

Interactive Case Presentation: IUS in Pediatrics

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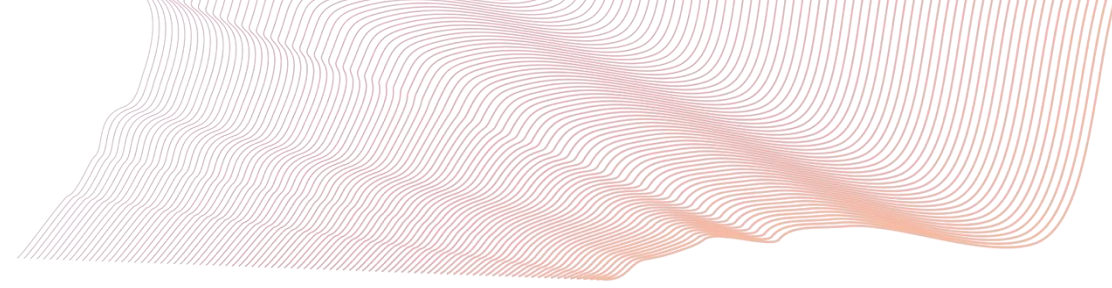
IBUS Advanced Ultrasound Workshop – Module 3

DDW, Chicago, IL, May 4th, 2026

Workshop organised in collaboration with

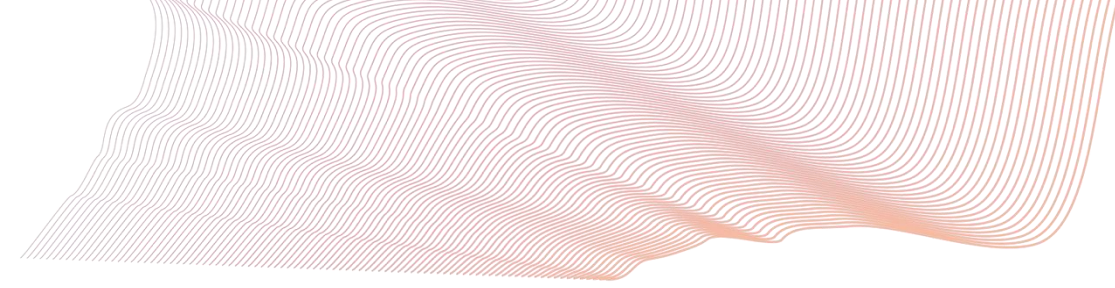
Disclosure

- Consultant: **Pfizer, Johnson & Johnson, Abbvie**
- Advisory Boards: **Takeda, Celltrion, Sanofi**
- Speaking Fees: **Prometheus**
- Shareholder: **Dova Health**
- Board Member: **iUSCAN**
- Committee Member: **IBUS**
- Grant Support: **The Leona M. and Harry B. Helmsley Charitable Trust**
- IUS Central Read Lead: **GI Reviewers, Clario, Perceptive**



BWT in adults vs. pre-pubertal children

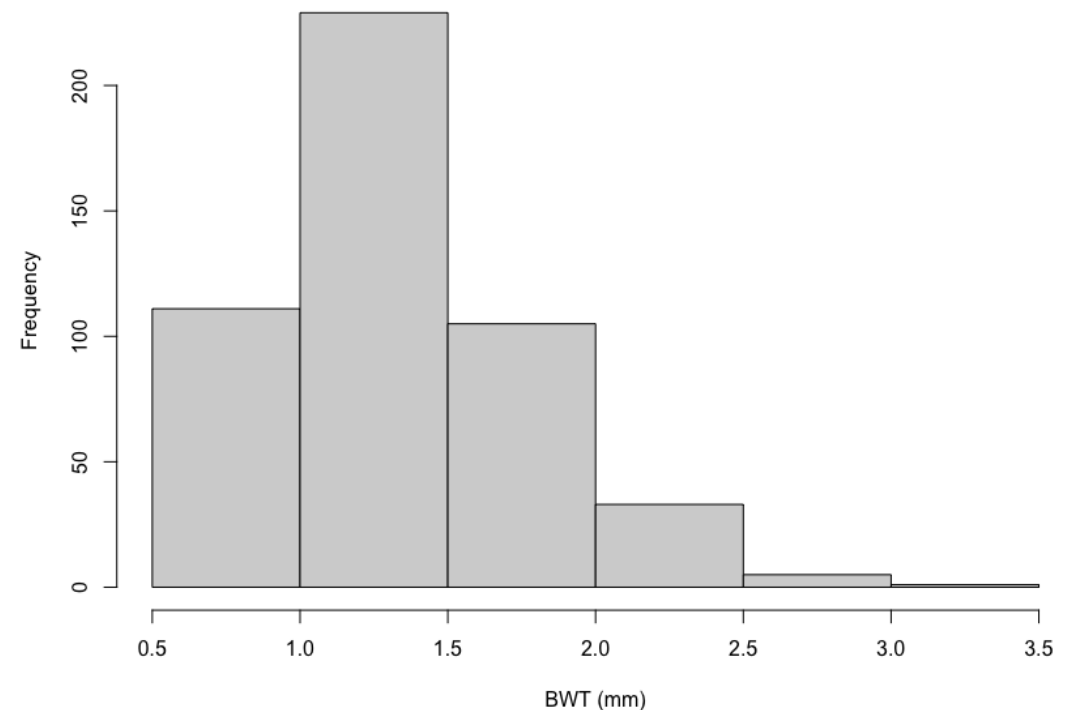
	Normal	Uncertain	Activity
Adults	≤ 3 mm	N/A	> 3 mm
Pre-pubertal children	< 2 mm	2-2.5 mm	> 2.5 mm



