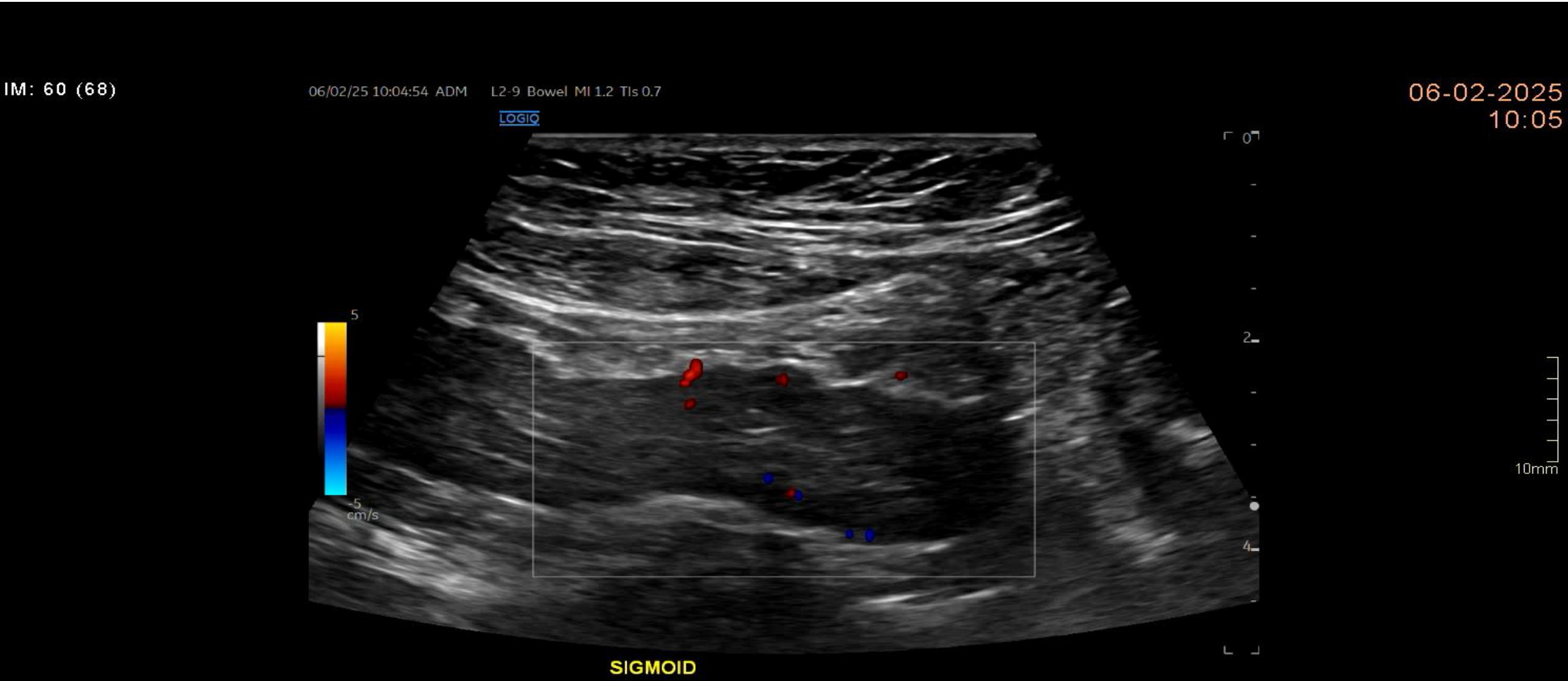
06/02/25 10:06:21 ADM
L2-9 Bowel MI 1.4 TIs 0.7
LOGIQ
06-02-2025
10:06
5
-5
cm/s
0
2
4
10mm
C DESCENDENS
Age at study: 046Y
UZ Leuven
UZLGEIGEUS01