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IUS in pediatrics and pregnancy

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Kuwait City, Kuwait, November 21st – 22nd,2025

Disclosure

Intended Learning Outcome

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

Pediatrics

1. Explain the benefits and limitations of using intestinal ultrasound (IUS) in pediatric clinical practice.
2. Compare and contrast IUS inflammation cut-offs in pediatric versus adult populations.

Pregnancy

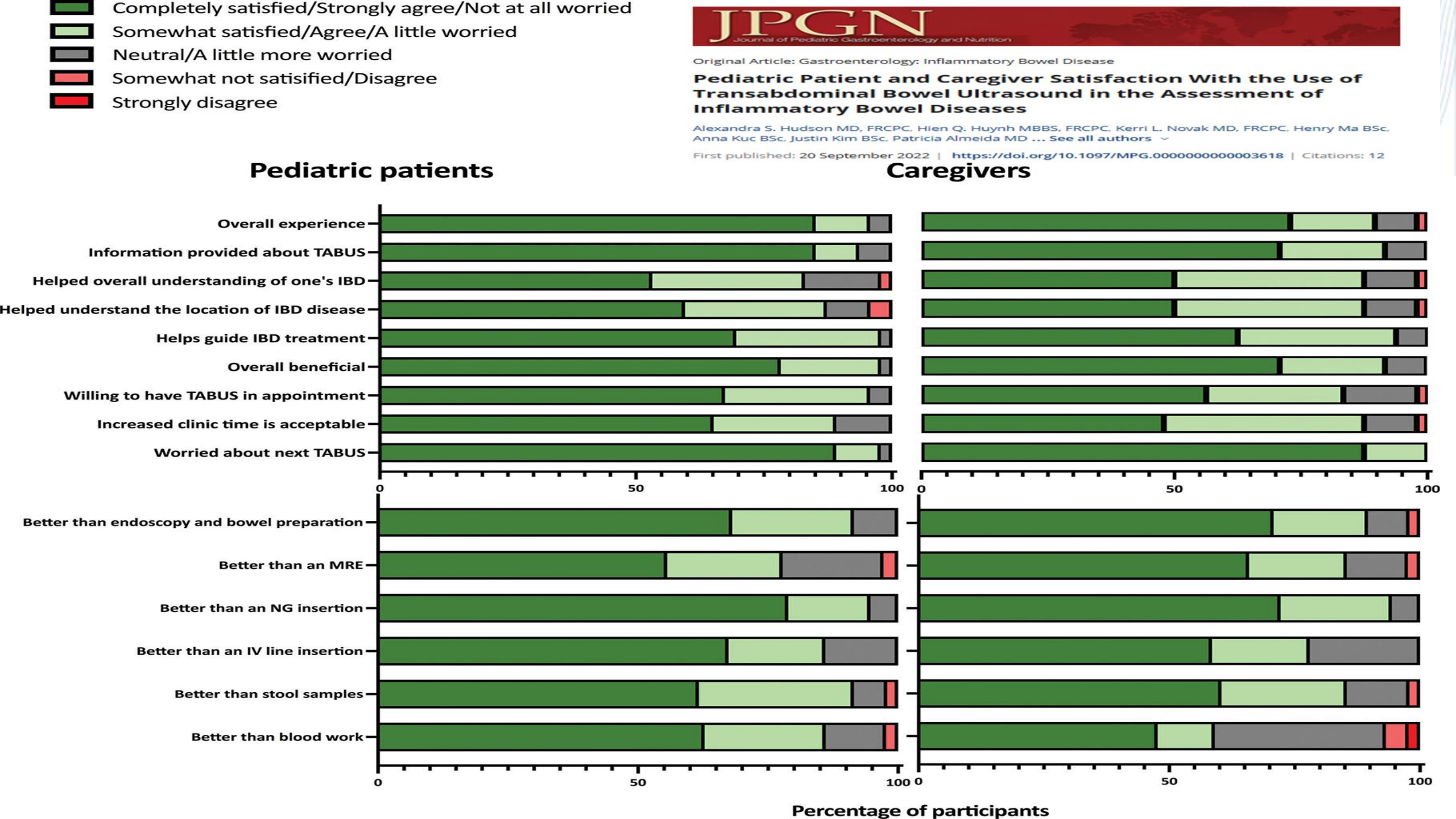
1. Discuss the anatomical challenges during pregnancy that impact the performance and interpretation of IUS.
2. Evaluate the effectiveness of IUS relative to standard care imaging modalities during pregnancy.

Intestinal USS in Paediatric IBD

- Same indications and utilization like in adult IBD
- Generally easier to perform due to smaller and less obese body habitus in pediatric IBD patients
- LineaR probe usually sufficient and rectum is visible in younger kids
- Non invasive – reduction of re-assessment endoscopies under GA
- Very good acceptability and satiscation by children and caregivers
- Patients with either Crohn disease or ulcerative colitis were both satisfied with TABUS, with it being particularly informative for those with severe IBD.
- Pediatric patients were not worried about potential TABUS findings, even in those with anxiety.

Intestinal USS in paediatric IBD

Advantages	Disadvantages
Can assess location of disease	Measurement of length of affected segment is less reliable than MRE
Can assess motility	Rectum not always visible
Can assess disease severity and complications	Learning curve
Can assess transmural healing	Operator dependency
Examination is noninvasive and radiation-free	Cutoff values and diagnostic accuracy are not yet established
Low costs	



JPGN
Journal of Pediatric Gastroenterology and Nutrition

Original Article: Gastroenterology: Inflammatory Bowel Disease

Pediatric Patient and Caregiver Satisfaction With the Use of Transabdominal Bowel Ultrasound in the Assessment of Inflammatory Bowel Diseases

Alexandra S. Hudson MD, FRCPC, Hien Q. Huynh MBBS, FRCPC, Kerri L. Novak MD, FRCPC, Henry Ma BSc, Anna Kuc BSc, Justin Kim BSc, Patricia Almeida MD ... See all authors

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IUS – what to use for/replacing endoscopy or MRE

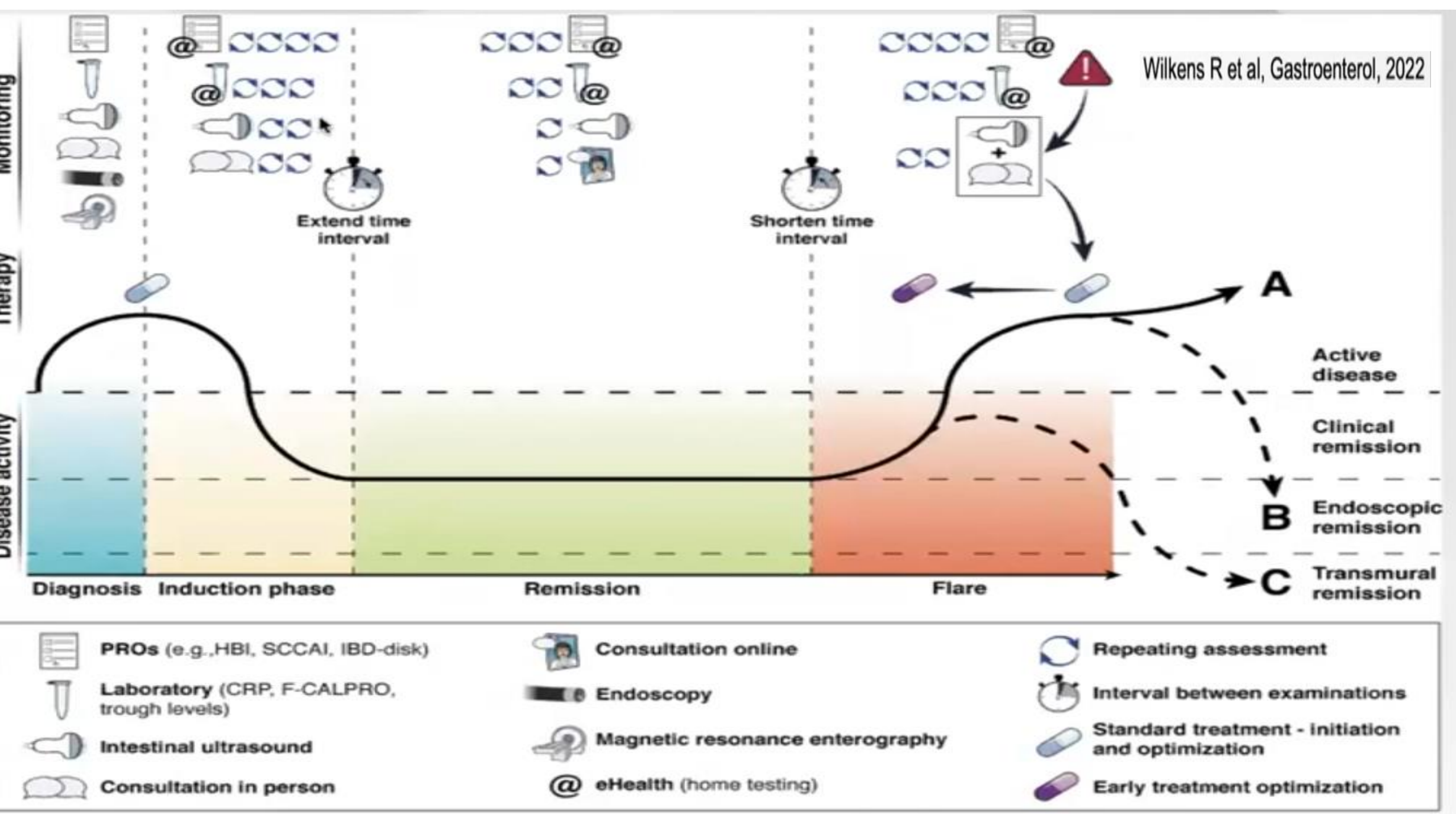
Diagnosis

- New Crohn's disease — ❌ NO
- Flare of established diagnosis — ✅ YES
- Complications — ✅ YES
  - Fibrosis vs inflammation — ❓ MAYBE
- Post-operative recurrence — ❓ MAYBE ✅ YES

Monitoring

- Response in ileo-colonic — ✅ YES
- Response in proximal SB — ❓ MAYBE ❌ NO
- Treat to target — ❓ MAYBE ✅ YES

Dysplasia surveillance — ❌ NO


Wilkens R et al, Gastroenterol, 2022
Monitoring
Therapy
Disease activity
Extend time interval
Shorten time interval
A
B
C
Active disease
Clinical remission
Endoscopic remission
Transmural remission
Diagnosis
Induction phase
Remission
Flare
PROs (e.g.,HBI, SCCAI, IBD-disk)
Laboratory (CRP, F-CALPRO, trough levels)
Intestinal ultrasound
Consultation in person
Consultation online
Endoscopy
Magnetic resonance enterography
eHealth (home testing)
Repeating assessment
Interval between examinations
Standard treatment - initiation and optimization
Early treatment optimization

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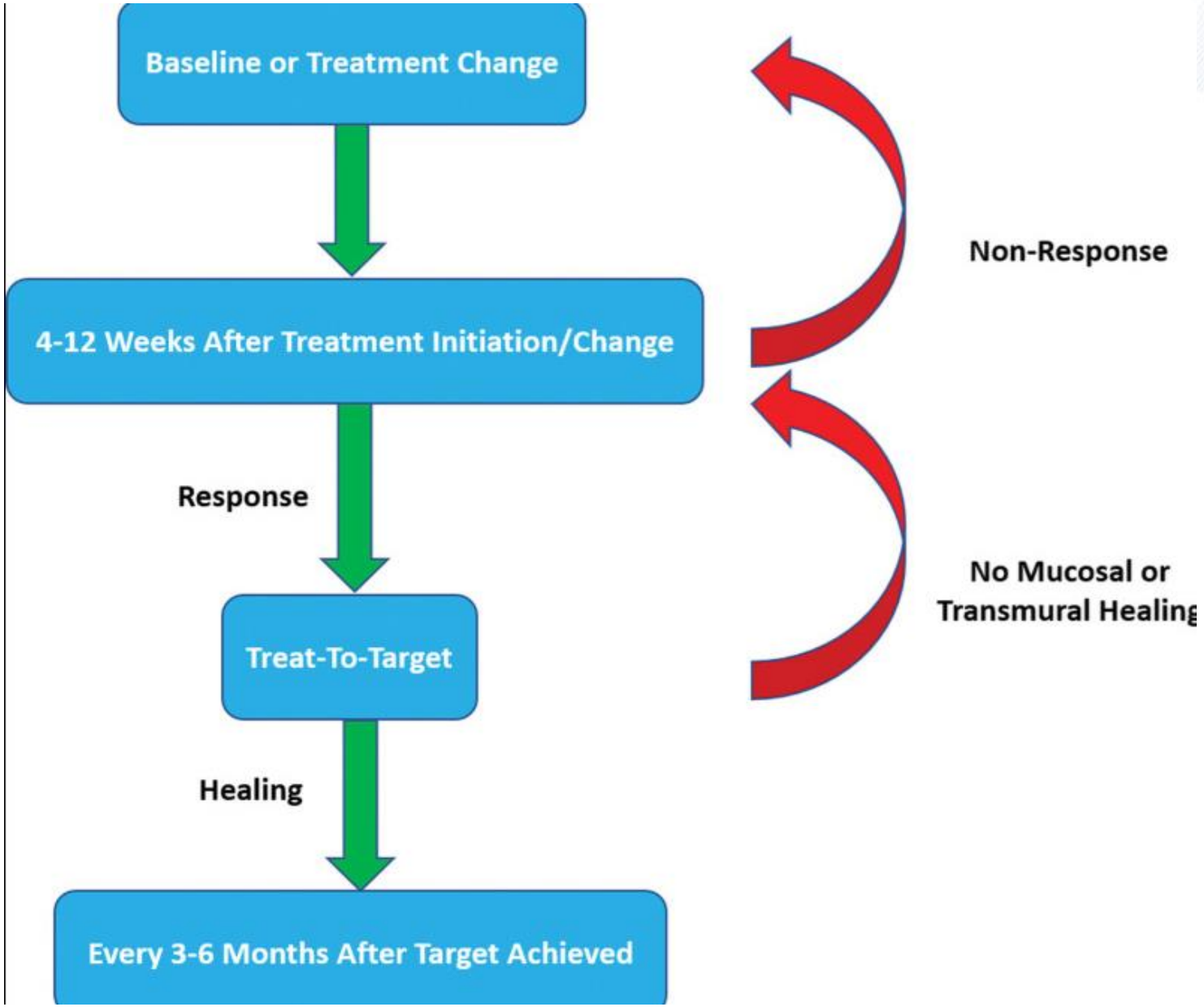

Intestinal Ultrasound for the Pediatric Gastroenterologist: A Guide for Inflammatory Bowel Disease Monitoring in Children

Expert Consensus on Behalf of the International Bowel Ultrasound Group (IBUS) Pediatric Committee

*Amelia Kellar, MD, MSc, *Michael Dolinger, MD, MBA, †Kerri L. Novak, MD, MSc, ‡Mallory Chavannes, MD, MHSc, *Marla Dubinsky, MD, and §Hien Huynh, MD

What Is Known

- Intestinal ultrasound (IUS) is an accurate, cross-sectional imaging tool used to monitor inflammation in inflammatory bowel disease.
- With comparable accuracy to computed tomography (CT) and magnetic resonance (MR), IUS is non-radiating, and applied at the bedside to facilitate real-time decision-making.

What Is New

- As IUS use is increasing, we provide a standardized approach and monitoring algorithm for use of pediatric bedside IUS to guide care.
- IUS is best performed at baseline to compliment endoscopy and during, or immediately after therapy induction. Monitoring every 3–6 months until treat-to-target colonoscopy is performed within 1 year is recommended.

Journal of Crohn's and Colitis, 2022, 523–543
https://doi.org/10.1093/ecco-jcc/jjab180
Advance Access publication October 10, 2021
ECCO Topical Review

ECCO Topical Review

ECCO-ESGAR Topical Review on Optimizing Reporting for Cross-Sectional Imaging in Inflammatory Bowel Disease

3.4.2. Transmural remission, definition, and timing of assessment in Crohn's disease

3.4.2.1. Transmural remission of the small and large bowel is defined by bowel wall thickness ≤3 mm with normal/0 colour Doppler signal. [InA. 0, Unc. 1, App. 17]

3.4.2.2. In some patients, sigmoid colon may contain an enlarged muscularis propria [outer hypoechoic layer typical in diverticular disease], allowing for bowel wall thickness up to 4 mm without resembling active inflammation. [InA. 3, Unc. 1, App. 13]

3.5.2. Transmural remission, definition, and timing of assessment in ulcerative colitis.

3.5.2.1. Transmural remission in ulcerative colitis of the large bowel is defined by bowel wall thickness ≤3 mm with normal/0 colour Doppler signal. [InA. 0, Unc. 1, App. 17]

3.5.2.2. In some patients, sigmoid colon may contain an enlarged muscularis propria [outer hypoechoic layer—typical in diverticular disease], allowing for bowel wall thickness up to 4 mm without resembling active inflammation. [InA. 3, Unc. 1, App. 13]

3.6. Adults vs. paediatric population

3.6.1.	The remission/response statements for Crohn's disease may be used in both adult and paediatric populations. [InA. 2, Unc. 1, App. 14]
3.6.2.	The remission/response statements for ulcerative colitis may be used in both adult and paediatric populations. [InA. 2, Unc. 2, App. 12]

There was only one paediatrician involved in our RAND/UCLA process. However, based on the limited available evidence from paediatric studies presented throughout this article [Supplementary Table 3],[56,59,61,88,92,93] we find that our recommendations may be used in both populations. Future studies are needed to validate or refute this assumption.