Children with Transmural Healing in Deep Remission Have a BWT < 2 mm

Analysis of 98 children & 484 bowel segments on IUS with IBD in sustained deep remission with mucosal healing

Histogram of BWT (mm)

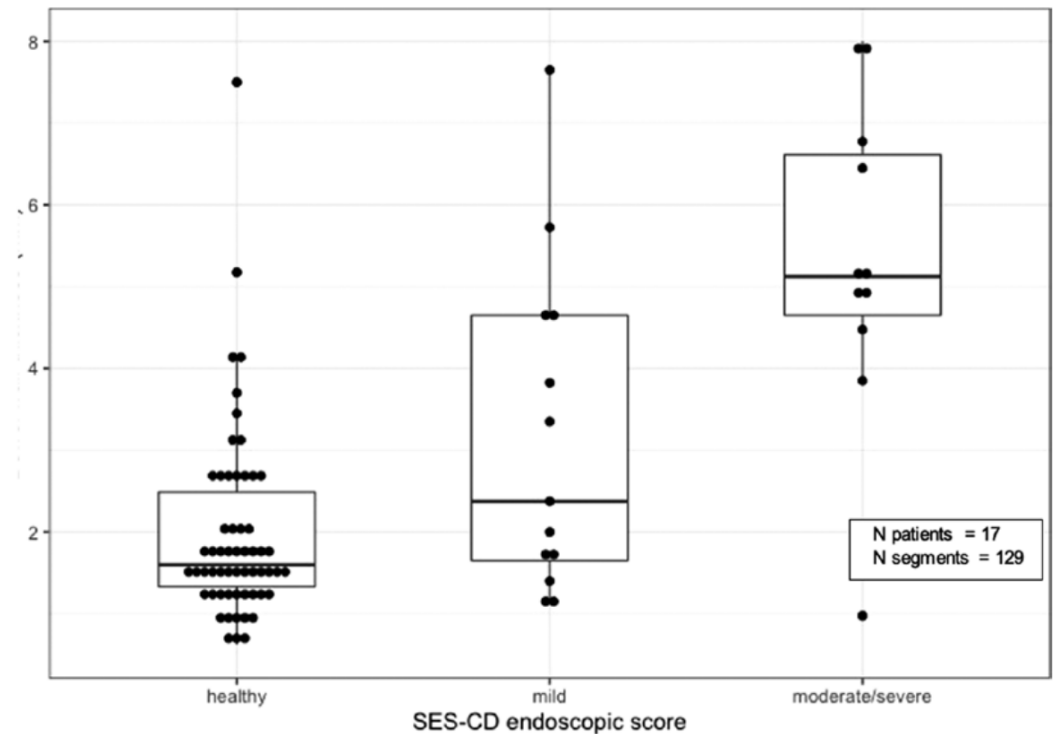


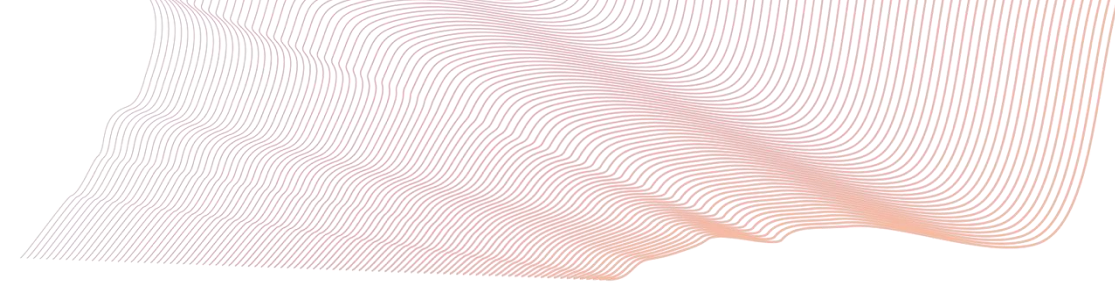
BWT \geq 2.0 mm Detects ileal Inflammation in Children

BWT \geq 2.0 mm

AUROC 0.88 for ileal endoscopic activity

A Bowel wall thickness by endoscopic severity graded by SES-CD





BWT > 3.5 mm Detects Segmental SES-CD of > 6

Segmental IUS Score or Parameter	Cut-Point	AUROC [95% CI]	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
BWT (mm)	≥ 3.6	0.95 [0.92-0.98]	89	93	62	99
MLS	≥ 1	0.92 [0.86-0.97]	89	88	50	98
SUS-CD	≥ 2	0.94 [0.90-0.98]	92	90	54	99
SUAS-CD	≥ 4.11	0.96 [0.93-0.99]	95	92	59	99
IBUS-SAS	≥ 22.2	0.96 [0.93-0.99]	95	91	58	99
SPAUSS	≥ 3	0.95 [0.90-0.99]	92	91	58	99
BUSS	≥ 3.3	0.96 [0.92-0.99]	95	90	54	99

Redefining normal: Building age-specific ultrasound standards in pediatric inflammatory bowel disease



ABSTRACT 1 Pediatric IUS Standards for Macroscopic Inflammation in < 12 years old

Retrospective Single-Center Review
Evaluated 35 patients (< 12 years old) across 164 matched segments (134 colon, 30 ileum) comparing IUS results to colonoscopy.