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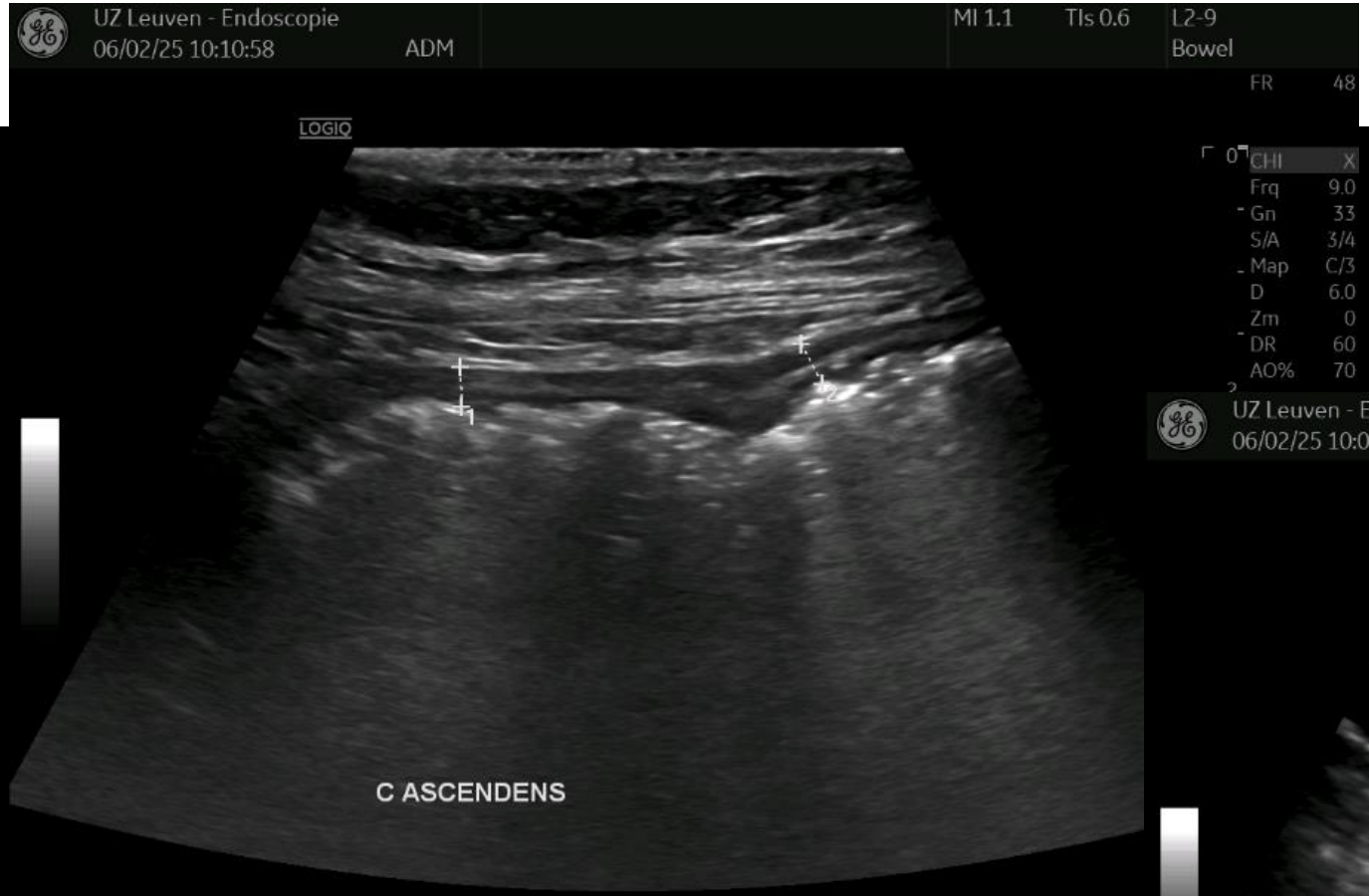
06/02/25 10:04:54 ADM
L2-9 Bowel MI 1.2 TIs 0.7
LOGIQ
06-02-2025
10:05
5
-5
cm/s
10mm
SIGMOID
Age at study: 046Y
UZ Leuven
UZLGEIGEUS01