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JPGN Journal of Pediatric Gastroenterology and Nutrition

Assessing Disease Activity in Pediatric Crohn's Disease Using Ultrasound

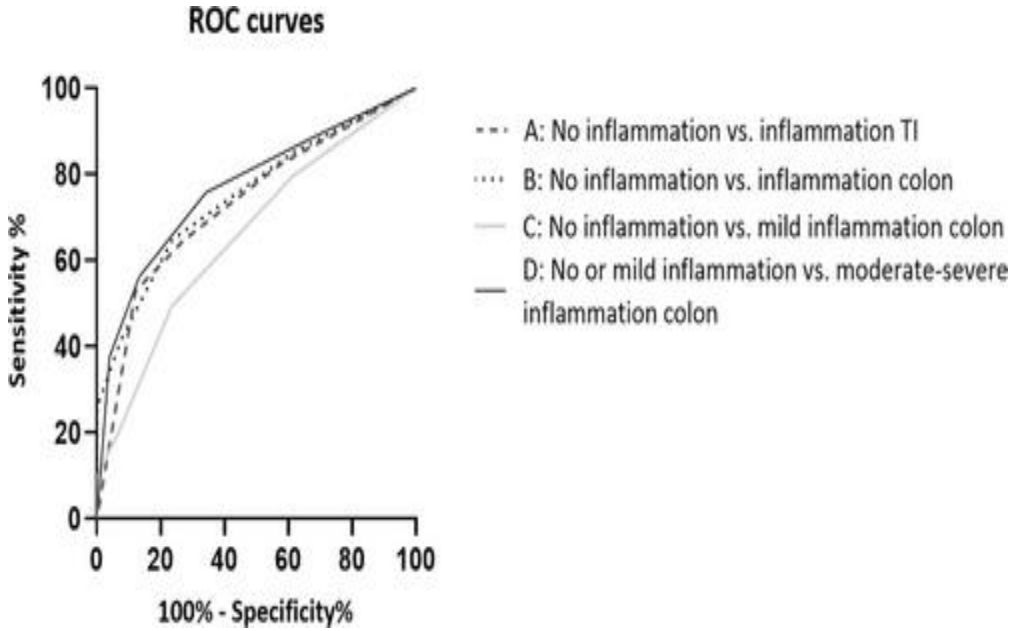
The Pediatric Crohn Disease Intestinal Ultrasound Score

Elsa A. van Wassenaer MD, PhD, Rick R. van Rijn MD, PhD, Floris A.E. de Voogd MD, PhD, Joost van Schuppen MD, Angelika Kindermann MD, PhD, Tim G.J. de Meij MD, PhD ... See all authors

First published: 07 February 2023 | https://doi.org/10.1097/MPG.0000000000003727 | Citations: 14

TI		Colon:	
BWT 2.0–3.0 mm:	1 point	BWT 1.6–2.0:	1 points
BWT 3.0–3.7 mm:	2 points	BWT 2.0–2.7 mm:	2 points
BWT >3.7 mm:	3 points	BWT >2.7 mm:	3 points
		Mesenteric fat infiltration:	1 point

PCD-US score of ≥3 points, that is, colonic BWT > 2.0 mm combined with fat infiltration, or a BWT > 3.7 or >2.7 mm for TI and colon respectively, had a high probability of endoscopic disease activity (specificity 88% and 92%, positive LR: 4.37 and 5.50 for TI and colon, respectively).



7 included studies

Reported ULN 1.9mm

<5 years even thinner BWT

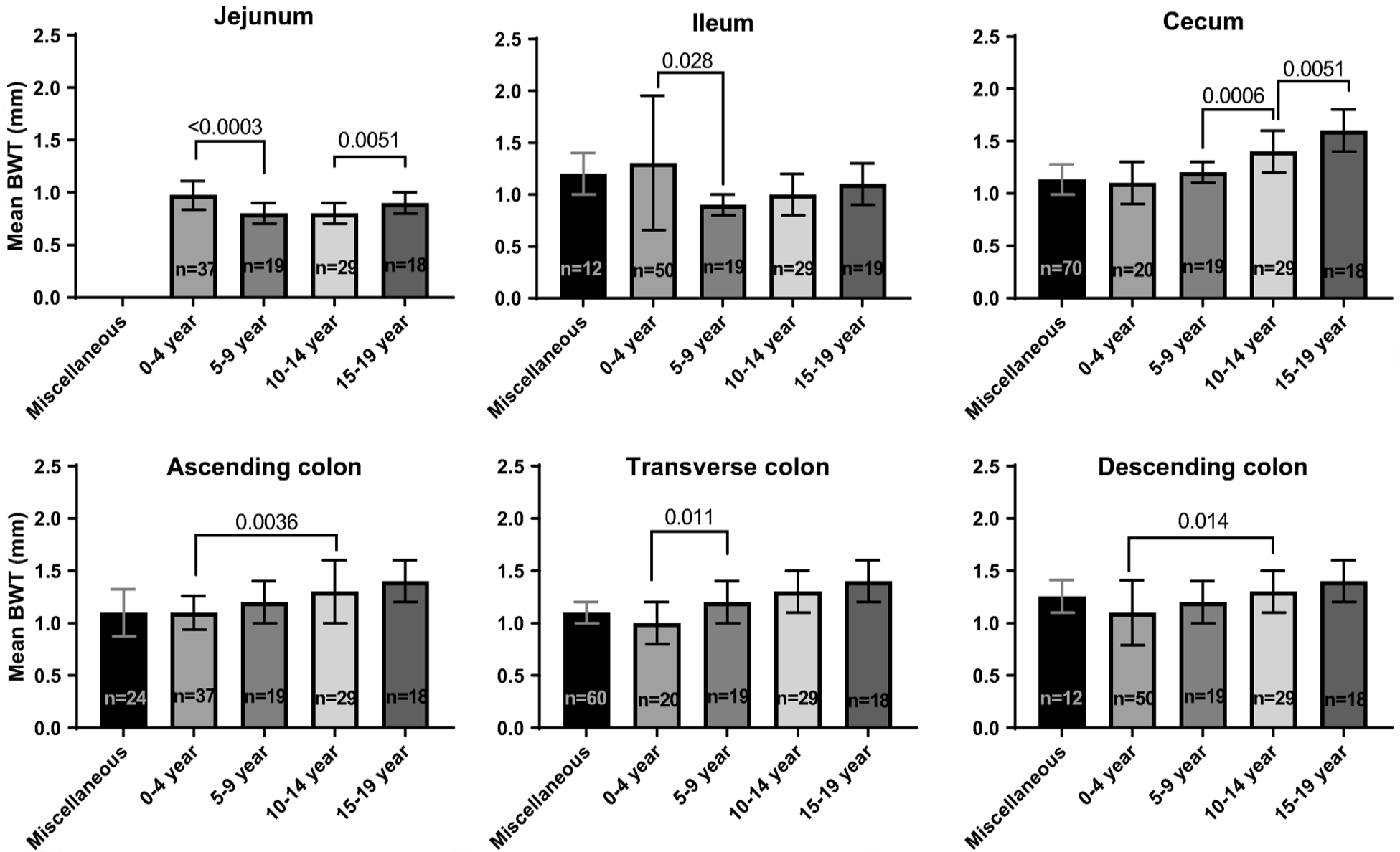


Fig. 2 Mean bowel wall thickness (BWT) in millimeters (mm) per age category, displayed per segment. Differences were tested with analysis of variance and subsequently with Student's *t*-tests for independent samples. *P*-values were corrected for multiple testing with the Bonferroni method. Miscellaneous: age range 3–18 years

Wassenaer et al 2019 Pediatr. Radiol.

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Do children with IBD in sustained deep remission have the same bowel wall thickness as adults?

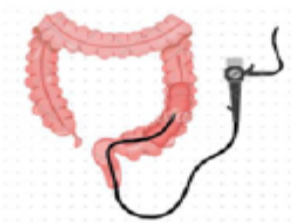
Background

- Remission values for bowel wall thickness (BWT) on intestinal ultrasound (IUS) for children with IBD are extrapolated from adults
- We evaluated BWT on IUS in children with IBD in sustained deep remission

Cohort and Design

- Cross-sectional study of children with IBD

Clinical Remission = Normal



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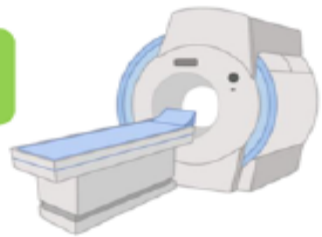


Outcome of Interest

- **Segmental BWT**
- **Effect of patient and disease characteristics**

Results

- Normal BWT in children with IBD in deep remission is less than adults
- BWT is unaffected by age, sex, and bowel segment

Kellar, et al. Defining normal bowel wall thickness in children with inflammatory bowel disease in deep remission: A multicenter study on behalf of the pediatric committee of the International Bowel Ultrasound Group (IBUS). J Pediatr Gastroenterol Nutr. (2025)

JPGN Journal of Pediatric Gastroenterology and Nutrition

Baseline Patient Demographics

Subjects	N (%), or median [IQR]
Female	40 (40.8)
Age (years)	15.2 [13.8-16.8]
Height (cm)	164.8 [157.0-172.7]
Weight (Kg)	56.6 [46.4-66.4]
Disease duration at time of IUS (years)	2.6 [1.2-4.3]
CD:UC:IBD-U	64 (65.3): 29 (29.6): 5(5.1)
CD Lower gastrointestinal involvement (n=64)	
L1: Ileal	29 (47)
L2: Colonic	8 (14)
L3: Ileocolonic	27 (39)
UC/IBD-U Disease Location (n=34)	
E1: Ulcerative Proctitis	0 (0)
E2: Left-sided Colitis	6 (17.6)
E3: Extensive Colitis	7 (20.6)
E4: Pancolitis	21 (61.8)

Defining normal bowel wall thickness in children with inflammatory bowel disease in deep remission: A multicenter study on behalf of the pediatric committee of the International Bowel Ultrasound Group (IBUS)

Amelia Kellar, Mallory Chavannes, Hien Q. Huynh, Illya Aronskyy, Bryan Lei, Jennifer C. deBruyn, Justin Kim, Michael T. Dolinger

First published: 29 April 2025 | https://doi.org/10.1002/jpn3.70049 | Citations: 4

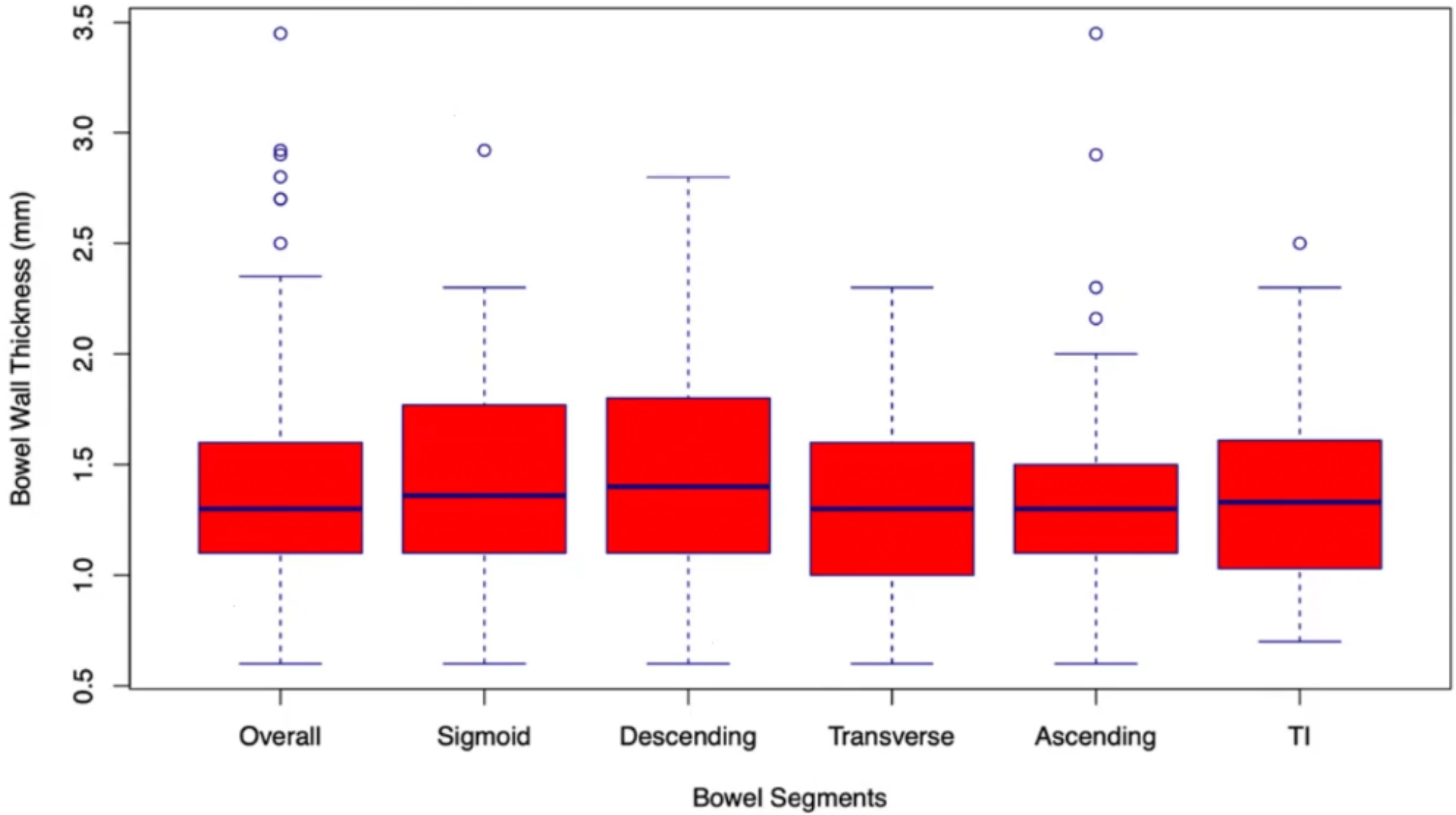
What is Known

- Intestinal ultrasound IUS) is a noninvasive, patient-centric tool for monitoring disease activity in children with inflammatory bowel disease (IBD).
- Bowel wall thickness (BWT) is the most important parameter for assessing IBD activity.

What is New

- Previously inflamed BWT for children with IBD in sustained deep remission is less than 3 mm seen in adults, and unaffected by age, sex, and bowel segment in this population.
- BWT may be affected by weight and disease duration.
- These findings are crucial to the standardized assessment of transmural healing in children.

Segmental bowel wall thickness



Univariate associations between bowel wall thickness (BWT) and clinical parameters, unadjusted and adjusted for colonic segments as a fixed effect.

Parameter	Unadjusted beta co efficient [95% CI]	P-value	Adjusted beta co-efficient [95% CI]	P -value
Age (years)	**0.023 (0.001 – 0.045)**	**0.039**	**0.023 (0.001 – 0.045)**	**0.039**
Sex (male reference)	-0.005 (-0.120 – 0.110)	0.929	-0.005 (-0.120 – 0.110)	0.936
Height (cm)	0.003 (-0.001 – 0.007)	0.127	0.003 (-0.001 – 0.007)	0.130
Weight (kg)	**0.004 (0.001 – 0.008)**	**0.014**	**0.004 (0.001 – 0.007)**	**0.016**
Disease Duration (months)	**-0.024 (-0.047 – -0.001)**	**0.046**	**-0.024 (-0.047 – 0.001)**	**0.046**
Diagnosis of UC (CD reference)	-0.120 (-0.243 – 0.002)	0.059	-0.120 (-0.243 – 0.002)	0.059
Diagnosis of IBDU	-0.133 (-0.387 – 0.121)	0.309	-0.133 (-0.387 – 0.121)	0.310

Comparison between segmental of wall thickness in previously inflamed segments and uninvolved bowel segments

Bowel Segments (n=322)	Previously inflamed Segments Median BWT (IQR)	Uninvolved Segments Median BWT (IQR)	P-value
All segments (mm)	1.35 (1.10-1.60)	1.30 (1.01-1.60)	0.625
Terminal Ileum (mm)	**1.45 (1.28-1.85)**	**1.13 (1.00-1.42)**	**0.003**
Ascending Colon (mm)	1.35 (1.1-1.50)	1.30 (1.10-1.50)	0.682
Transverse Colon (mm)	1.21 (1.00-1.68)	1.35 (1.03-1.60)	0.810
Descending Colon (mm)	1.31 (1.11-1.56)	1.60 (1.10-1.90)	0.053
Sigmoid Colon (mm)	1.30 (1.03-1.49)	1.40 (1.10-1.77)	0.605

- Median BWT was 1.4mm [1.1-1.6] with no differences in bowel segments
- BWT is affected weight and duration of disease
- Previously inflamed BWT for children with IBD in sustained deep remission is less than 3mm in adults
- It is not designed to determine the best cut-off for predicting abnormality

In multivariate analysis (mixed-effect model)

- A significant positive association remained between BWT and weight [adjusted β=0.006 (95% CI 0.001-0.011), p=0.038]
- A significant negative association between BWT and disease duration [adjusted β=-0.028 (95% CI -0.052- -0.003), p=0.038].