Defining Normal Transmural Parameters

Establish normal BWT thresholds and evaluate utility of other transmural parameters (hyperemia, fat, stratification) in young children.

⬆️ **62% FALSE NEGATIVE RATE WITH 2.5 MM STANDARD**

Using the previously recommended 2.5 mm pediatric cutoff resulted in missing inflammation in over half of the symptomatic segments.



2.0 mm Bowel Wall Thickness
Optimal cutoff in CHILDREN < 12

≥ 2.0 MM

85% Sensitivity

93% Specificity

HIGHLY ACCURATE FOR CHILDREN UNDER 12 YEARS OLD

MARKERS CORRELATING WITH MACROSCOPIC ACTIVITY

While hyperemia was common, inflammatory fat (IFat) and loss of bowel wall stratification (BWS) had a Positive Predictive Value (PPV) of 0.97 to 1.0.

Comparison of Median BWT by Endoscopic Appearance

Normal:

1.0 mm [0.8-1.3]

Abnormal (Any):

2.7 mm [2.1-3.5]

Moderate to Severe:

3.3 mm [2.6-3.8]

IUS SCORES ARE ABLE TO DIFFERENTIATE ACTIVITY

In addition to BWT, International Bowel Ultrasound Segmental Activity Score (IBUS-SAS) and Milan Ultrasound Criteria (MUC) were accurate at differentiating macroscopic inflammation (AUC 0.90 for both) in children.



ABSTRACT 2 Submucosal Thickness and IBD Activity in Pediatric IBD (Median 14 years)

Prospective Enrollment (2019-2024)
Included 132 patients (624 segments) with a median age of 14, focusing on the relationship between layer thickness and endoscopic severity.

Evaluating Submucosal Thickness (SMT)

The study aimed to report SMT measurements and the SMT/BWT ratio in children, previously only defined in adult populations.

SM THICKENING AS A NEW INDICATOR

SMT correlated significantly with endoscopic disease severity in both Crohn's Disease (rho=0.48) and Ulcerative Colitis (rho=0.48). Moderate correlations for BWT: CD rho=0.55, UC rho=0.53 (p < 0.001).

⬆️ SUBTYPE-SPECIFIC SMT CUTOFFS

Optimal cutoffs for detecting inflammation:

SM/BWT Ratio: UC vs. CD



ULCERATIVE COLITIS

Ratio ≥ 0.5 effective for identifying inflammation (consistent with adult data)



CROHN'S DISEASE

Ratio not helpful in pediatric CD - uniform layer thickening

Crohn's Disease
≥ 1.1 mm

Ulcerative Colitis
≥ 0.8 mm

Shared Insights: The Expanding Role of Intestinal Ultrasound



Precision, Mechanism-Informed Care

SMT measurements provide insight into inflammation patterns: UC starts with submucosal expansion, while CD shows uniform thickening of all layers.



Bedside Biomarker for Treat-to-Target

IUS facilitates non-invasive monitoring and early response assessment, allowing for more agile therapeutic adjustments.

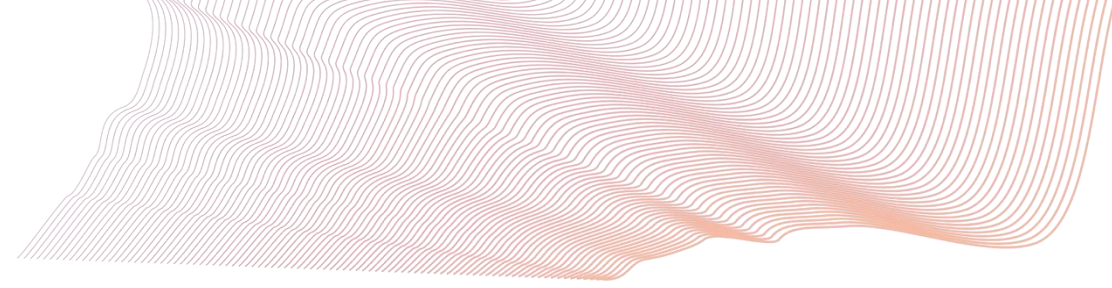


Redefining Pediatric Norms

Both studies emphasize that pediatric IUS requires unique, age-specific standards rather than relying on established adult thresholds.

1. Kullmann H, Celiberto L, Foster A, et al. Establishing normal transmural parameters in young children based on intestinal ultrasound and colonoscopy. ECCO 2026, P0396 (Abstract ID: jjaf231.577).

2. Hong JM, Chamseddine E, Carroll M, et al. Intestinal ultrasound measurement of the submucosa layer in pediatric inflammatory bowel disease: Thickness and ratio cut-offs for identifying inflamed bowel. ECCO 2026, P0309 (Abstract ID: jjaf231.490).