UZ Leuven - Endoscopie
06/02/25 10:10:58
ADM
MI 1.1
TIs 0.6
L2-9
Bowel
FR 48
LOGIQ
CHI
Frq 9.0
Gn 33
S/A 3/4
Map C/3
D 6.0
Zm 0
DR 60
AO% 70
C ASCENDENS
1 L 3.2 mm
2 L 3.6 mm


UZ Leuven - Endoscopie
06/02/25 10:07:56
ADM
MI 1.1
TIs 0.4
L2-9
Bowel
FR 55
LOGIQ
CHI
Frq 9.0
Gn 33
S/A 3/4
Map C/3
D 5.0
Zm 0
DR 60
AO% 70
C TRANSVERSUM
1 L 3.2 mm
2 L 4.1 mm


UZ Leuven - Endoscopie
06/02/25 10:05:53
ADM
MI 1.1
TIs 0.4
L2-9
Bowel
FR 55
LOGIQ
CHI
Frq 9.0
Gn 33
S/A 3/4
Map C/3
D 5.0
Zm 0
1 L 5.6 mm
2 L 4.9 mm
C DESCENDENS


UZ Leuven - Endoscopie
06/02/25 10:04:13
ADM
MI 1.1
TIs 0.4
L2-9
Bowel
FR 55
LOGIQ
CHI
Frq 9.0
Gn 33
S/A 3/4
Map C/3
D 5.0
Zm 0
DR 60
AO% 70
1 L 5.3 mm
2 L 6.6 mm
SIGMOID

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IUS Report February 6th 2025

- **Ileum**
  - BWT 1.5 mm // 1.0 mm
  - Limberg score 0 // 0

- **Ascending colon**
  - BWT 4.7 mm // 3.4 mm
  - Limberg score 2 // 1
  - iFat gone

- **Transverse colon**
  - BWT 4.6 mm // 4.1 mm
  - Limberg score 2 // 1
  - Loss of stratification gone

- **Descending colon**
  - BWT 6.1 mm // 5.0 mm
  - Limberg score 3 // 1
  - Loss of stratification
  - Ulcerations
  - iFat

- **Sigmoid**
  - BWT 4.9 mm // 5.7 mm
  - Limberg score 3 // 2
  - Loss of stratification
  - Ulcerations
  - iFat

MUC 9.98

How to implement IUS in UC disease monitoring

Ulcerative Colitis

Baseline assessment

Early response assessment within 12 weeks

Clinic (PRO)
Biomarkers (fCalpro and/or CRP)

+

Endoscopy
or
IUS

Ulcerative Colitis

Assessment of subclinical inflammation every 6-12 months

Clinic (PRO)
and
Biomarkers (fCalpro)
and/or
IUS

Endoscopy only if findings are discrepant, for considering treatment withdrawal and for dysplasia surveillance

Kucharzik et al. ECCO-ESGAR-IBUS Guidelines 2025.

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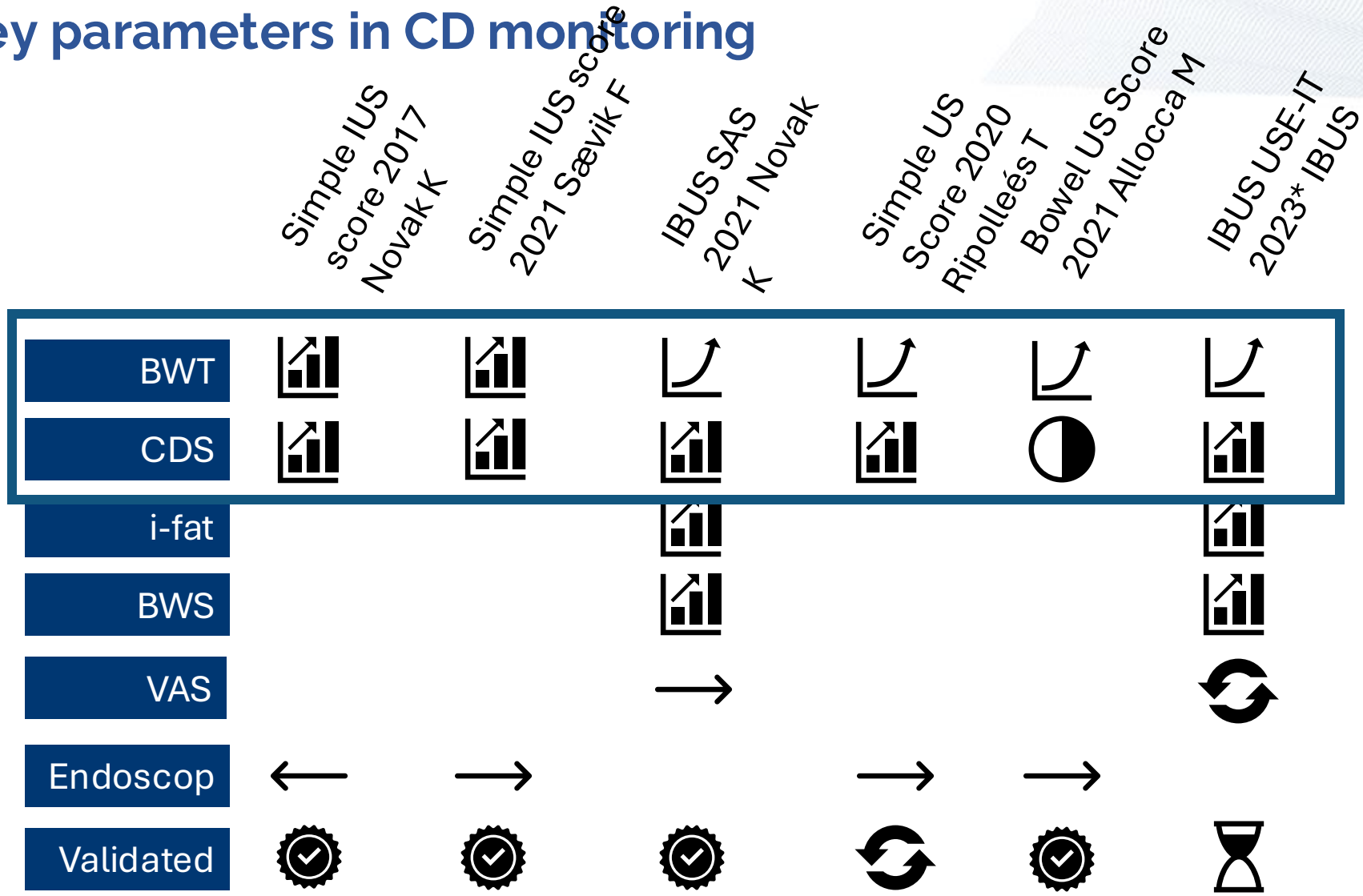
Key parameters in CD monitoring