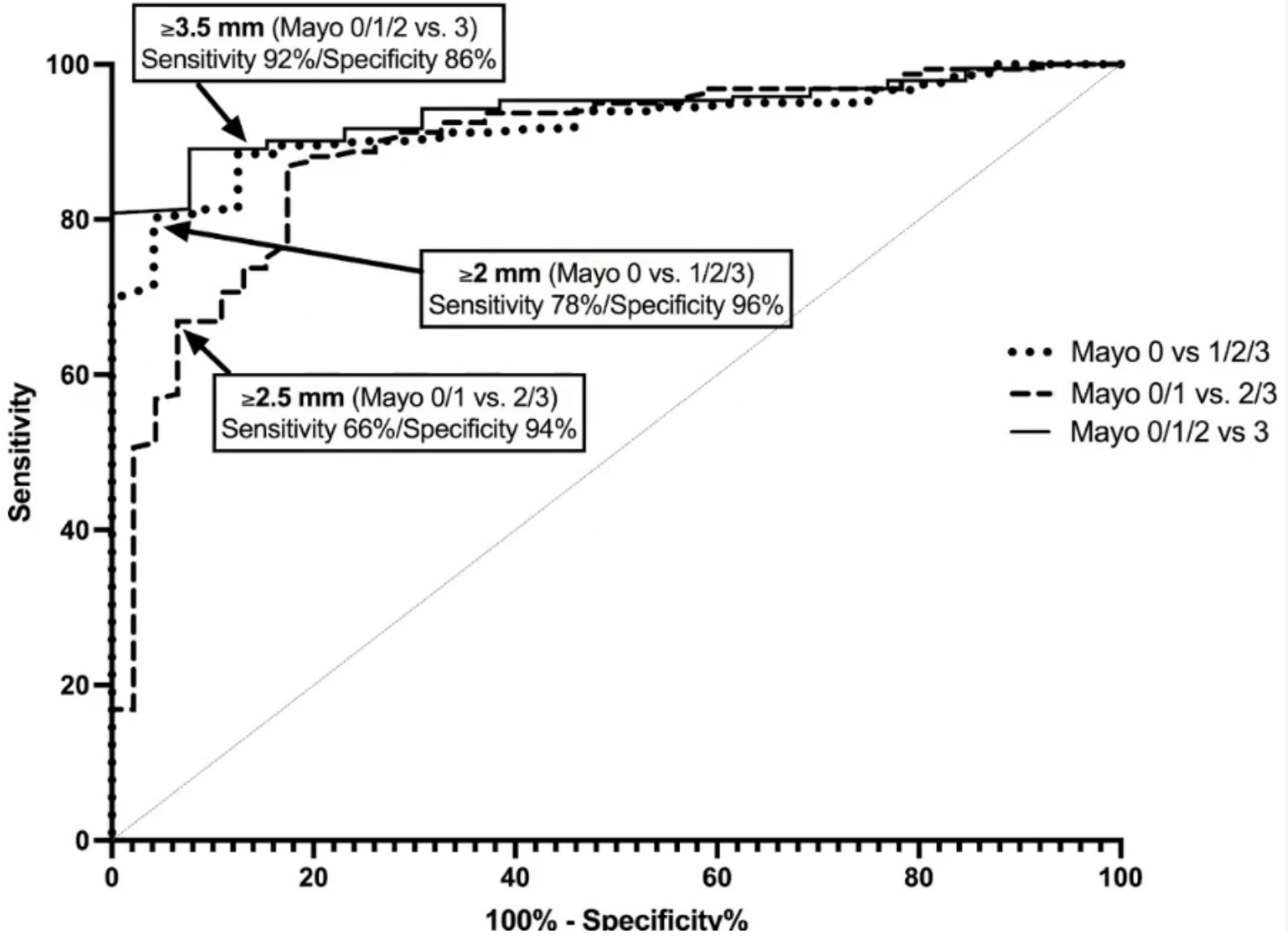
Four intestinal ultrasound scores and bowel wall thickness alone correlated well with pediatric ulcerative colitis disease activity

Alexandra S. Hudson, Daniela M. Isaac, Henry Ma, Christine Lo, Justin Kim, Anna Kuc, Kerri L. Novak, Matthew W. Carroll, Eytan Wine, Hien Q. Huynh

JPGN Journal of Pediatric Gastroenterology and Nutrition

ORIGINAL ARTICLE | Open Access

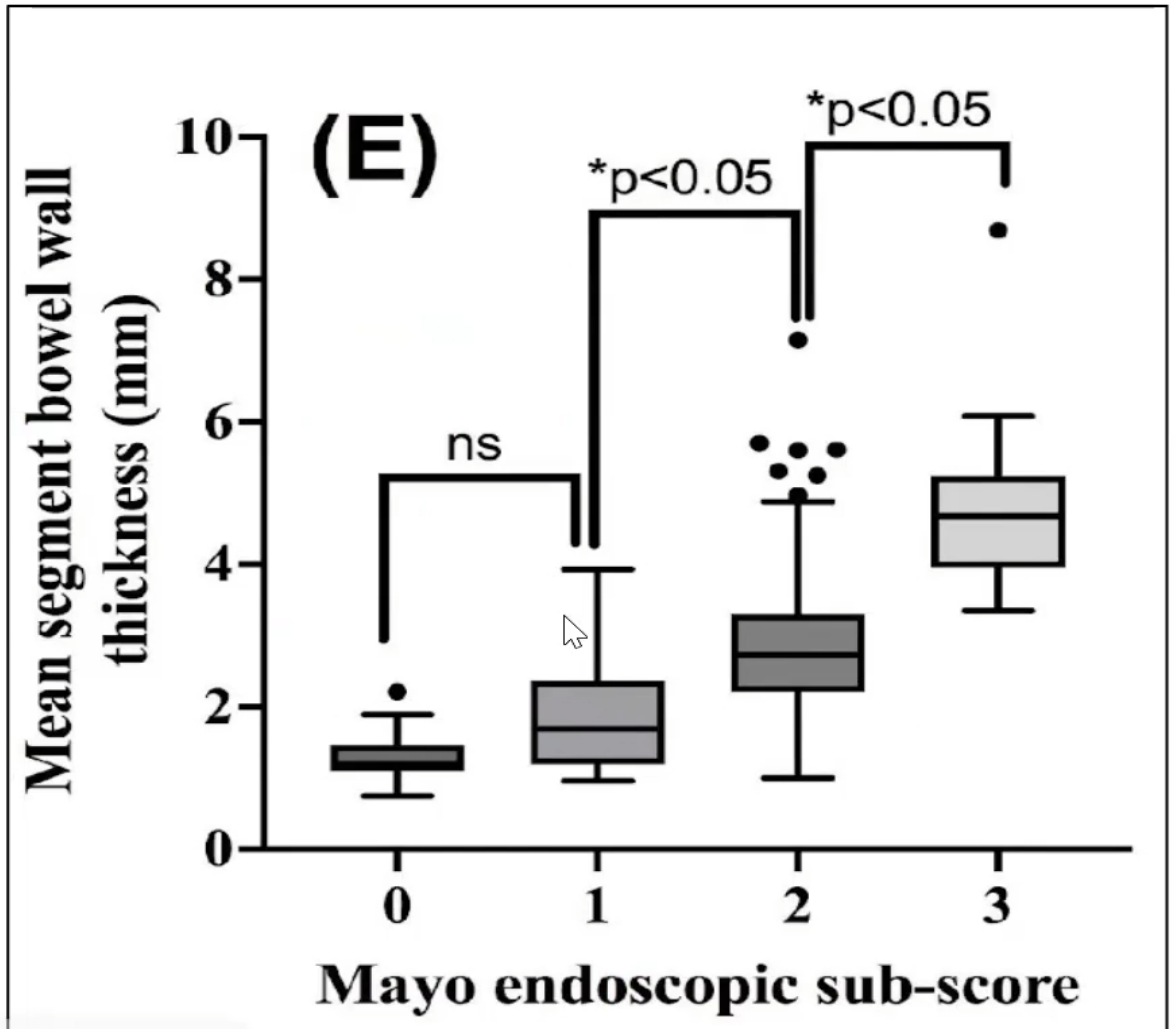
- Prospective enrolment
- **52 pediatric new UC (206 colon segments)**
- IUS (BWT and 4 scores) **correlated**:
  - Best with endoscopy
  - Then with symptoms (PUCAI), CRP, albumin
  - Weakest with ESR and Fcal
- Patients needing hospital admission had worse IUS

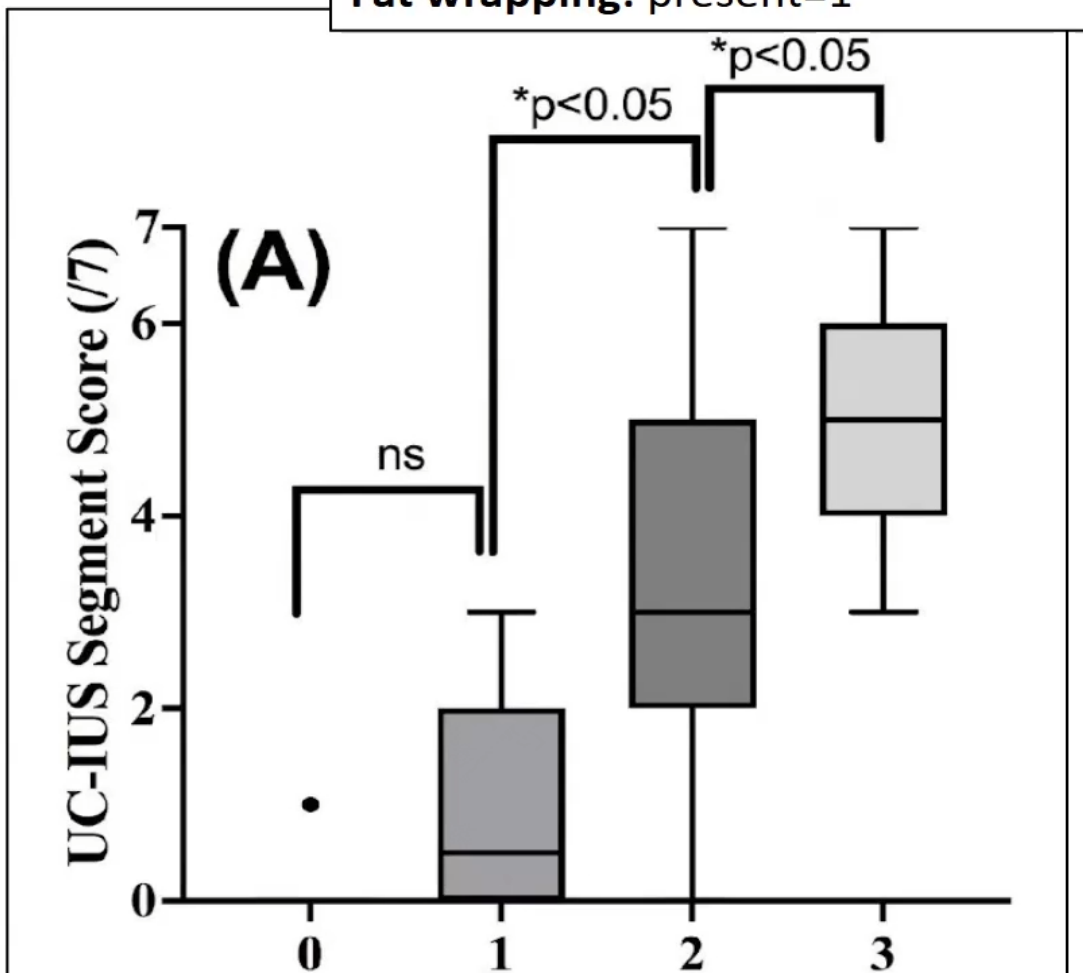


First published: 28 August 2024 | https://doi.org/10.1002/jpn3.12

Pediatric UC

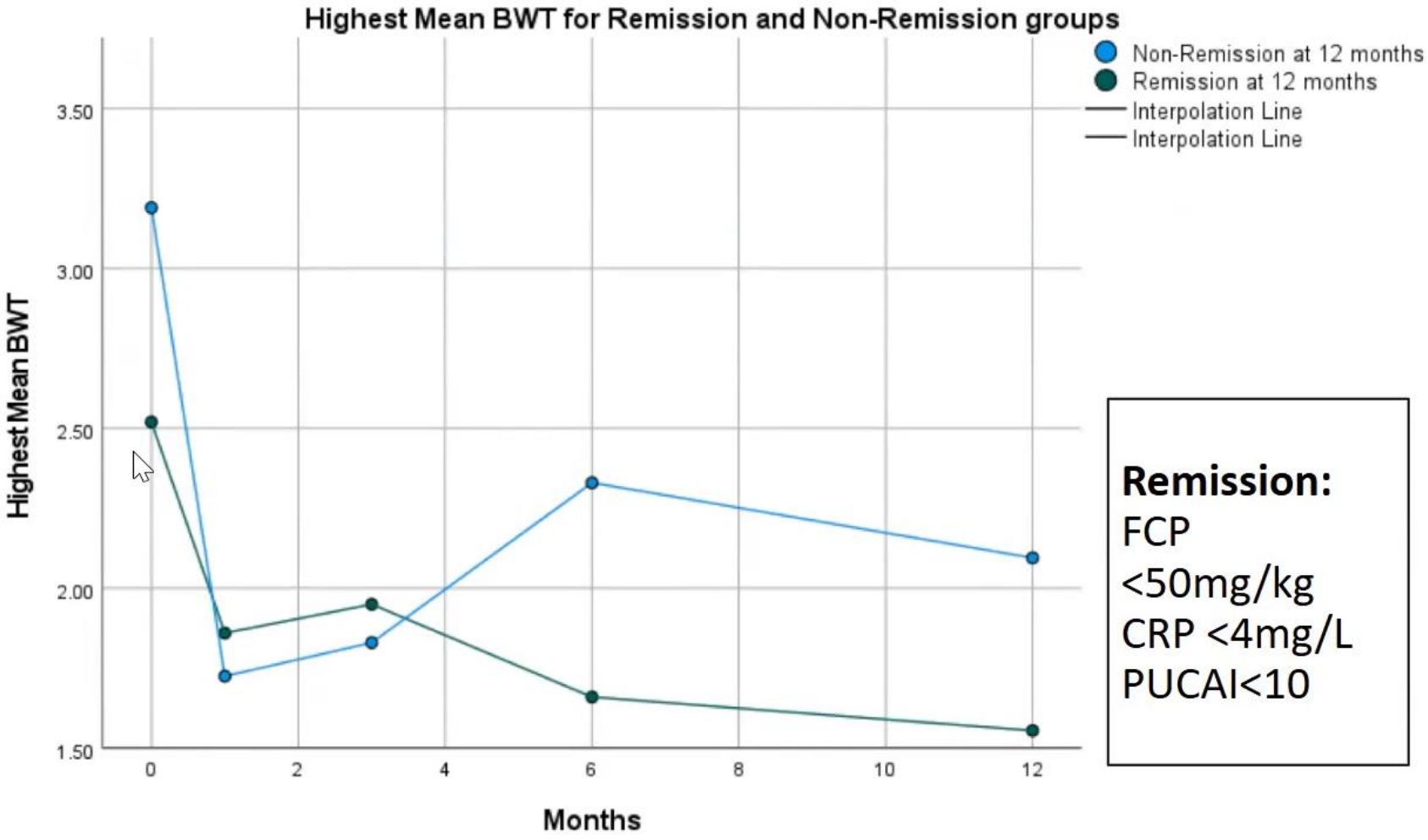
UC-IUS score:
BWT: >2mm=1, >3mm=2, >4mm=3
Doppler signal: spots=1, stretches=2
Haustrations: abnormal=1
Fat wrapping: present=1





Pediatric UC Over Time

- Prospective enrolment
- **42 patients (168 colon segments)**
- IUS (BWT and UC-IUS score) **correlated over 1 year**:
  - PUCAI
  - Biochemical markers
  - Endoscopy
- Biggest decrease in BWT **during the first month** (average 40% decrease)