Case SC

7 yo male with 2 months of abdominal pain and diarrhea

- 10 lb weight loss
- 4-episodes of diarrhea daily, loose with mucus, 50% with blood
- Daily lower abdominal pain, ranges from 4-7/10
- Father with Crohn's disease
- Fecal calprotectin 3850
- Labs: Hgb 11.9, Albumin 4.2, CRP 26.5 mg/L



SAMSUNG

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Small Parts /BOWEL- /LA2-14A /FR51Hz /4.0cm

[2D]

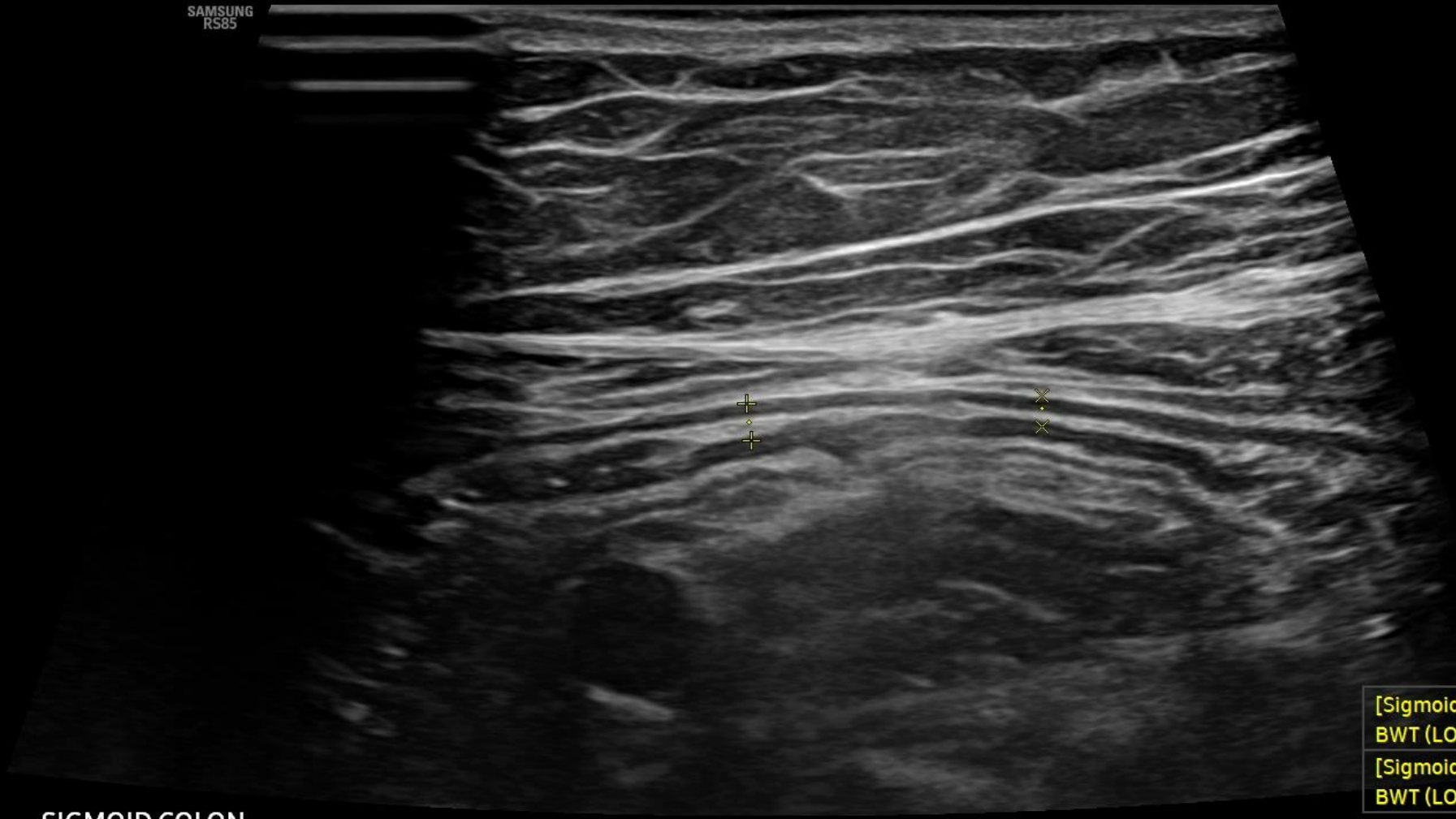
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RS85

Frq Res.1
GN 61
DR 49
FA 8
P 100



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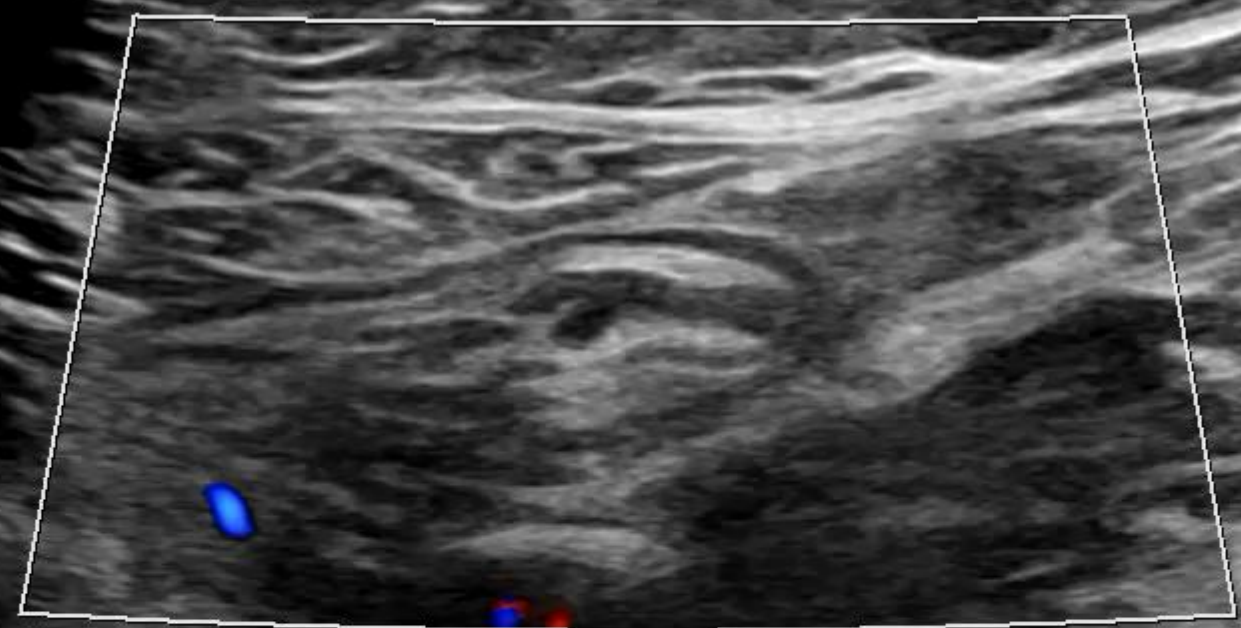
2