Criteria

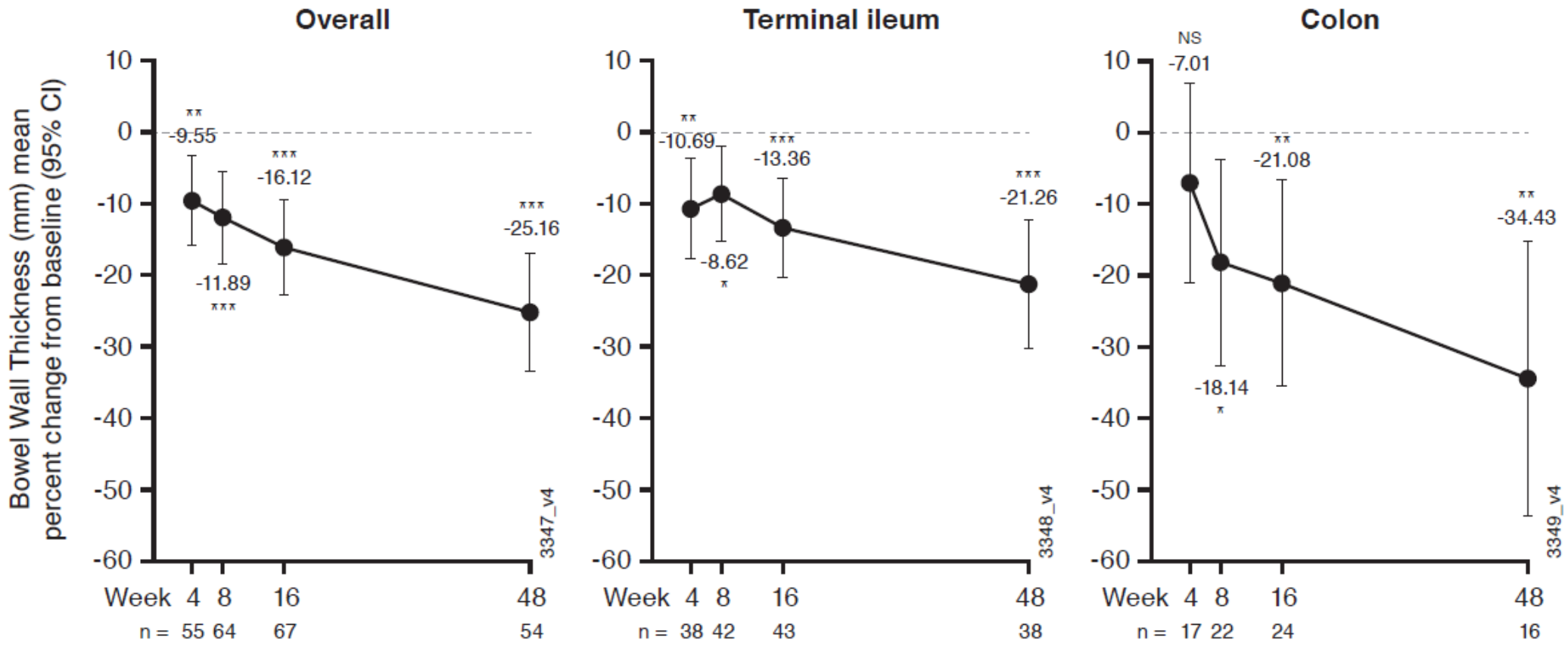
- BWT (cut-off at 3 mm)
- CDS
- i-fat

Goodsall et al. *JCC* 2021.