Remission:
FCP <50mg/kg
CRP <4mg/L
PUCAI<10

IBUS Webinar 1/2025 Hudson et al ***Manuscript in progress***

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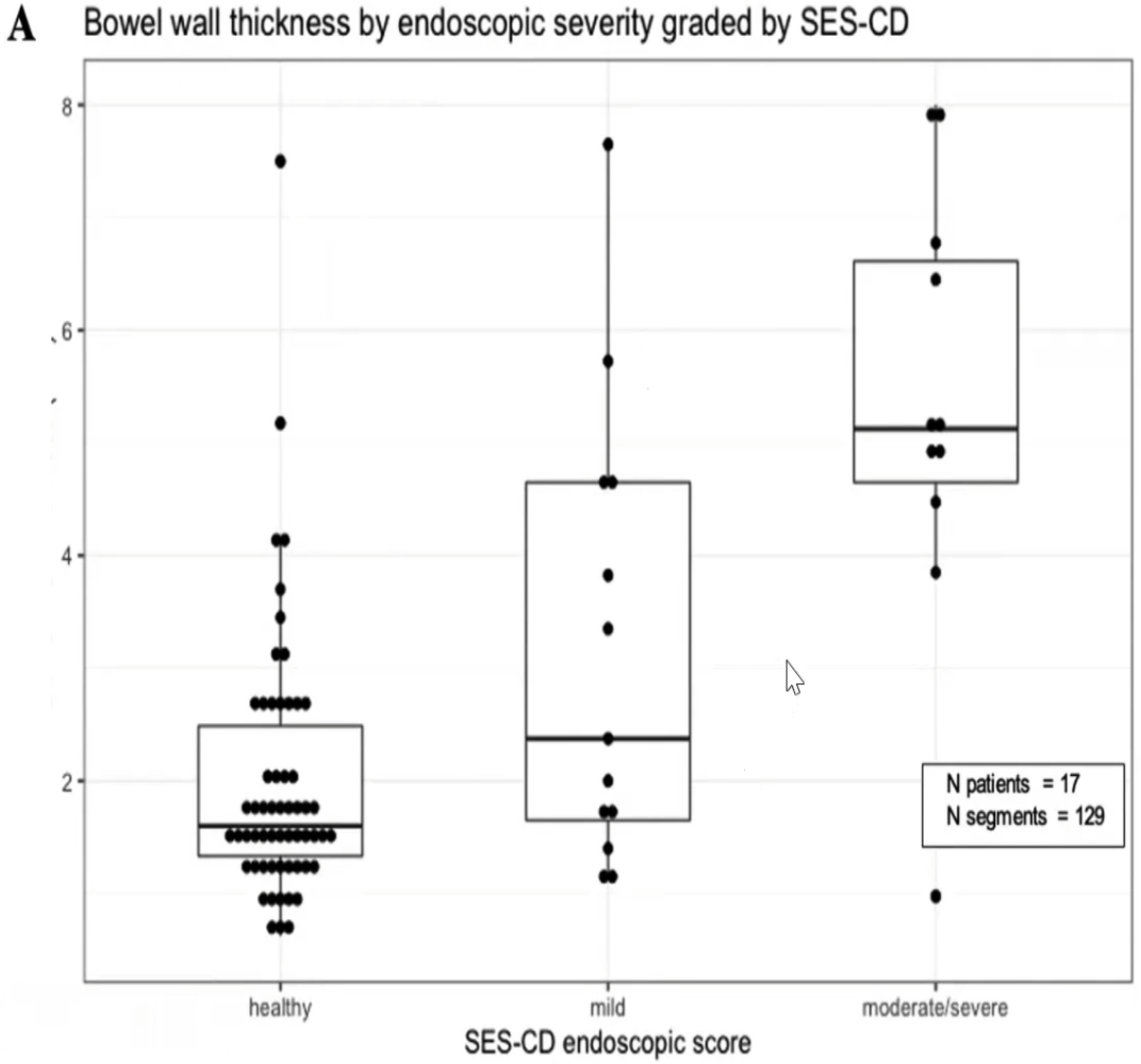
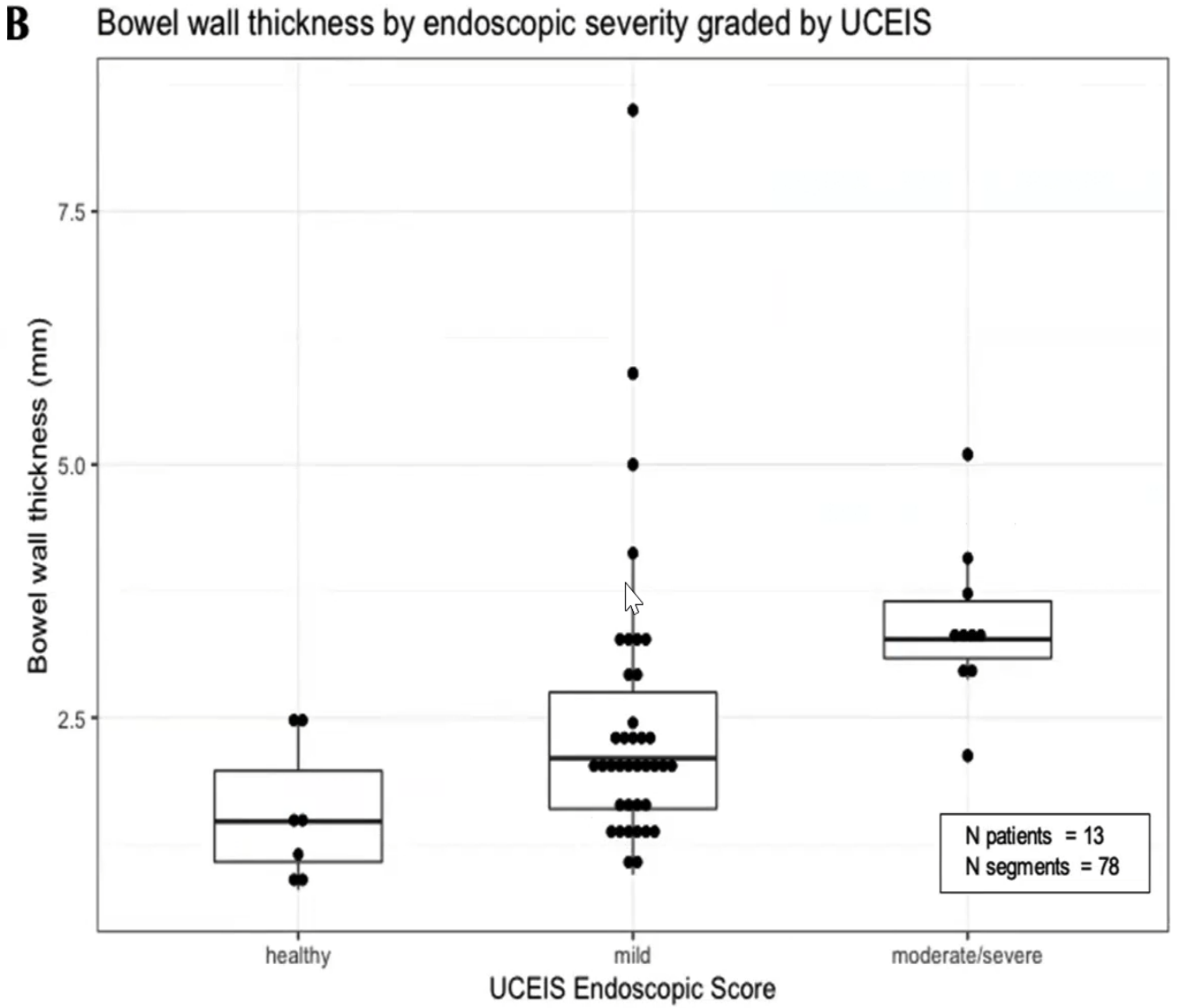
Bedside Intestinal Ultrasound Predicts Disease Severity and the Disease Distribution of Pediatric Patients With Inflammatory Bowel Disease: A Pilot Cross-sectional Study

Mallory Chavannes, MD, MHSc,[*] Lara Hart, MD, MSc,[†] Panteha Hayati Rezvan, PhD,[‡] Jonathan R. Dillman, MD, MS, MSc,[§] and D. Brent Polk, MD[¶]

Inflam Bowl Diseases 2024





Pediatric Crohn's The TI

Simplification Model into PCD-US Score

Based on the results of the multivariate regression analyses, a point-based index was made. The points assigned to each variable (ie, the calculation of the PCD-US score) are as follows:

TI	
BWT 2.0–3.0 mm:	1 point
BWT 3.0–3.7 mm:	2 points
BWT >3.7 mm:	3 points

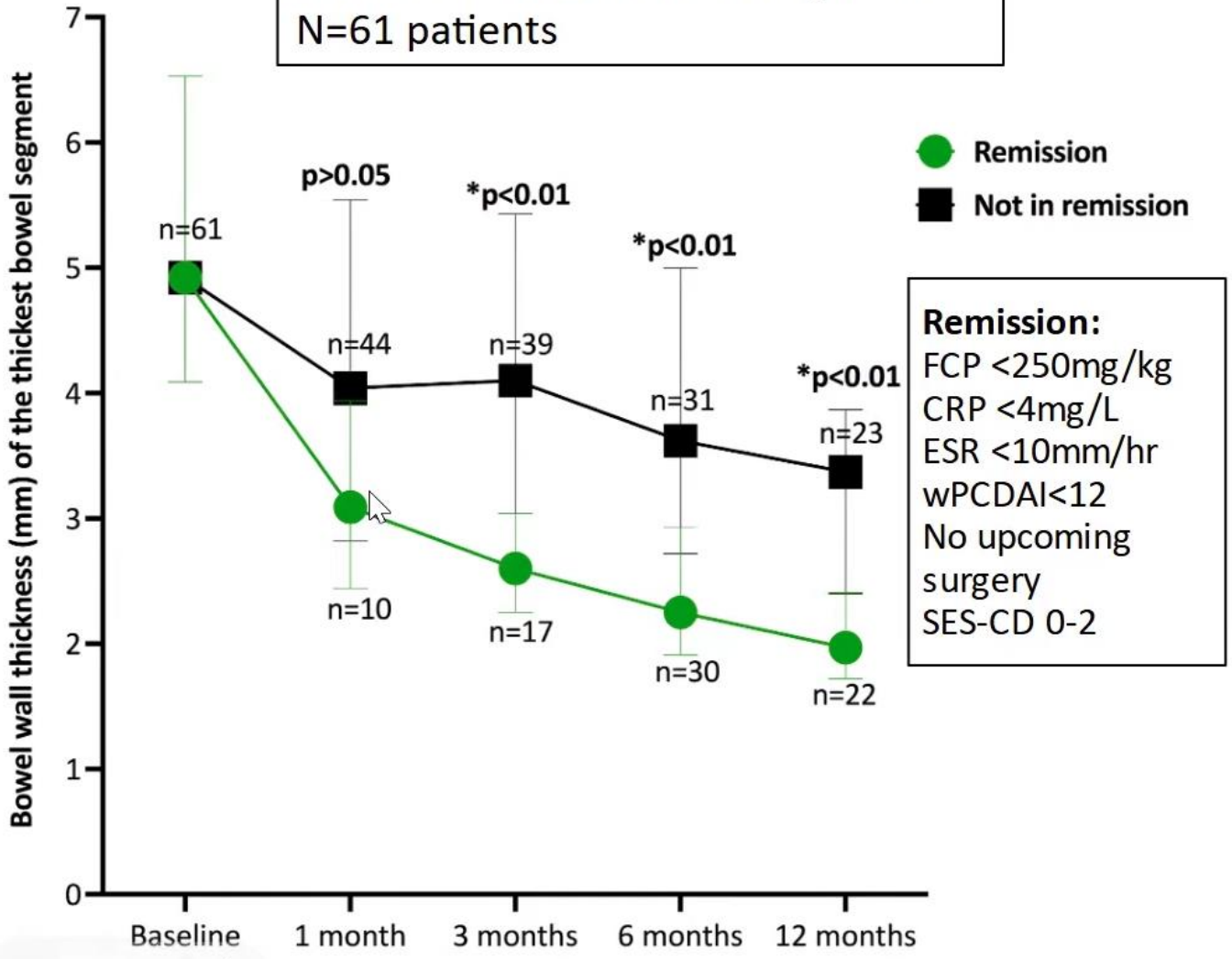
TABLE 3A. Testing characteristics of PCD-US score for endoscopic disease activity in TI

	Sensitivity (95% CI)	Specificity (95% CI)
No inflammation versus inflammation		
≥1 point	82 (65–93)%	42 (25–61%)
≥2 points	65 (47–80)%	73 (54–87)%
3 points	53 (35–70)%	88 (72–97)%

74 patients
Wassenaer et al 2023 JPGN

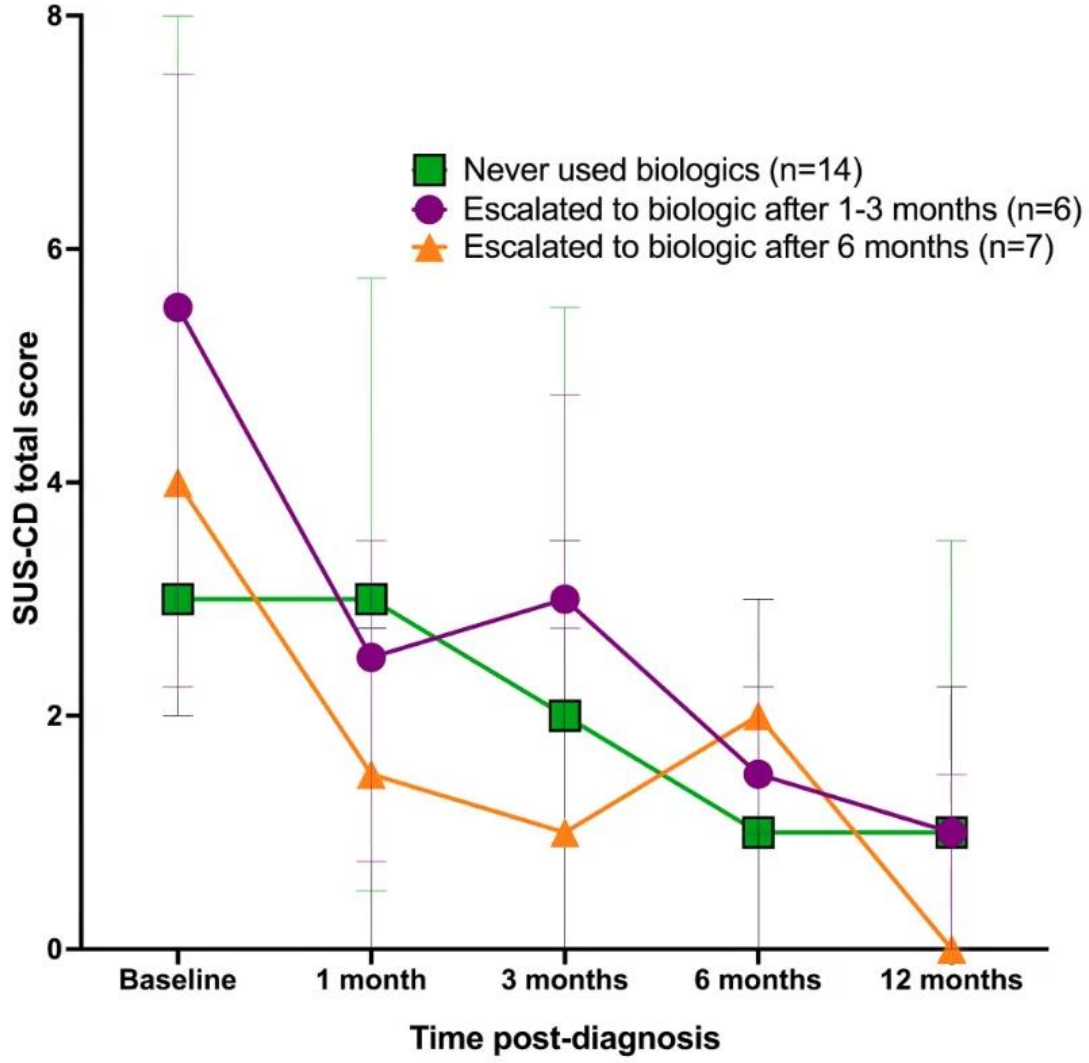
Pediatric Crohn's over time

BWT of the most severe segment
N=61 patients



Remission:
FCP <250mg/kg
CRP <4mg/L
ESR <10mm/hr
wPCDAI<12
No upcoming surgery
SES-CD 0-2

SUS-CD Score of most severe segment
BWT 1 (≥3mm), 2 (≥5mm), 3 (≥8mm)
Hyperemia 1 (2-5 vessels/cm^2), 2 (>5 vessels/cm^2)



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IBUS Webinar 1/2025 Hudson et al ***Manuscript in progress***