SIGMOID COLON

[Sigmoid Colon]
BWT (LONG) 1.83 mm
[Sigmoid Colon]
BWT (LONG) 1.53 mm

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SIGMOID COLON



SAMSUNG

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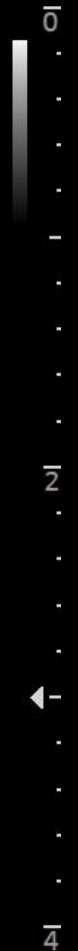
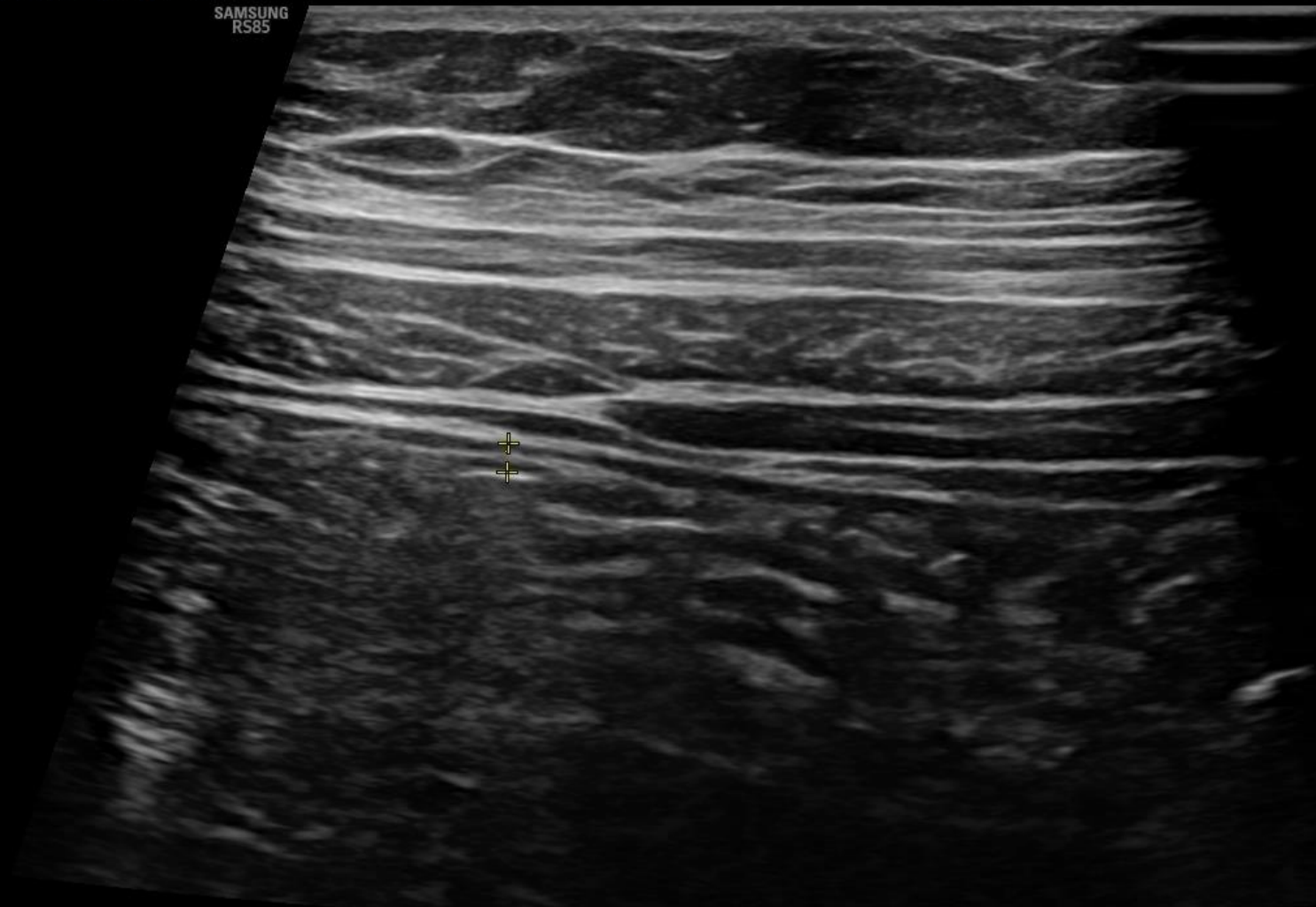
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Small Parts /BOWEL- /LA2-14A /FR46Hz /4.5cm

[2D]