Novak et al. *JCC* 2021.

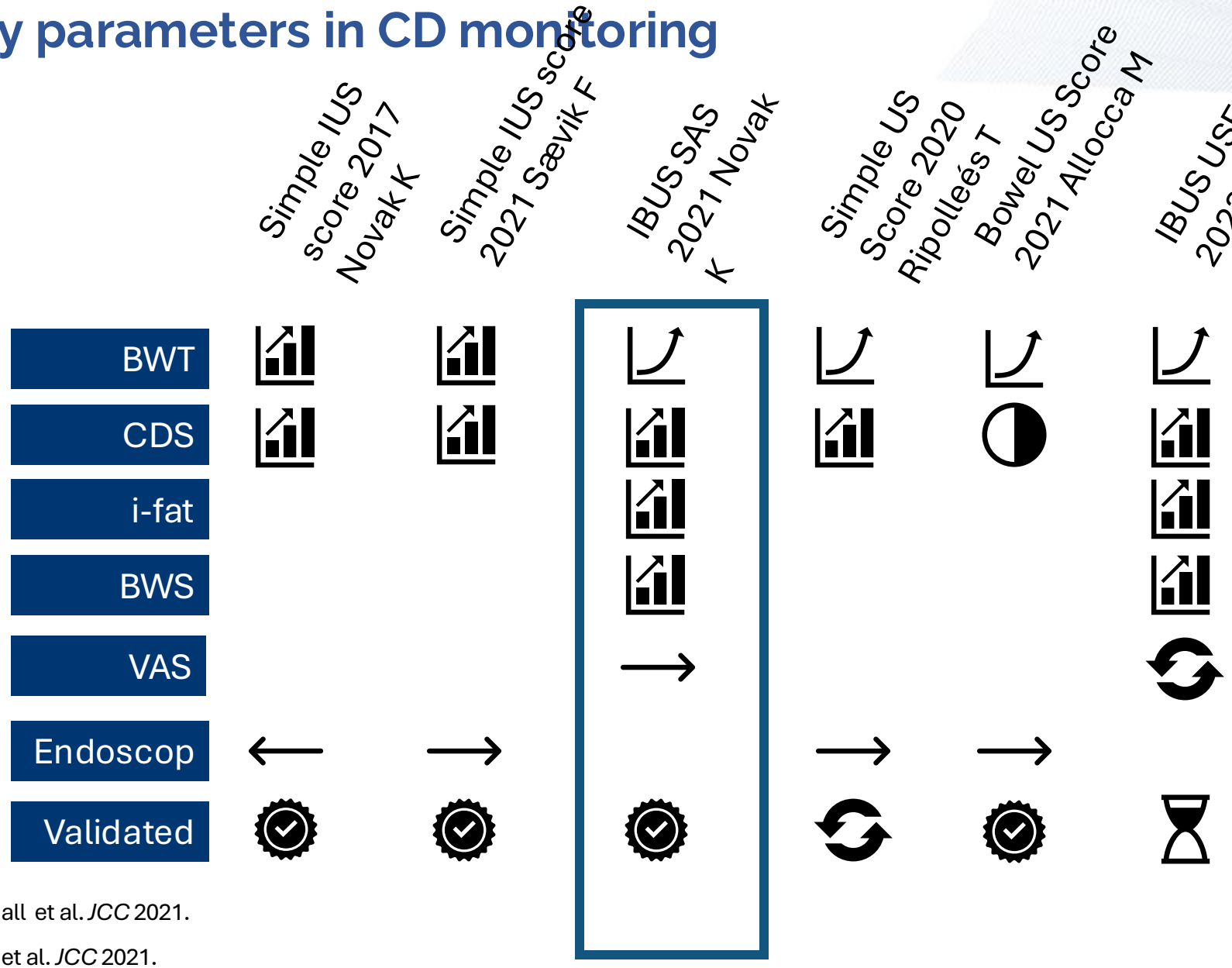
Courtesy Rune Wilkens

The responsiveness of BWT and CDS during treatment



Kucharzik Tet al. C *Clin Gastroenterol Hep 2022*.

Key parameters in CD monitoring



Criteria

- BWT (cut-off at 3 mm)
- CDS
- i-fat

Goodsall et al. *JCC* 2021.

Novak et al. *JCC* 2021.