Integrating scientific knowledge for global equity

7th WORLD CONGRESS
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WCPGHAN 2024
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AUTOMATIC PEDIATRIC IBD ASSESSMENT IN INTESTINAL ULTRASOUND IMAGES USING MACHINE LEARNING

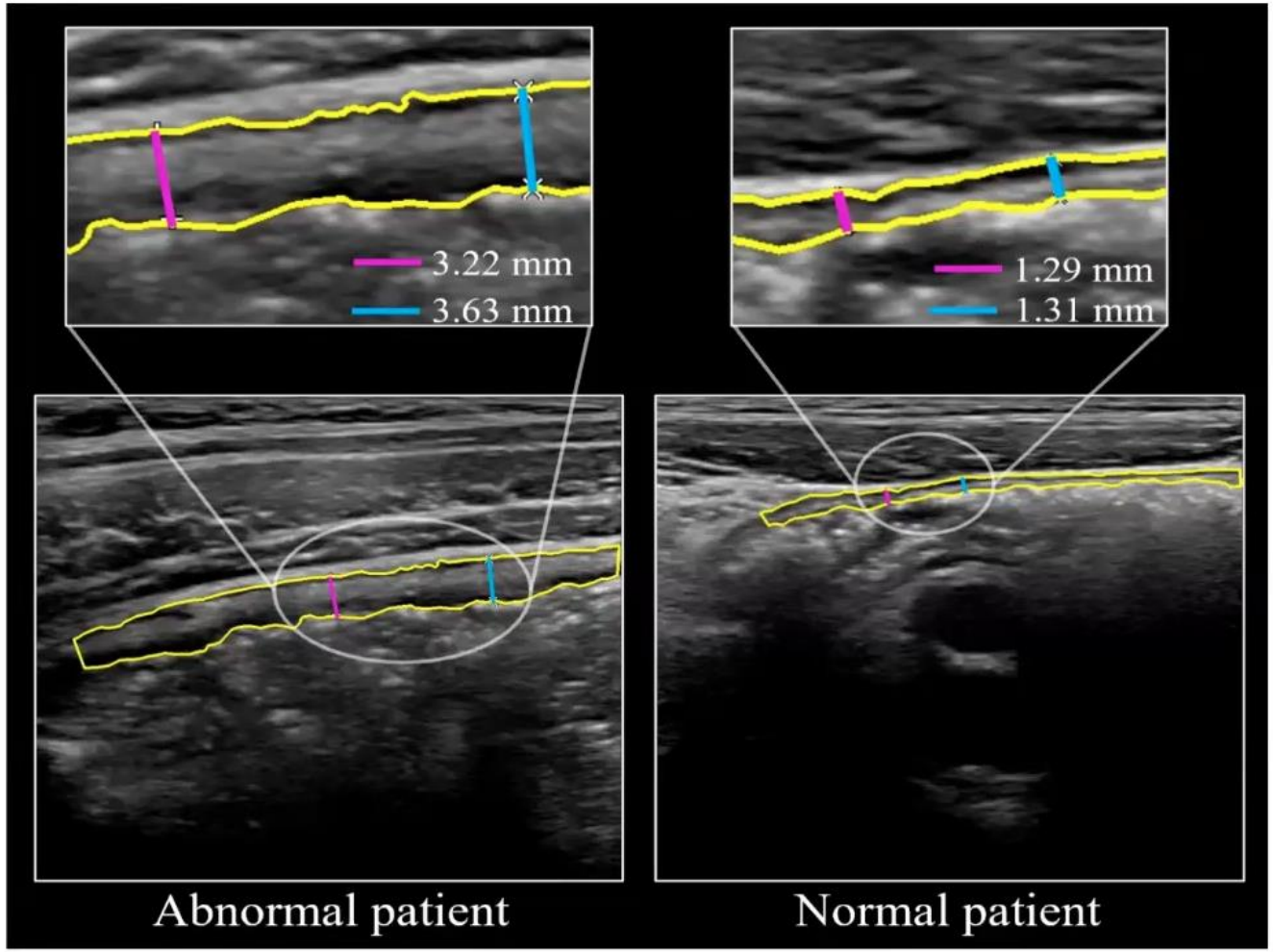
Logiraj Kumaralingam[1], Kenneth Le May[2], Van Bao Dang[1], Javaneh Alavi[1], **Hien Q. Huynh[2],** Lawrence H. Le[1]

[1]Department of Radiology and Diagnostic Imaging, University of Alberta, Edmonton, Alberta, Canada

[2]Department of Pediatrics, University of Alberta, Edmonton, Alberta, Canada.

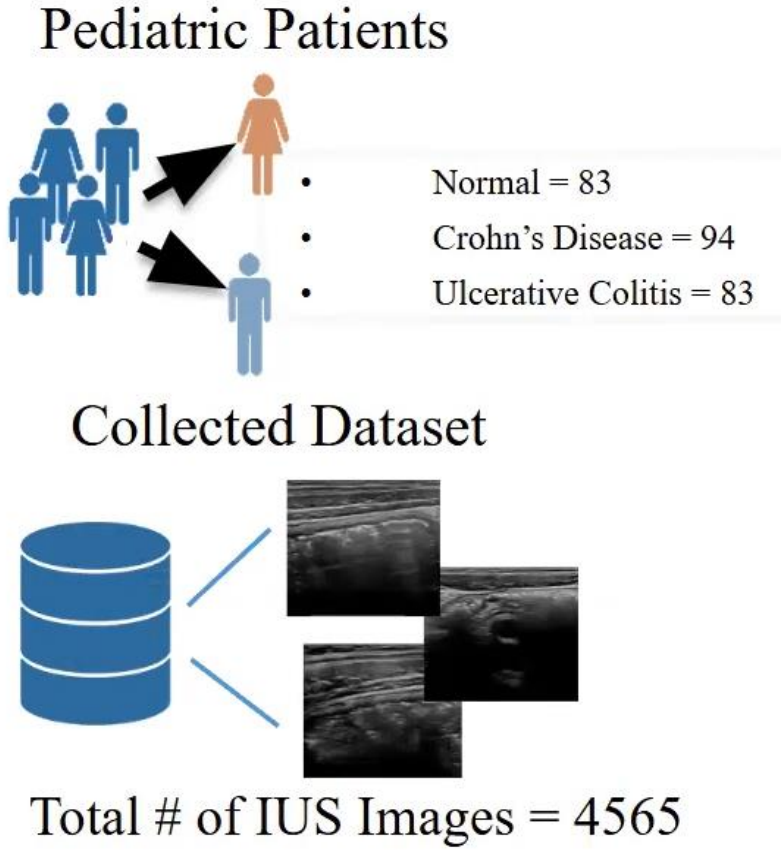
IUS Abnormal vs. Normal Images

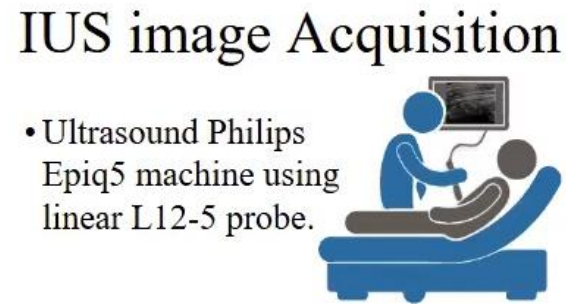
- **Gold-standard Measurements:**
  - ❖ Experienced clinician trained in IUS
  - ❖ Terminal ileum, cecum, ascending, transverse, descending, and sigmoid colons
  - ❖ At least two measurements from both proximal and distal sections except for cecum.
  - ❖ Classification were validated by:
    - ➢ Colonoscopy
    - ➢ Magnetic Resonance Enterography (MRE)



Dataset Details

- **Patient Demographics:**
  - Total: 260 pediatric patients
  - Age Range: 11 months to 18 years (Median: 13; Mean: 12.89)
  - Gender: 109 females, 151 males
- **Image Dataset:**
  - Total Longitudinal Images: 4,565
  - Abnormal: 1,478 images from 177 patients (94 CD and 83 UC)
  - Normal: 3,087 images from 83 normal patients and normal segments of those with IBD
- **Enrollment and Scanning:**
  - Enrollment Period: April 2020 – May 2023
  - Single centre: Edmonton Pediatric IBD Clinic & Stollery Children's Hospital, Alberta, Canada
  - Scanner: Philips EPIQ 5q ultrasound with linear L12-5 probe





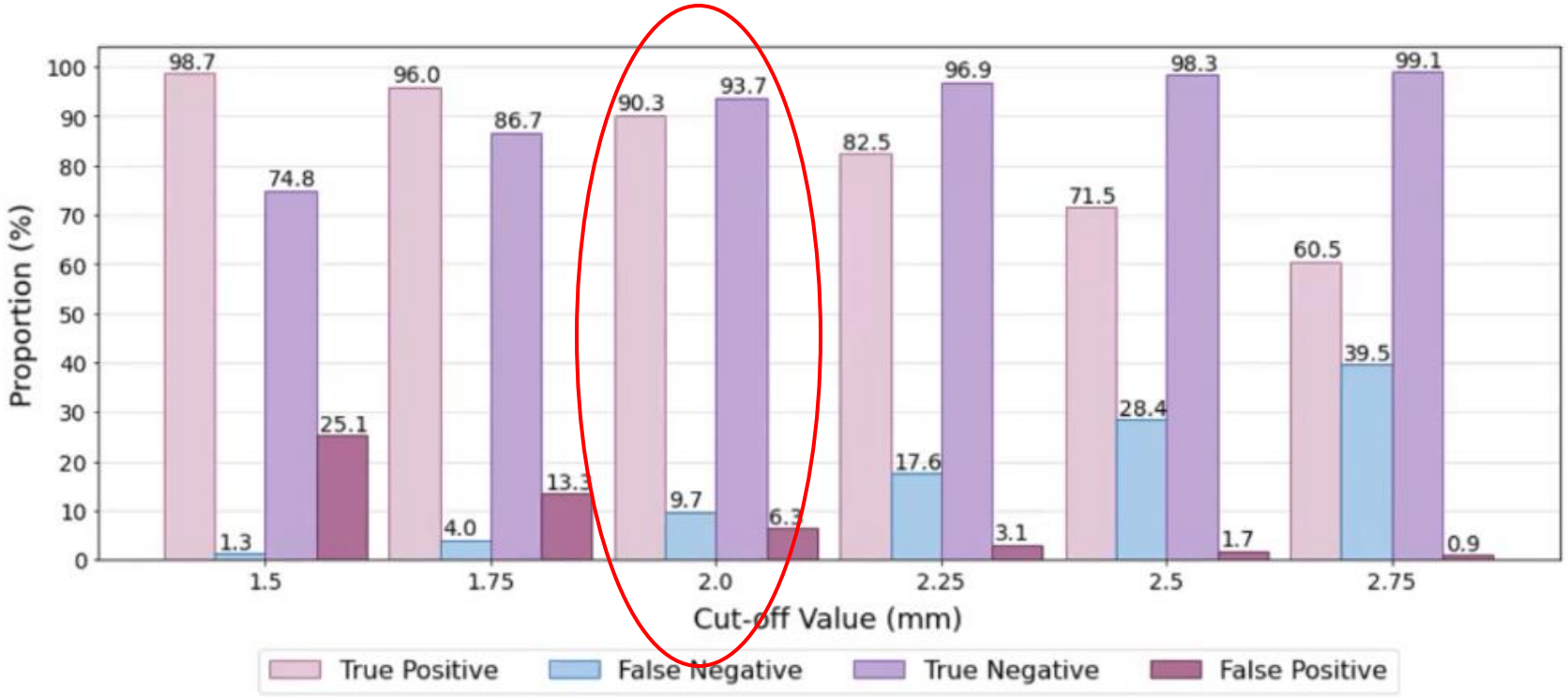
Statistical BWT Analysis (Testing Images=3953)

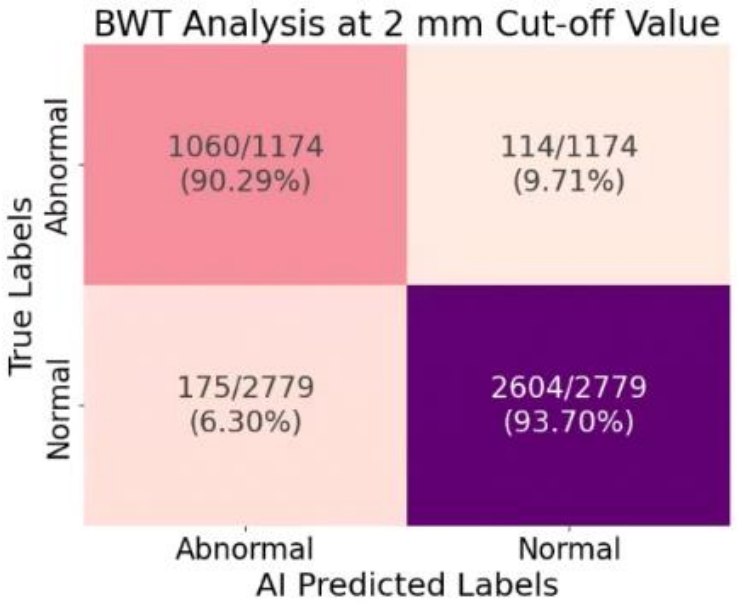
Classes	Median (25^{th} – 75^{th} interquartile range)	
	Manual Measurements (mm)	Automatic Measurements (mm)
Abnormal	3.05 (2.49 – 4.01)	3.18 (2.54 – 4.12)
Normal	1.30 (1.12 – 1.52)	1.19 (0.97 – 1.48)

ICC: 0.942 (95% CI: 0.938-0.946)

R^2 value: 0.89 (indicating high agreement)

Sensitivity Analysis of Average BWT Across Various Cut-Offs





- **2 mm** was an optimal cut-off for distinguishing abnormal and normal cases with highest **(>90%)** sensitivity and specificity.

Conclusions

- AI automates BWT measurements, which correlate highly with manual measurements by trained clinicians

- **In children with IBD, a lower cut-off of 2 mm BWT gives a better sensitivity without losing too much specificity in detecting transmural inflammation**

- This can provide clinicians with an **advanced tool** for accurate assessment of BWT, reducing workload, and boosting efficiency

Definition of IUS Response to Predict Endoscopic Remission is Poorly Understood

- Changes in bowel wall thickness (BWT) can be seen in response to biologic treatment of adults with CD[1]
- BWT in the terminal ileum (TI) of children with CD treated with anti-TNF therapy has been shown to decrease over time[2]
- Expert consensus definition of IUS response at 14 + 2 weeks after treatment initiation[3]:
  - > 25% reduction in BWT
  - > 2 mm decrease in BWT
  - May be beneficial to assess IUS response between 4-8 weeks in certain situations
- Study of 31 adults with TI and colonic CD treated with anti-TNF therapy found an 18% reduction in BWT 4-8 weeks after treatment initiation predicted endoscopic response at weeks 12-34[4]

1. Kucharzik et al., *CGH*, 2017

> J Crohns Colitis. 2024 Aug 6;18(7):1002-1011. doi: 10.1093/ecco-jcc/jjad216.

Early Intestinal Ultrasound Response to Biologic Therapy Predicts Endoscopic Remission in Children with Ileal Crohn's Disease: Results from the Prospective Super Sonic Study

Michael Todd Dolinger [1], Illya Aronskyy [1], Amelia Kellar [1], Elizabeth Spencer [1], Nanci Pittman [1], Marla C Dubinsky [1]

Background and Aims: STRIDE-II recommends early biomarker targets for treatment optimization to achieve treat-to-target [T2T] endoscopic remission [ER] in Crohn's disease [CD]. The predictive capabilities of intestinal ultrasound [IUS] for T2T ER remain unknown. We aimed to evaluate IUS response to predict ER in children with CD.

Methods: This was a prospective longitudinal cohort study of children with ileal [TI] CD initiating biologic therapy undergoing IUS, clinical disease activity, and C-reactive protein [CRP] assessments at baseline, week 8, 6 months, and T2T within 1 year. The primary outcome was the accuracy of optimal cut-points to predict TI ER [SES-CD ≤ 2] for change in bowel wall thickness [BWT] on IUS from baseline to week 8, and BWT at week 8. Area under the receiver operating curve [AUROC] analysis was performed and univariate analysis tested associations.