SAMSUNG
RS85

Frq Res.1
GN 61
DR 49
FA 8
P 100



DESCENDING COLON

[Descending Colon]
BWT (LONG) 1.41 mm



SAMSUNG

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Small Parts /BOWEL- /LA2-14A /FR51Hz /4.0cm

[2D]

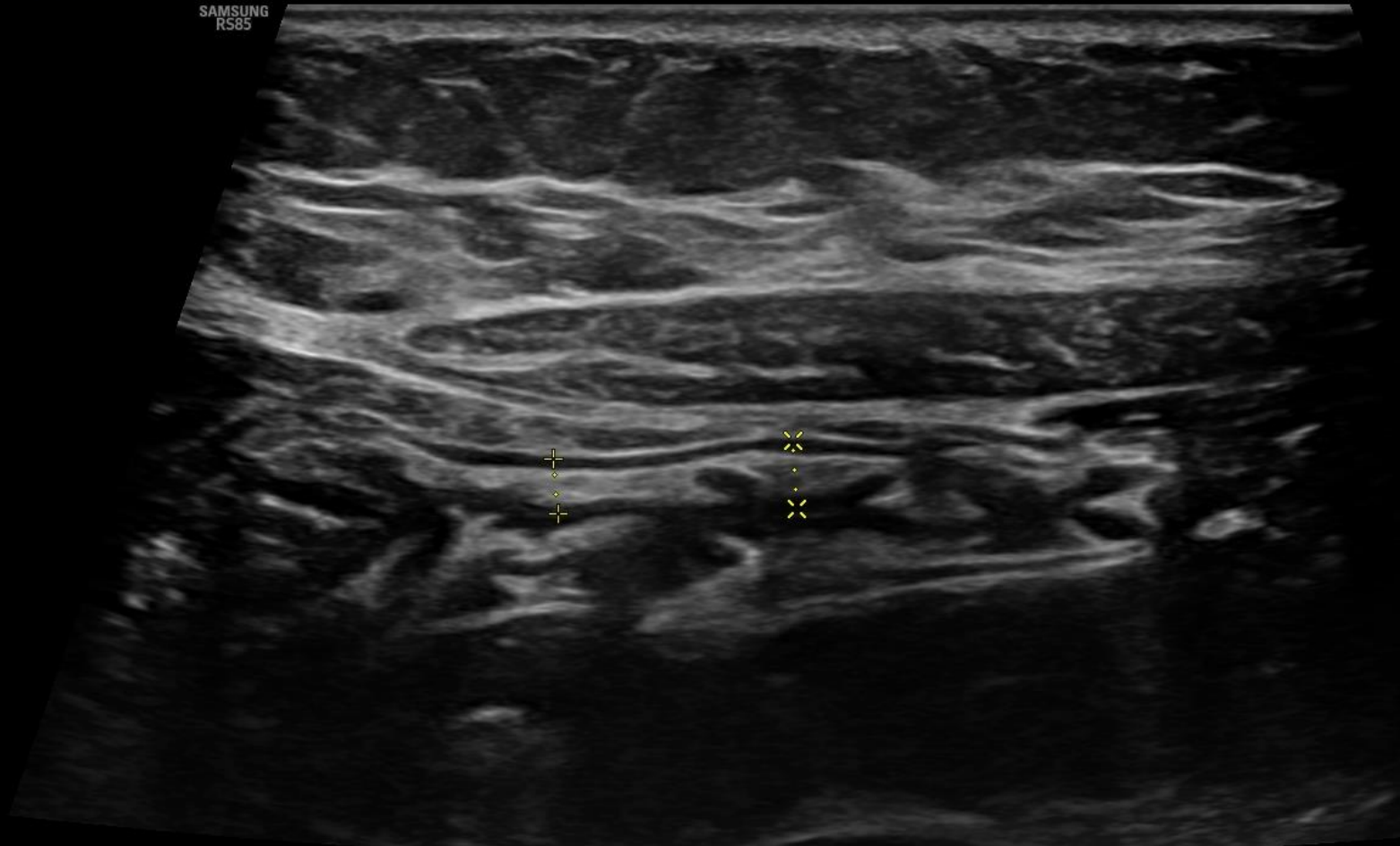
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R585