Courtesy Rune Wilkens

IBUS-SAS

Table 2. Core activity parameters, Delphi grading consensus

	Normal	Uncertain	Activity	
BWT	≤3 mm	NA	>3 mm	
i-fat	0 = Absent	1 = Uncertain	2 = Present	
CDS	0 = Absent [none]	1 = Short signals	2 = Long signals inside bowel	3 = Long signals inside & outside bowel
BWS	0 = Normal	1 = Uncertain	2 = Focal [≤ 3 cm]	3 = Extensive [>3 cm]

BWT, bowel wall thickness; i-fat, inflammatory fat; CDS, colour Doppler signal; BWS, bowel wall stratification; NA, not applicable.

IBUS-SAS = BWT x 4 + i-fat x 15 + CDS x 7 + BWS x 4

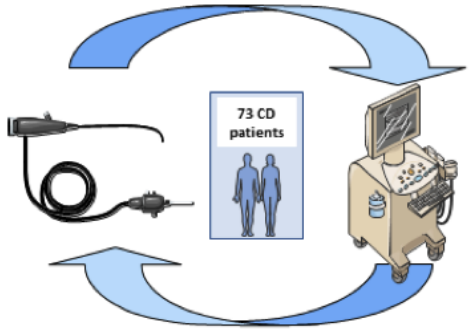
Novak et al. *JCC* 2021.

IBUS-SAS

Correlation of ultrasound scores with endoscopic activity in Crohn's disease: a prospective exploratory study

OBJECTIVE

To compare intestinal ultrasound scores (i.e., IBUS-SAS, BUSS, SUS-CD, and Simple-US) regarding their correlation with endoscopy.

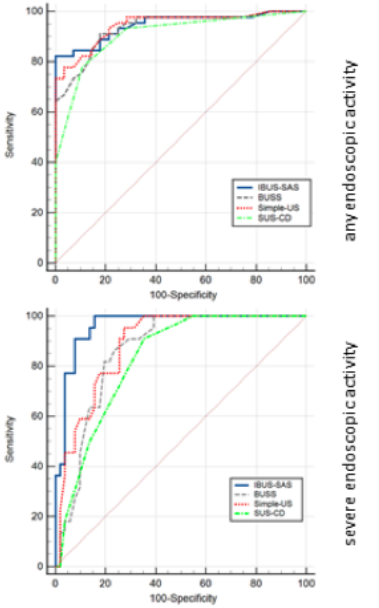


RESULTS

All scores showed significant positive correlation with endoscopy ($p<0.0001$), with IBUS-SAS ranking the highest ($\rho=0.87$). IBUS-SAS was also the most correlated with clinical activity ($\rho=0.58$).

ROC curve of IBUS-SAS for endoscopic activity showed the highest AUC (0.95 [95% CI 0.87-0.99], with sensitivity of 82.2% and specificity of 100% for a cut-off value of 25.2.

IBUS-SAS was statistically superior to all other scores to detect severe endoscopic activity.



CONCLUSION

IBUS-SAS outperformed the other scores and may be suggested in Centres with adequate experience in intestinal ultrasound.