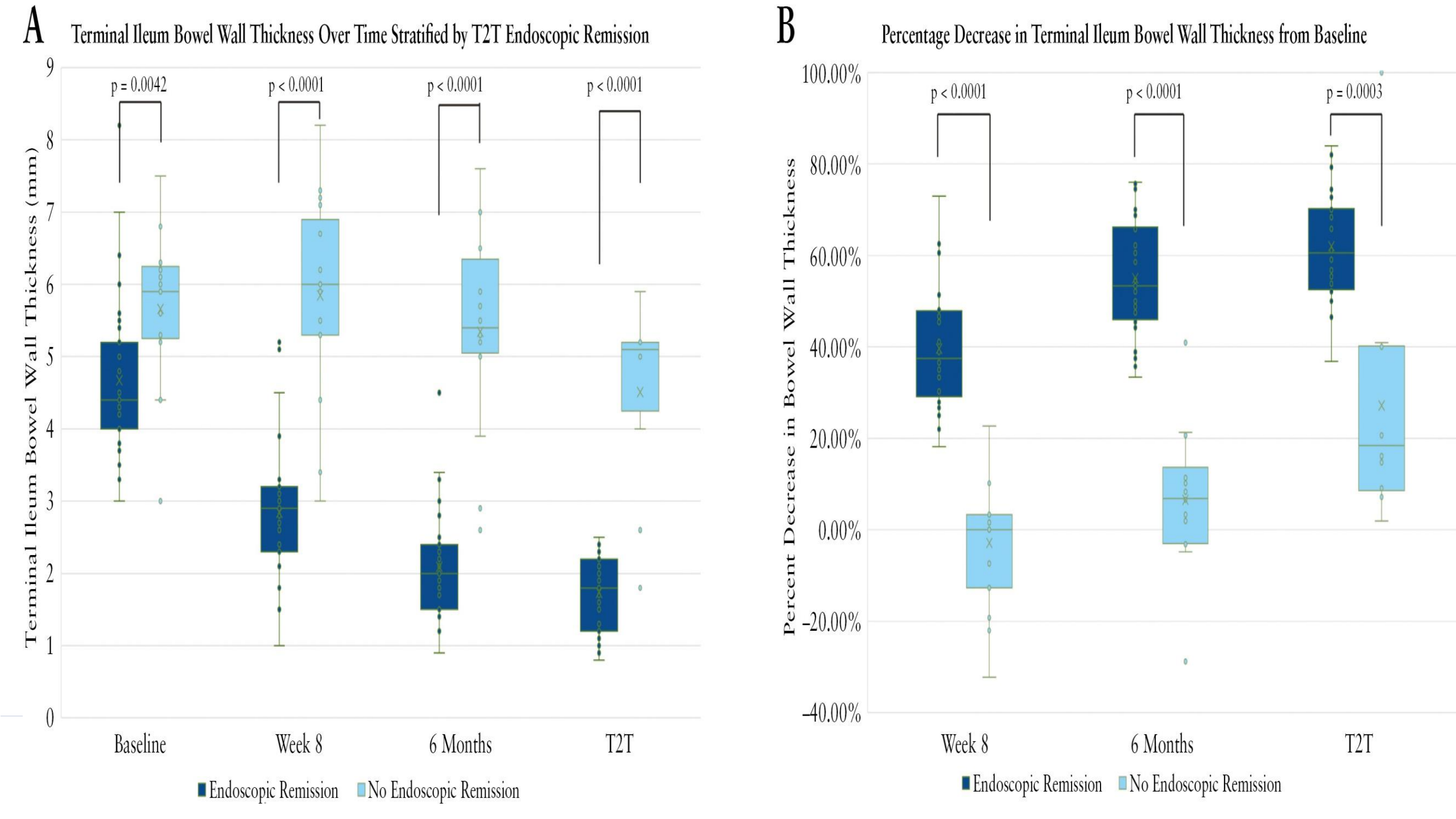
Results: In total, 44 children (median age 13 [IQR 12–17] years, 29 [66%] biologic naïve) were included, and 29 [66%] achieved ER. A ≥18% decrease in TI BWT at week 8 predicted ER with an AUROC of 0.99 [95% CI 0.98–1.00], 100% sensitivity, 93% specificity, 97% positive predictive value, and 100% negative predictive value, superior to a ≥46% decrease in PCDAI (AUROC 0.67 [95% CI 0.49–0.84]) and ≥84% decrease in CRP (AUROC 0.49 [95% CI 0.31–0.67]) at week 8.

Conclusions: Early change in TI BWT on IUS is highly predictive of ER in children with CD and superior to symptoms and CRP. Our findings suggest that IUS could be used for treatment optimization and tight control to guide T2T strategies.

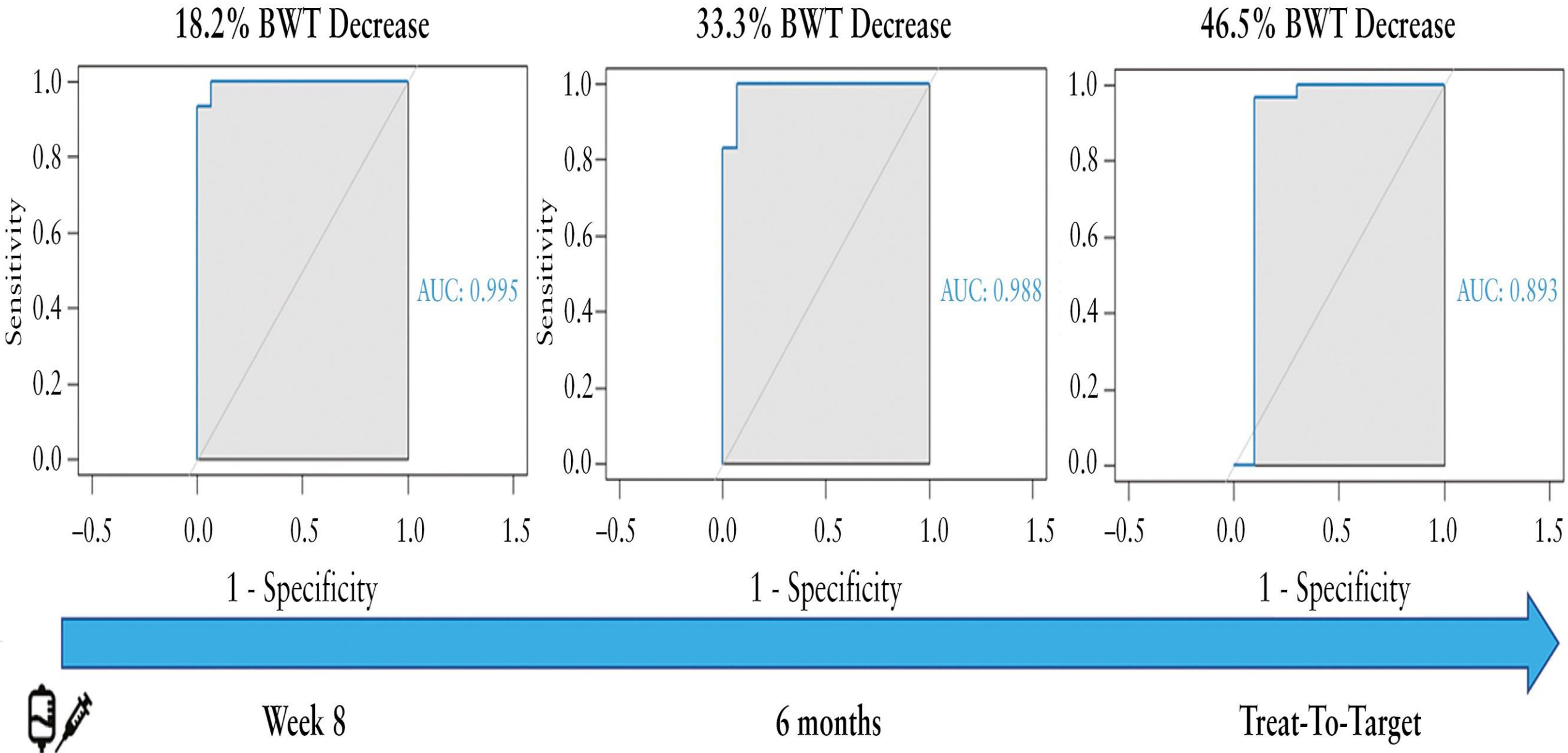
Evaluation of Early IUS Response in Children with CD

- Aimed to evaluate if early IUS response at week 8 predicts T2T endoscopic outcomes in children with TI CD initiating biologic therapy
- To compare if early changes on IUS are superior to early changes in clinical disease activity and CRP to predict T2T endoscopic outcomes

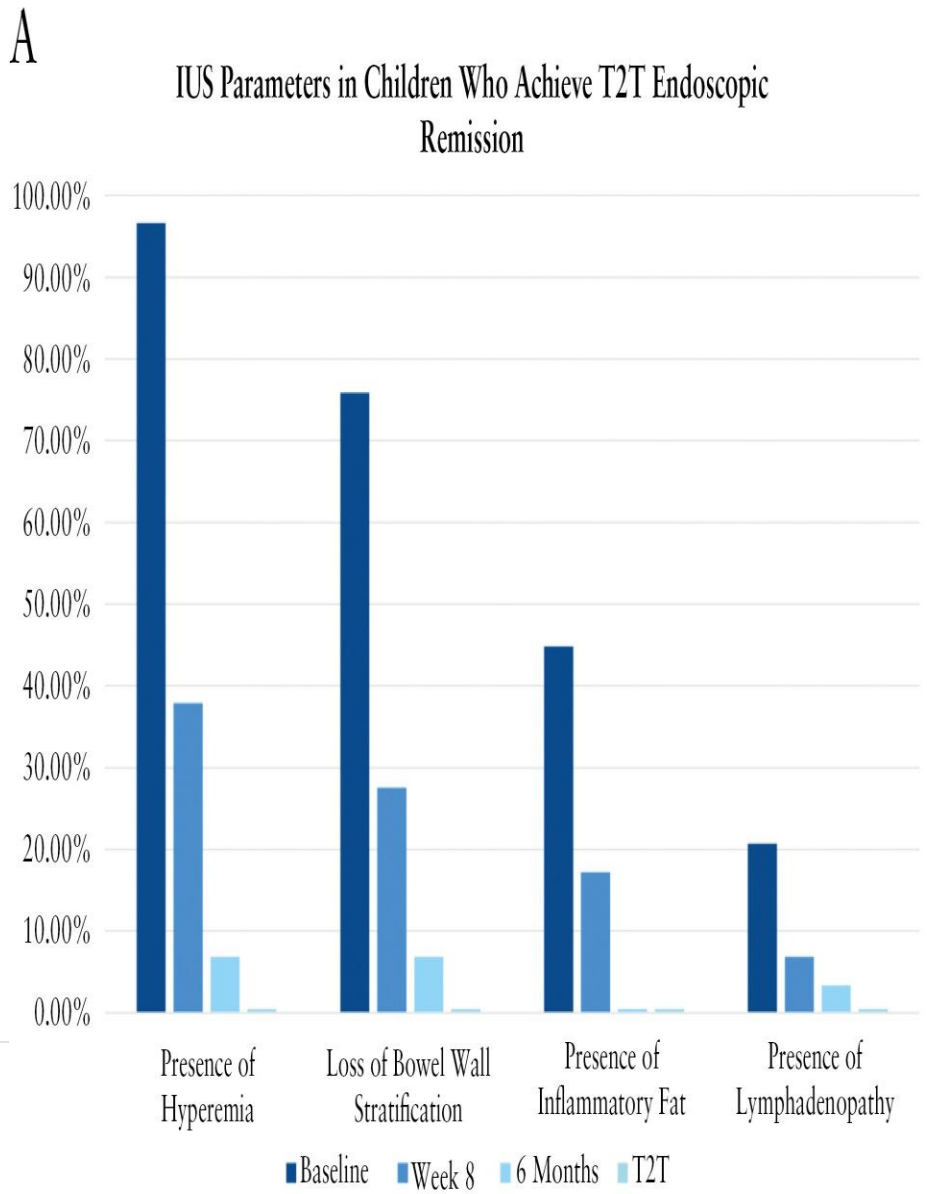
Dolinger M et al., *DDW 2023 Oral Presentation Mo782*

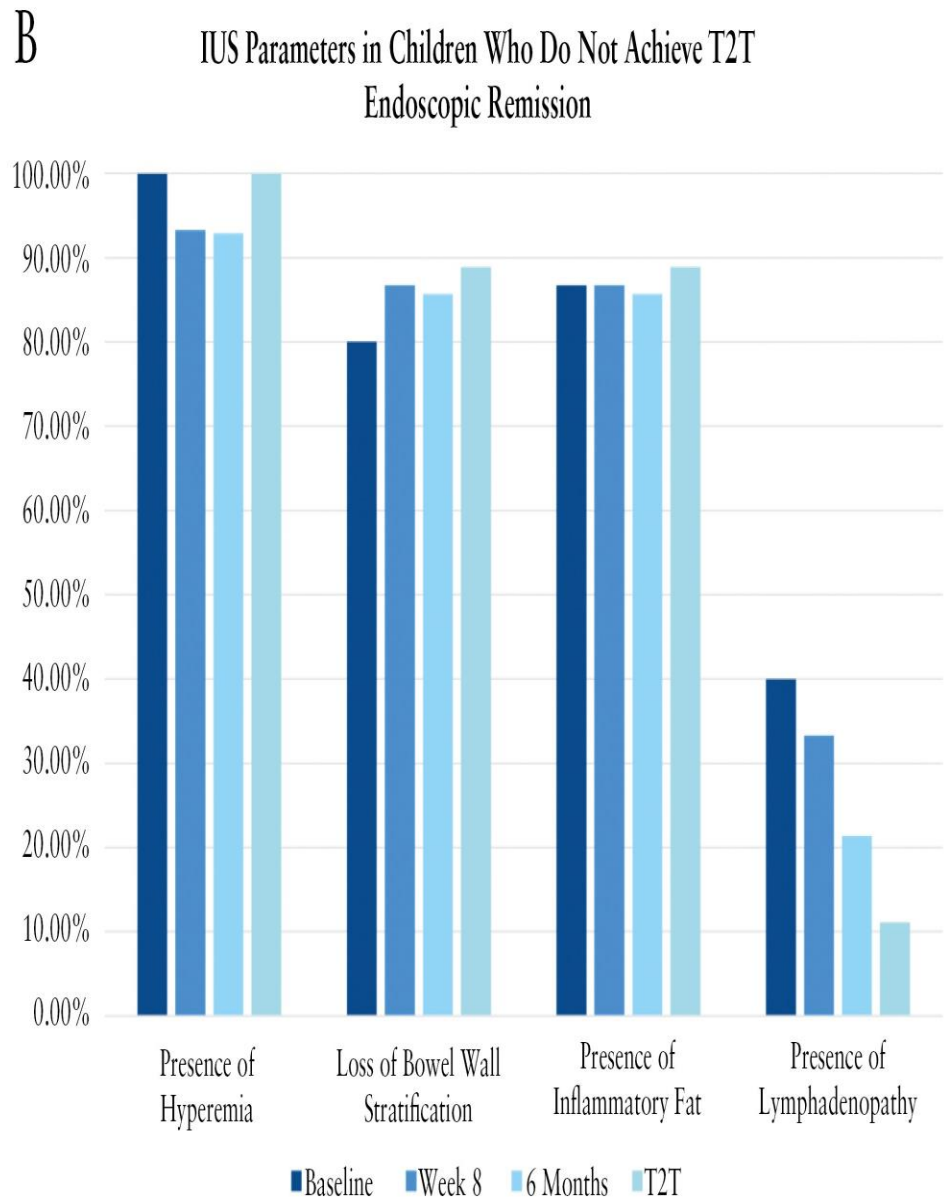

A
Terminal Ileum Bowel Wall Thickness Over Time Stratified by T2T Endoscopic Remission
Terminal Ileum Bowel Wall Thickness (mm)
p = 0.0042
p < 0.0001
p < 0.0001
p < 0.0001
Baseline
Week 8
6 Months
T2T
Endoscopic Remission
No Endoscopic Remission
B
Percentage Decrease in Terminal Ileum Bowel Wall Thickness from Baseline
Percent Decrease in Bowel Wall Thickness
p < 0.0001
p < 0.0001
p = 0.0003
Week 8
6 Months
T2T
Endoscopic Remission
No Endoscopic Remission

Percentage Change in Bowel Wall Thickness from Baseline To Predict Endoscopic Remission



Normalization of IUS parameters in children who achieve endoscopic remission vs children who do not achieve





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KUWAIT GASTROENTEROLOGY ASSOCIATION
رابطة الجهاز الهضمي والكبد الكويتية

Reliability and Validity of Mesenteric Fat Assessment by Intestinal Ultrasound in Pediatric Crohn's Disease Using the Chicago Mesenteric Fat Index

Amelia Kellar, MD, MSc, Tessa George, BS, Michael T Dolinger, MD, MBA, Matthew Smyth, MD, Noa Krugliak Cleveland, MD, David T Rubin, MD, Joëlle St-Pierre, MD, PhD ✉

Inflammatory Bowel Diseases, izaf238, https://doi.org/10.1093/ibd/izaf238

Published: 06 November 2025 **Article history** ▾

Methods

Children (≤18 years of age) with ileal CD who underwent IUS at 2 centers were enrolled. Three expert sonographers independently graded MF as present/absent and by the CMFI. IRR was calculated using Fleiss' kappa coefficient. Correlations between MF and clinical characteristics, inflammatory markers, and IUS data were calculated.