Frq Res.1
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DR 49
FA 8
P 100



0

2



[Transverse Colon]
BWT (LONG) 2.56 mm
[Transverse Colon]
BWT (LONG) 3.18 mm

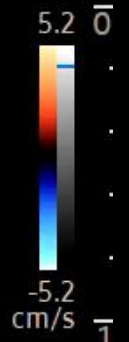
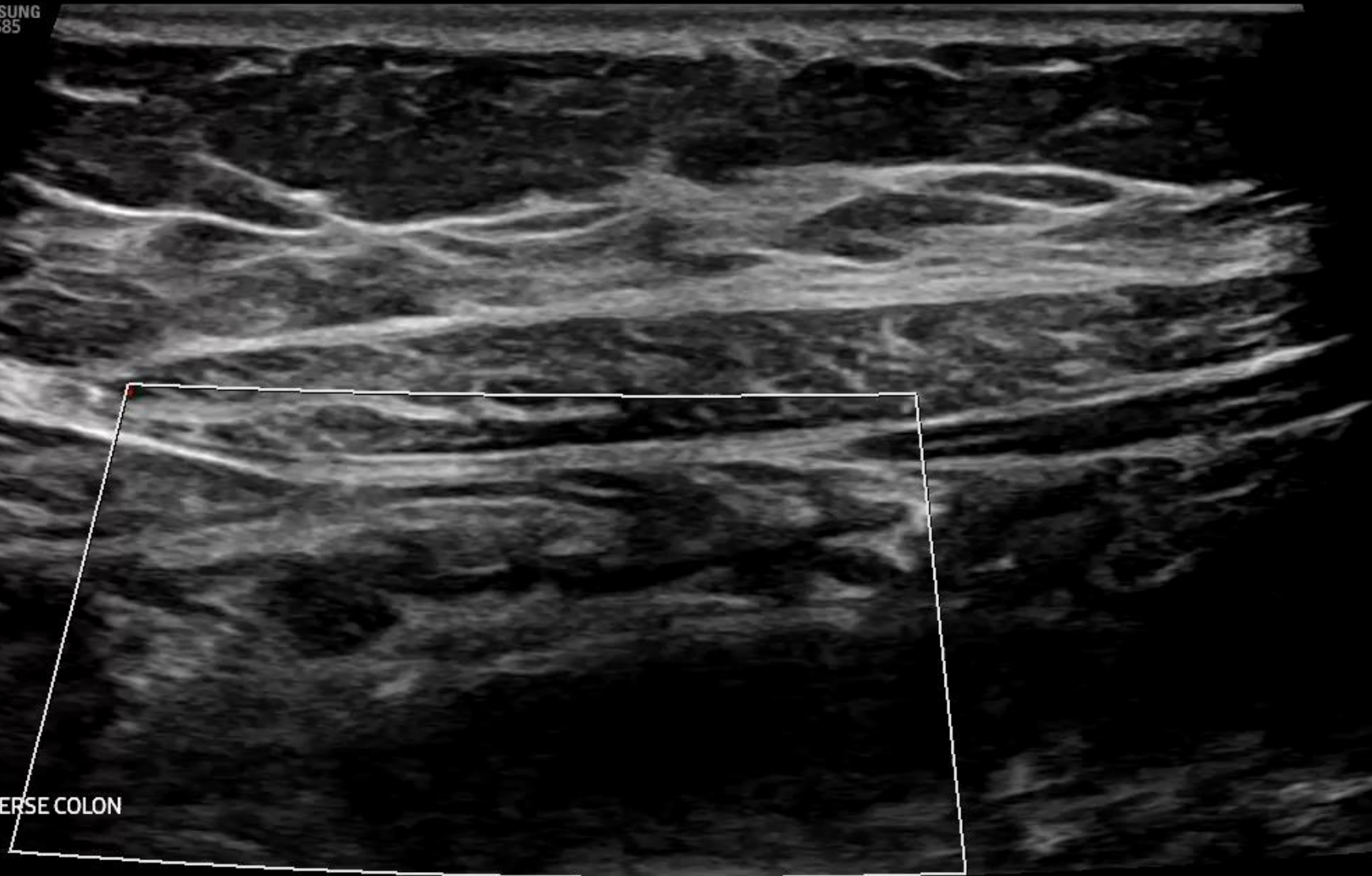
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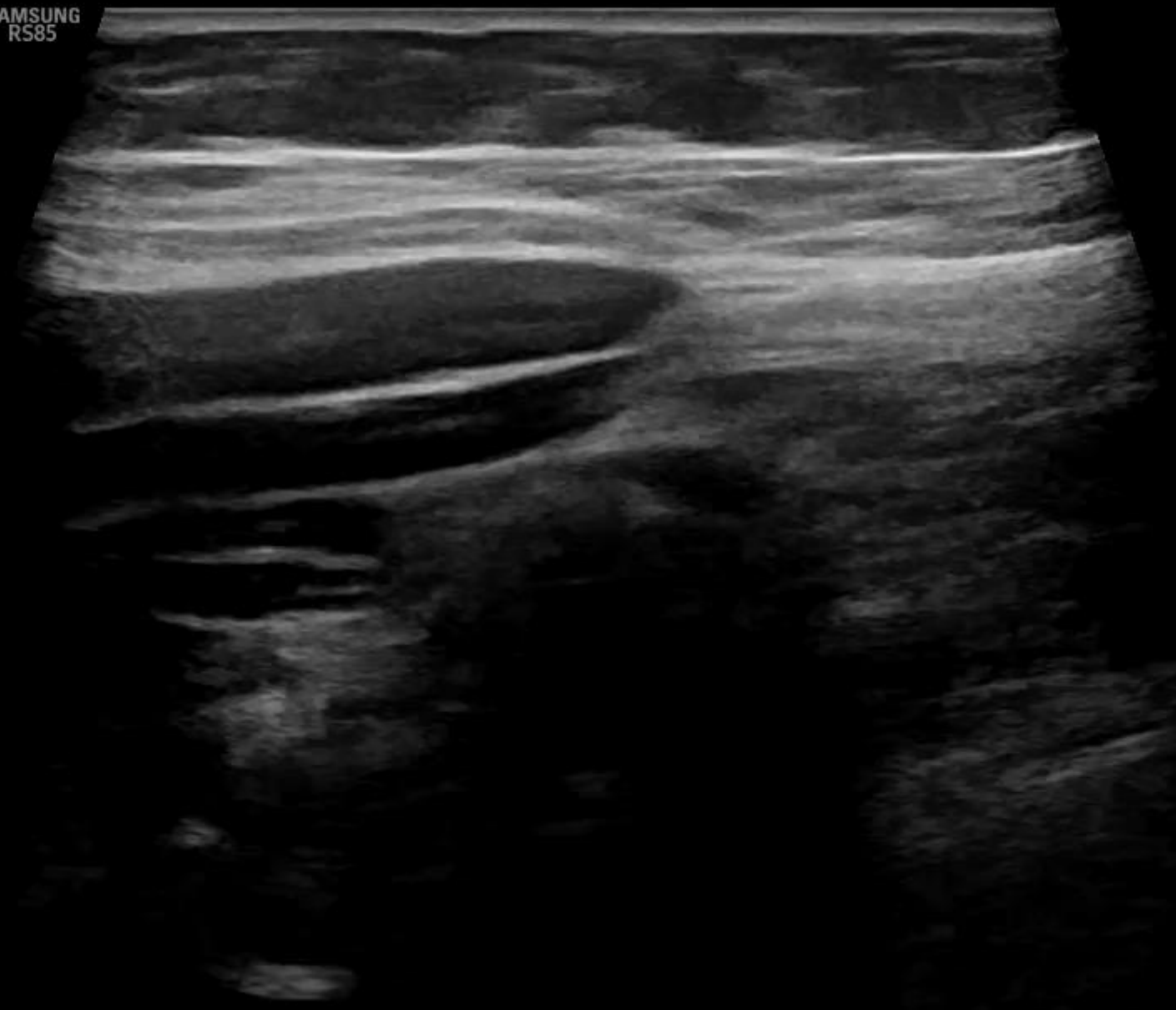
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TRANSVERSE COLON