JCC JOURNAL of CROHN'S and COLITIS

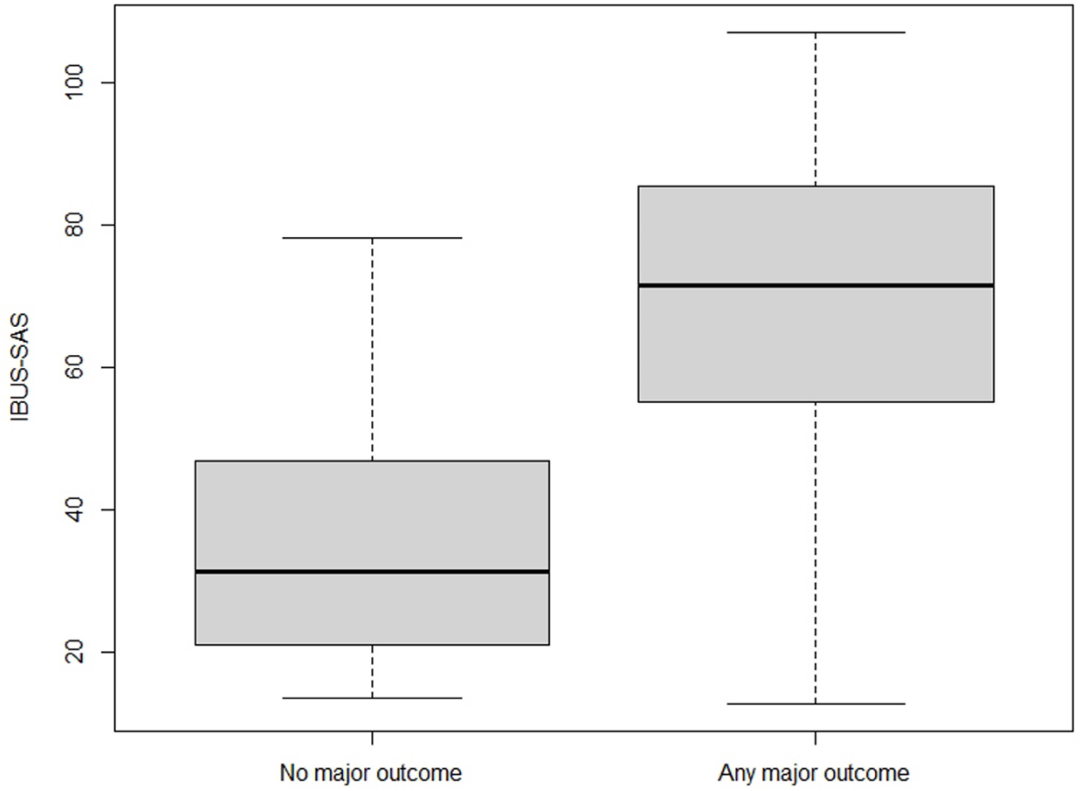
Dragoni et al. *JCC* 2023.

IBUS-SAS has a prognostic value !

IBUS-SAS (n=60) new onset IBD 51, BWT of 5.2 mm.

Δ-17.0 at 3 months (p=0.008).

Figure 1. Association between IUS score at diagnosis and major outcomes



Major outcomes: IBD related surgery, biologic therapy, or hospitalisation

Madsen GR et al. DOP10, *ECCO2022*

19y woman, refractory to adalimumab – vedolizumab - ustekinumab – JAK inhibitor

IBUS-SAS = 5.5 (BWT) x 4 + 2 (i-fat) x 15 + 1 (CDS) x 7 + 0 (BWS) x 4

IBUS-SAS = 59

19y woman, refractory to adalimumab – vedolizumab - ustekinumab – JAK inhibitor

IBUS-SAS
BWT (X.x)
CDS (0-3)
BWS (0-3)
i-FAT (0-2)

IBUS-SAS
BWT
Continuous
CDS
0 = 0
1 = short
2 = long
3 = outside
BWS
0 = normal
1 = uncertain
2 = focal
3 = long
i-FAT
0 = normal
1 = uncertain
2 = certain

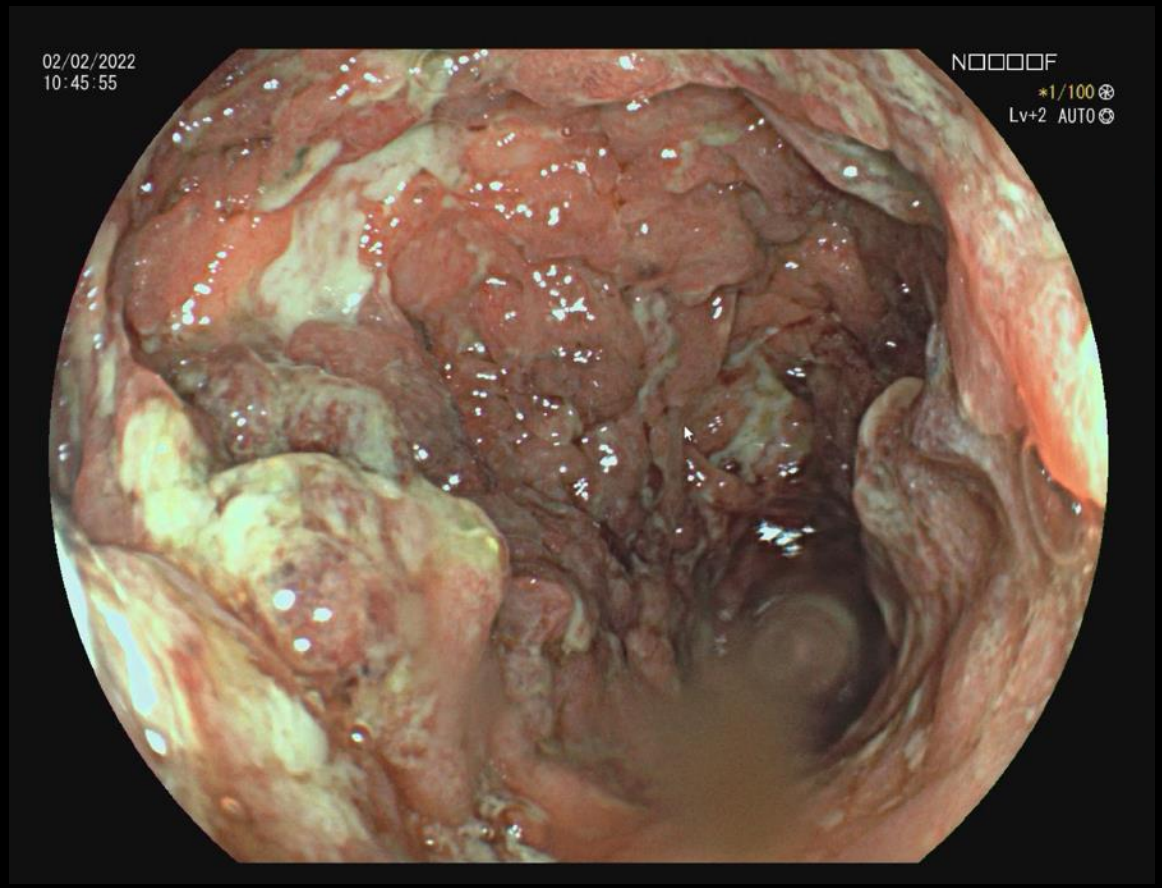
IBUS-SAS = 1.6 (BWT) x 4 + 0 (i-fat) x 15 + 0 (CDS) x 7 + 0 (BWS) x 4