Results

Eighty IUS exams in 67 patients were included. The IRR was substantial for binary MF ($\kappa = 0.744$) and CMFI ($\kappa = 0.618$). Increasing CMFI grade was associated with bowel wall thickness ($P < .001$; odds ratio [OR], 16.35; 95% confidence interval [CI], 5.74–46.58), presence of ileal stricture ($P < .001$; OR, 30.32; 95% CI, 5.74–160.15), and presence of hyperemia ($P = .001$; OR, 6.59; 95% CI, 2.27–19.09).

Conclusion

Assessment of MF on IUS is reproducible and reliable in pediatric CD. The CMFI can be used as a biomarker that mirrors biochemical and sonographic indicators of pediatric CD activity.

Take home points

- In pediatric IBD, the BWT cut-off for response and remission is not ≤3mm

- ≤2mm is likely the ideal cut-off in both pediatric UC and CD
  - The terminal ileum may have a slightly higher BWT cut-off compared to the colon

- Inflammatory bowel segments in remission resemble normal bowel
  - Further research is needed for fibrostenotic bowel segments (treated stricturing and/or penetrating disease), likely to remain thicker

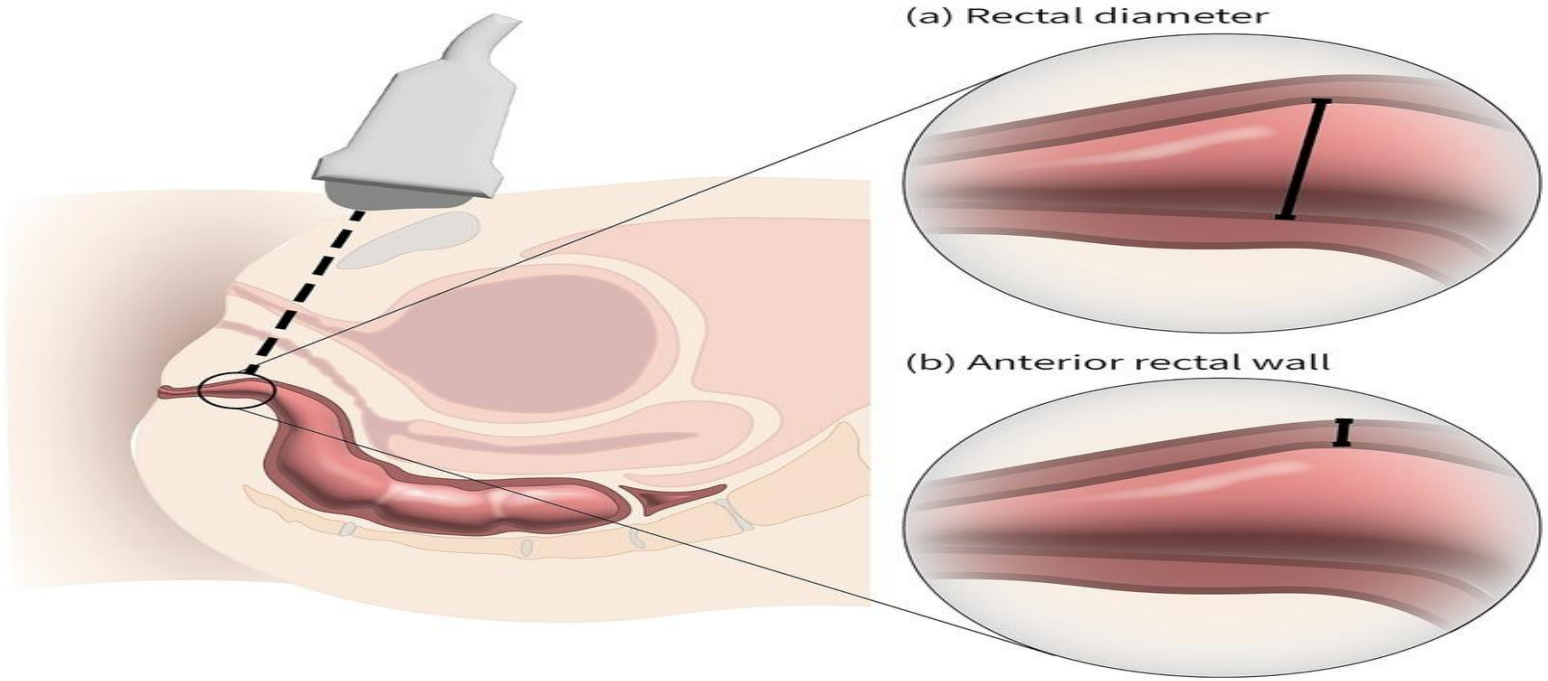
CEP Clin Exp Pediatr Vol. 68, No. 2, 127-135, 2025
https://doi.org/10.3345/cep.2024.00927

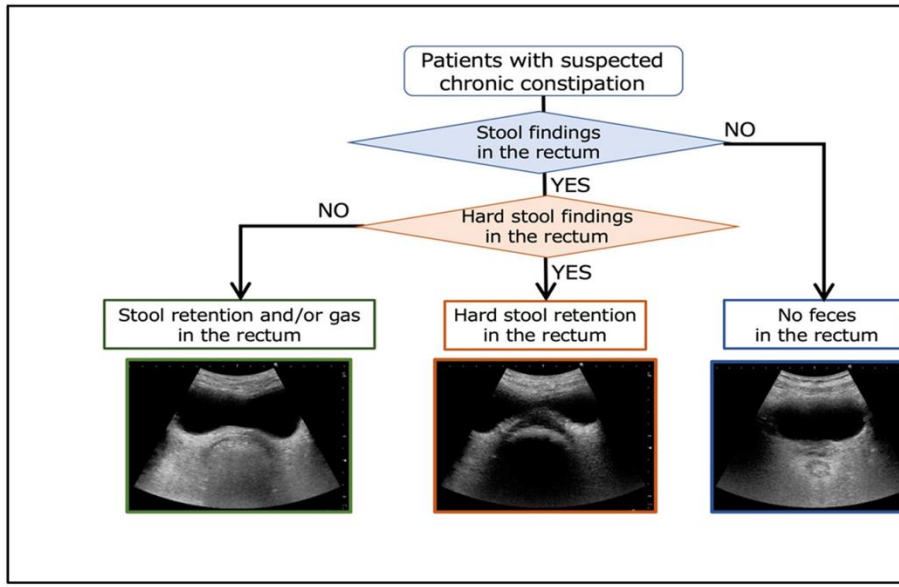
Review article

Value of transabdominal ultrasonography for diagnosing functional constipation in children: a systematic review and meta-analysis

Duc Long Tran, MD[1,2], Phu Nguyen Trong Tran, MD[1,2], Paweena Susantitaphong, MD, PhD[3,4], Phichayut Phinyo, MD[5], Palittiya Sintusek, MD, PhD[6]

Transverse lower abdominal ultrasonography (broken line) of (a) Rectal diamiter and (b) Anterior rectal wall





Expert position statement: Defining the role of intestinal ultrasound in assessing constipation and faecal loading

International Expert Panel

15 panel members
- 13 adult gastroenterologists
- 1 paediatric gastroenterologist
- 1 radiologist
- 2 DGBI experts

RAND/UCLA voting methodology

57 statements generated from a systematic review

2 rounds of voting

ONLINE VOTING

Results

43 statements appropriate
3 statements inappropriate
5 statements uncertain

IUS considered appropriate in the assessment of functional gut disorders

Posterior acoustic shadowing and colonic distension are important sonographic features of faecal loading

Lack of prospective adult studies

Sonographic Faecal Loading

An expert panel of gastroenterologists concluded that intestinal ultrasound is an appropriate modality to investigation constipation and faecal loading in patients and further well-designed studies are warranted to further define sonographic parameters of faecal loading and broaden its application to functional gastrointestinal disorders

Mathias, et al. *Aliment. Pharmacol. Ther.* Oct 2025

A rectal diameter >30 mm to define faecal loading in paediatric patients

AP&T

Intended Learning Outcome

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

Pediatrics

1. Explain the benefits and limitations of using intestinal ultrasound (IUS) in pediatric clinical practice.
2. Compare and contrast IUS inflammation cut-offs in pediatric versus adult populations.

Pregnancy

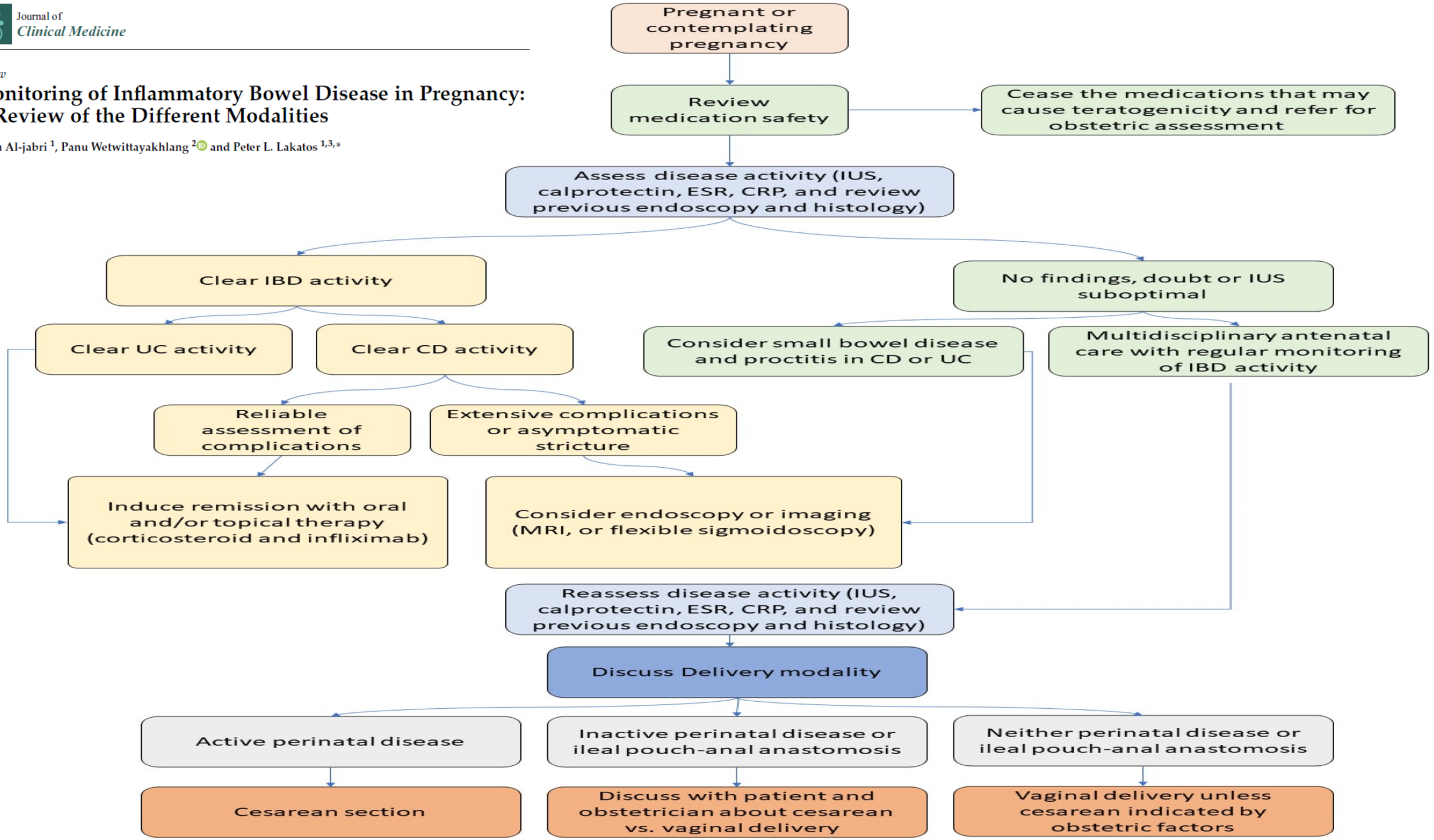
1. **Discuss the anatomical challenges during pregnancy that impact the performance and interpretation of IUS.**
2. **Evaluate the effectiveness of IUS relative to standard care imaging modalities during pregnancy.**

Journal of
Clinical Medicine

Review

Monitoring of Inflammatory Bowel Disease in Pregnancy: A Review of the Different Modalities

Reem Al-jabri [1], Panu Wetwittayakhlang [2] and Peter L. Lakatos [1,3,*]



Disease Management during Pregnancy

IBD is associated with higher risk of adverse pregnancy outcomes compared to non-IBD pregnancies

- **Prematurity**: 1.87-fold increase (<37wk gestation; 95% CI 1.52 to 2.31; p<0.001)
- **Low birth weight**: 2-fold increase (<2500 g; 95% CI 1.38 to 3.19; p<0.001).
- **Congenital abnormalities**: 2.37-fold increase (95% CI 1.47 to 3.82; p<0.001)
- **Cesarean delivery**: 1.5-fold (95% CI 1.26 to 1.79; p<0.001)

	Flaring UC	Flaring CD
Premature birth	OR 2.72	OR 2.66
Low birth weight	OR 2.10	OR 3.3
Stillbirth/miscarriage/abortion	4-fold increase	5-fold increase

Cornish J *et al. Gut* 2006, Broms G *et al. Inflamm Bowel Dis* 2014, Stephansson O *et al. Inflamm Bowel Dis* 2011

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Monitoring IBD during Pregnancy

IBD in remission

- GI visit in 1st trimester and than as needed (each trimester)
- Labs at every trimester, consider FCP, TDM in 2nd trimester
- Examine perineum for evidence of active disease

IBD flare

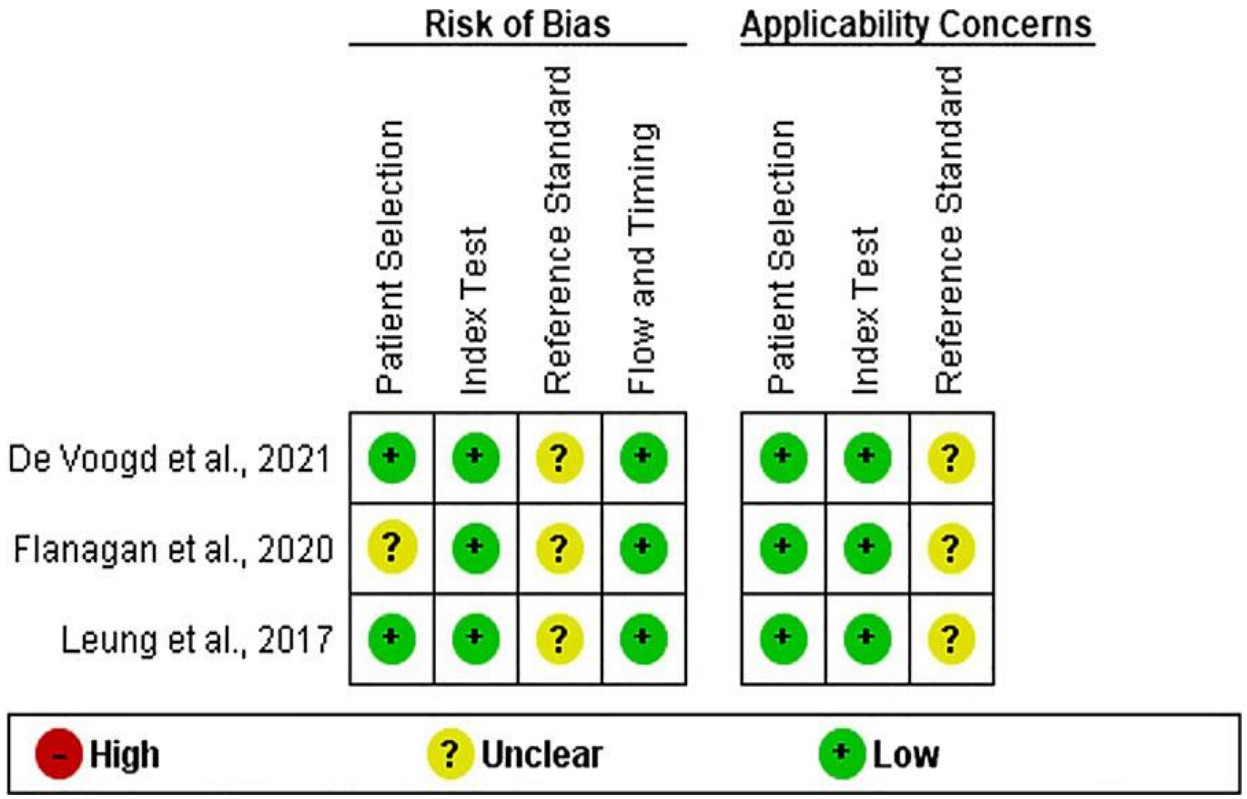
Diagnostics

- **Ultrasound**
- **Endoscopy:** perform when result will change management, prefer flexible sigmoidoscopy unprepped, unsedated in any trimester
- **MR**: gadolinium should be avoided
- **CT:** a single CT scan (50mGy) is below the level of concern

Adapted from Mahadevan *et al. Gastroenterology* 2019

From: **Intestinal Ultrasonography Diagnostic Performance and Feasibility in IBD during Pregnancy: A Systematic Review and Narrative Synthesis**

Inflamm Intest Dis. 2024;9(1):229-240. doi:10.1159/000541017



Journal of Crohn's and Colitis, 2025, **19(7)**, jjaf107
https://doi.org/10.1093/ecco-jcc/jjaf107
Advance access publication 31 July 2025
Ecco Guideline/Consensus Paper

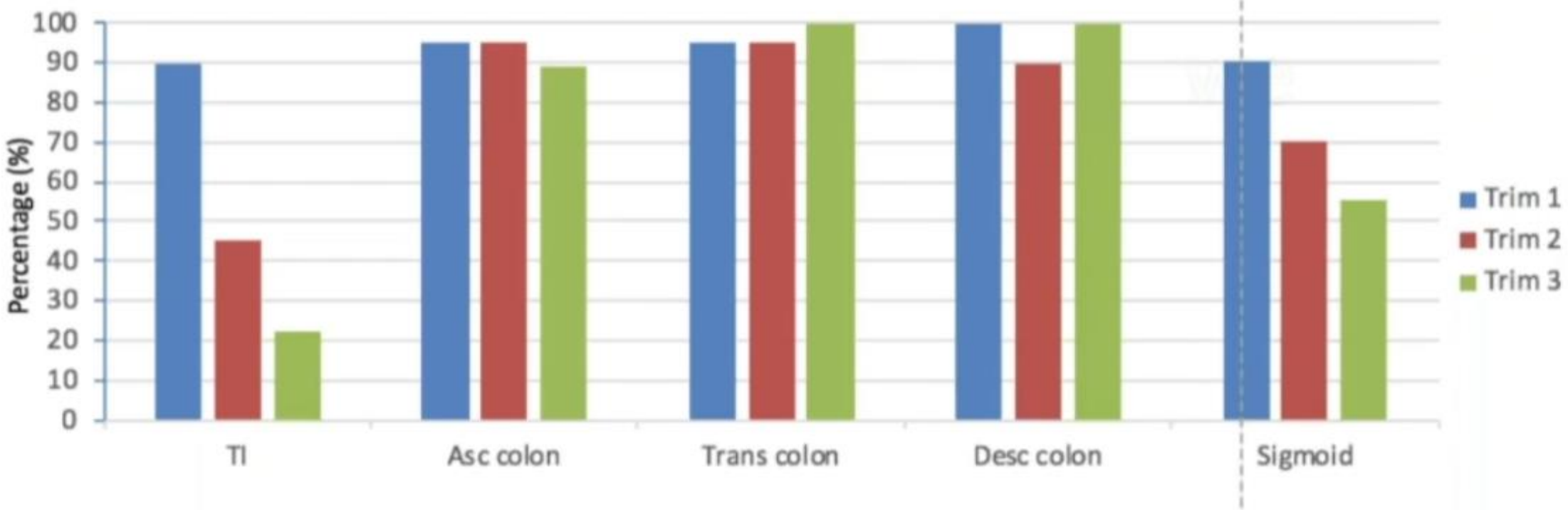
ECCO-ESGAR-ESP-IBUS Guideline on Diagnostics and Monitoring of Patients with Inflammatory Bowel Disease:

Beyond 20 weeks,:
-colonic views were adequate in almost all cases

-but the ileocaecal valve and terminal ileum became more difficult to visualize, with an adequate window in approximately 50% of cases

IUS in IBD during Pregnancy: Feasibility

Figure 1: Visualization of bowel segments in pregnant IBD patients per trimester



De Voogd F et al. ECCO 2020 Abstract; Flanagan E *et al. J Crohn Colitis* 2020

Journal of Crohn's and Colitis, 2020, 1405–1412
doi:10.1093/ecco-jcc/jjaa082
Advance Access publication April 28, 2020
Original Article

Original Article

Monitoring Inflammatory Bowel Disease in Pregnancy Using Gastrointestinal Ultrasonography

Emma Flanagan,[a,o] Emily K. Wright,[b] Jakob Begun,[c,o] Robert V. Bryant,[d] Yoon-Kyo An,[c] Alyson L. Ross,[e] Katerina V. Kiburg,[a] Sally J. Bell[e]

Results:

Ninety patients and 127 GIUS examinations were included [median gestation 19 weeks, range 4–33]. Adequate colonic views were obtained in 116/127 [91%] scans.

Adequate ileal views were obtained in 62/67 [93%] scans <20 weeks and 30/51 [59%] scans at 20–26 weeks. positive correlation between bowel wall thickness and calprotectin [r = 0.26, p = 0.03].

GIUS delivered aspecificity of 83%, sensitivity of 74%, and negative predictive value of 90% compared with calprotectin

Conclusions:

GIUS is a feasible and accurate modality for monitoring IBD in pregnancy.

Adequate GIUS views of the colon and terminal ileum can be obtained in the majority of patients up to 20 weel gestation

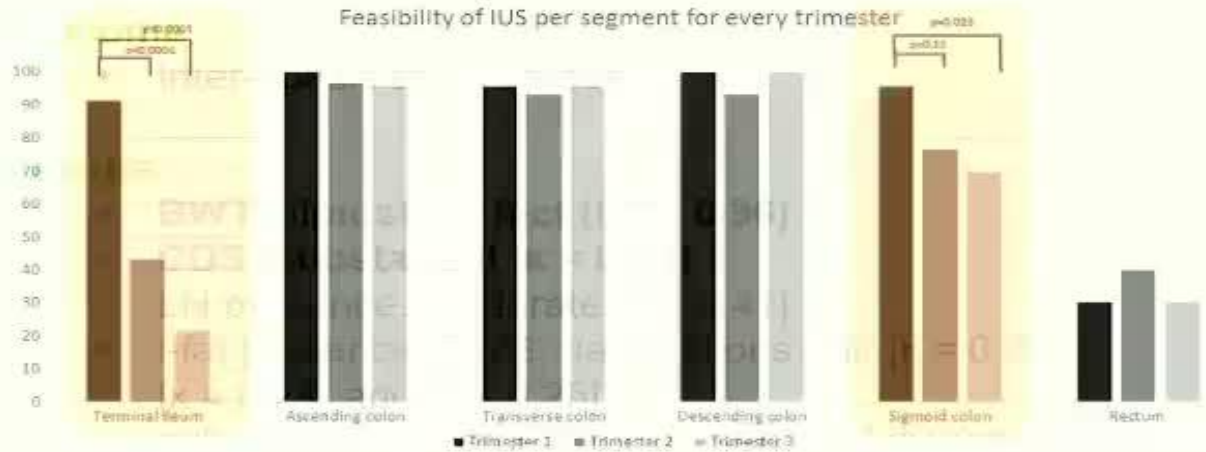
Beyond 20 weeks, GIUS provides good views of the colon but the terminal ileum becomes difficult to assess.

Feasibility of IUS in pregnancy

ICA IBD Centrum Amsterdam

Patients
38 patients with IBD, 27 patients having serial IUS during their pregnancy

Intervention: IUS in each trimester compared with clinical disease activity and FCal as reference standard



	Trimester 1 (n = 22)	Trimester 2 (n = 23)	Trimester 3 (n = 20)
Sensitivity	83.3%	92.3%	66.6%
Specificity	93.8%	100%	100%
AUROC (95% CI)	0.891 (0.702–1.000), $P = .006$	0.923 (0.802–1.000), $P < .0001$	0.813 (0.591–1.000), $P = .021$

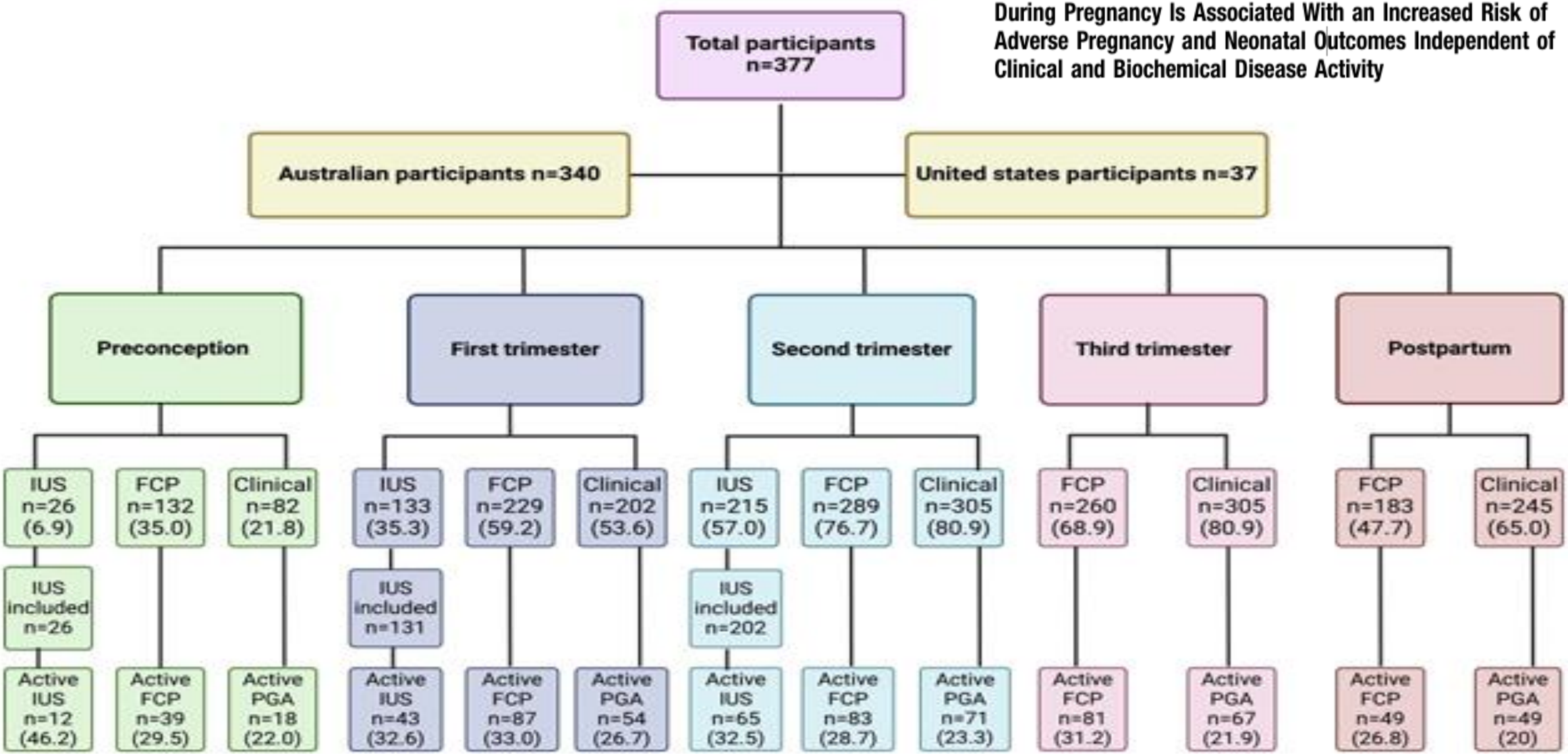
Active disease defined as fecal calprotectin ≥250 µg/g *or* fecal calprotectin ≥100 µg/g and HBI ≥4/SCCAI ≥3

Results
- Feasibility decreases in the third trimester in the TI and sigmoid
- IUS detected active disease with 98% specificity throughout pregnancy

De Voogd *et al. Inflamm Bowel Dis 2021*

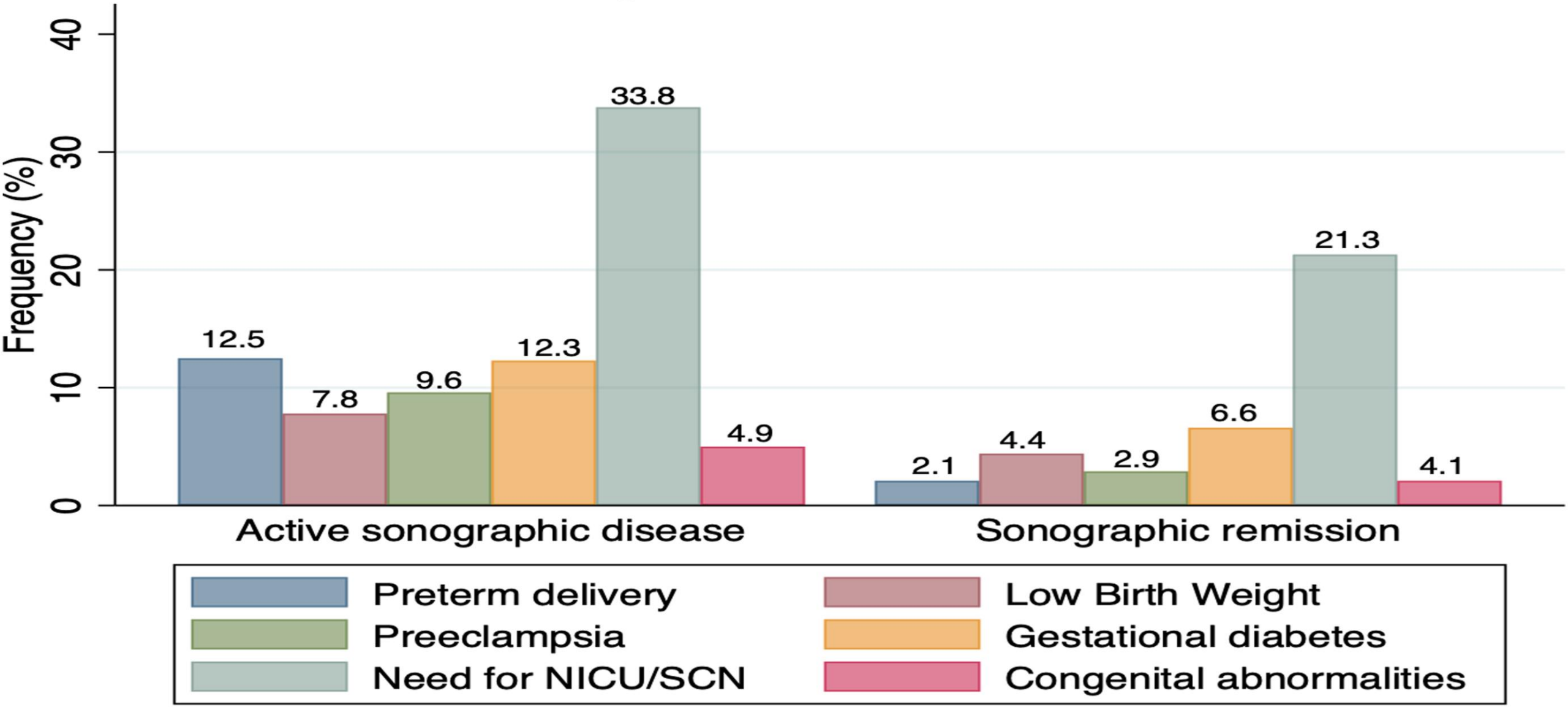
Gastroenterology 2025;169:647–662

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

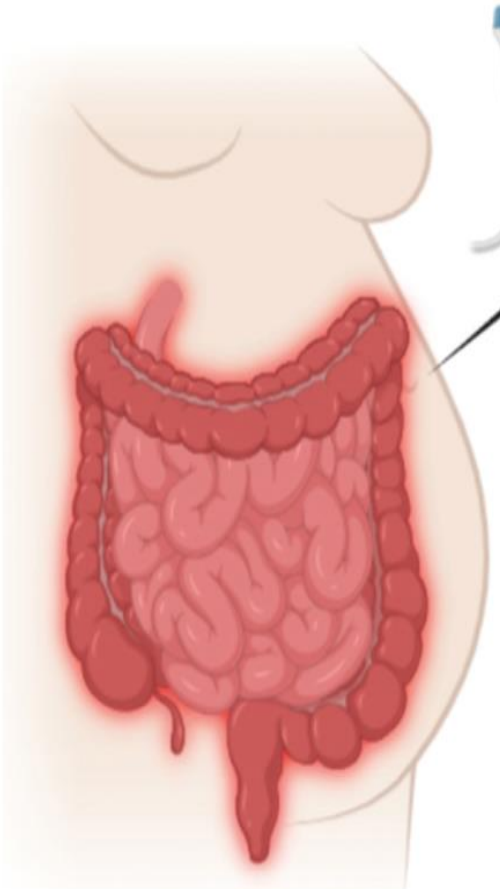


Risk of adverse obstetric outcomes

according to active IUS in T1 and/or T2



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



↑ Bowel wall thickness >6mm

Hyperemia

↑ Preterm & low birth weight delivery

↑ Preeclampsia

↑ Neonatal special/intensive care unit admission

Agreement between assessment activity tools

FCP

HBI/SCCAI

minimal in T1 (0.29) & T2 (0.29), **none** in T3 (0.07)

IUS

minimal in T1 (0.35) & **none** in T2 (0.08)

Gastroenterology