IBUS-SAS = 6.4 < 25

Post induction infliximab combo with proactive TDM

IBUS-SAS
BWT (X.x)
CDS (0-3)
BWS (0-3)
i-FAT (0-2)

IBUS-SAS
BWT
Continuous
CDS
0 = 0
1 = short
2 = long
3 = outside
BWS
0 = normal
1 = uncertain
2 = focal
3 = long
i-FAT
0 = normal
1 = uncertain
2 = certain



20y man, hospitalised with new diagnosis colonic CD

IBUS-SAS = 6.3 (BWT) x 4 + 2 (i-fat) x 15 + 2 (CDS) x 7 + 2 (BWS) x 4

IBUS-SAS = 77.2

20y man, hospitalised with new diagnosis colonic CD

IBUS-SAS
BWT (X.x)
CDS (0-3)
BWS (0-3)
i-FAT (0-2)

IBUS-SAS
BWT
Continuous
CDS
0 = 0
1 = short
2 = long
3 = outside
BWS
0 = normal
1 = uncertain
2 = focal
3 = long
i-FAT
0 = normal
1 = uncertain
2 = certain

6 weeks after IFX rescue therapy

IBUS-SAS = 1.1 (BWT) x 4 + 0 (i-fat) x 15 + 0 (CDS) x 7 + 0 (BWS) x 4

IBUS-SAS = 4.4 < 25

6 weeks after IFX rescue therapy

IBUS-SAS
BWT (X.x)
CDS (0-3)
BWS (0-3)
i-FAT (0-2)

IBUS-SAS
BWT
Continuous
CDS
0 = 0
1 = short
2 = long
3 = outside
BWS
0 = normal
1 = uncertain
2 = focal
3 = long
i-FAT
0 = normal
1 = uncertain
2 = certain

How to implement IUS in CD disease monitoring

Crohn's Disease

Baseline assessment

Early response assessment within 12 weeks

Clinic (PRO) Biomarkers (CRP and/or fCalpro)

+

Cross sectional imaging (IUS or MRE)

Endoscopic evaluation within 12 months

Crohn's Disease

Assessment of subclinical inflammation every 6-12 months

Clinic (PRO) and Biomarkers (CRP and/or fCalprotectin) and/or Cross sectional imaging (IUS or MRE)

Endoscopy only if findings are discrepant and for considering treatment withdrawal

Kucharzik et al. ECCO-ESGAR-IBUS Guidelines 2025.

Conclusion

- **Ultrasound activity** scores play a **crucial role in standardised IBD monitoring**, also beyond clinical trials.
- **Bowel wall thickness** and **color Doppler signal** are **key parameters** that respond early to treatment and correlate with endoscopic outcomes in both **CD** and **UC**.
- **Early changes** in BWT are **predictive** for **long-term outcomes**.
- **Milan Ultrasound Criteria (MUC)** and **IBUS-SAS** providee a **validated scoring** system with prognostic value.
- Assess your patients in a **standardised manner**, and **report** (including images).