1
2
3

SAMSUNG
RS85



ASCENDING COLON





SAMSUNG

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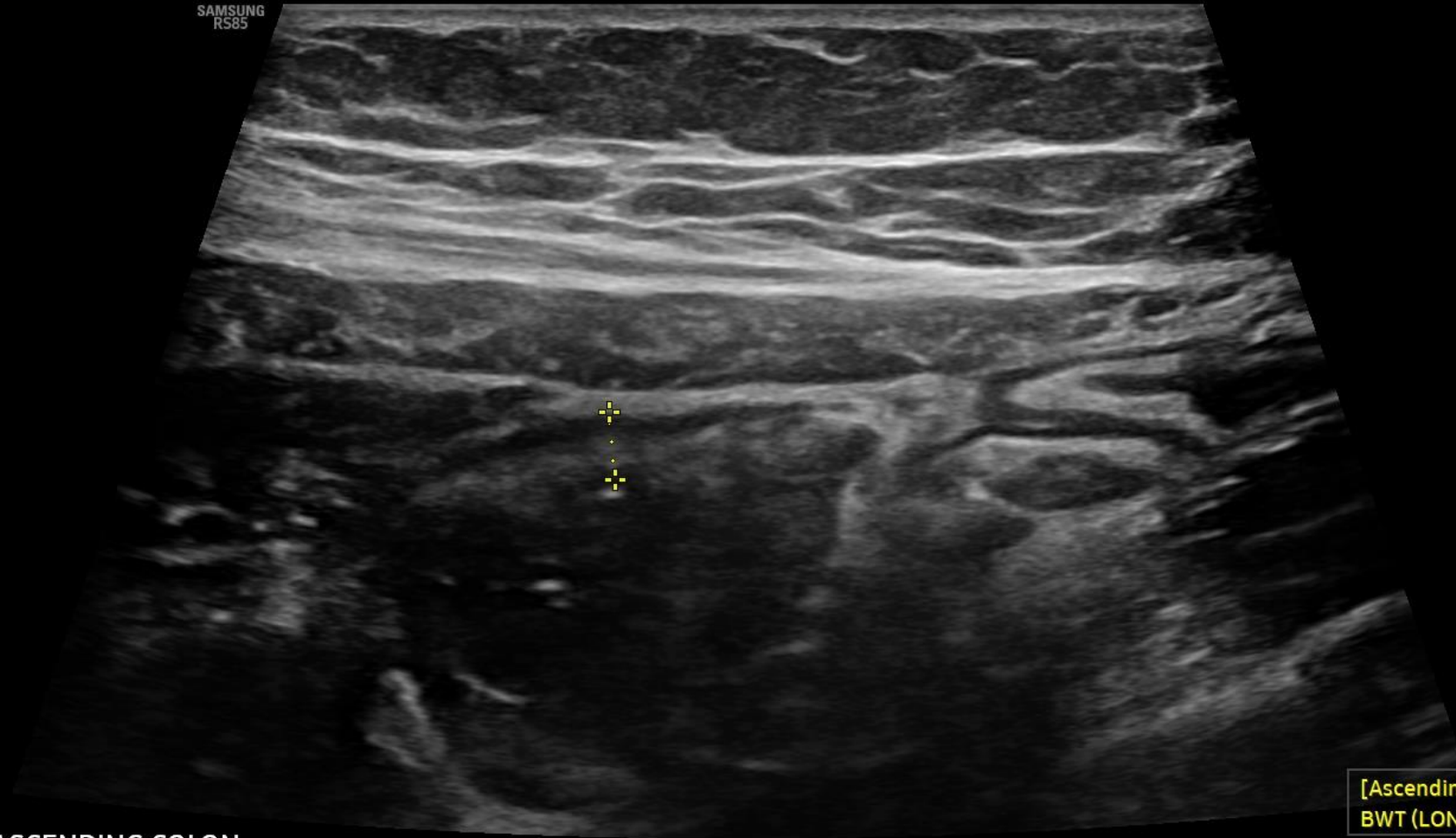
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Small Parts / BOWEL- / LA2-14A / FR46Hz / 4.5cm

[2D]

SAMSUNG
RS85

Frq Res.1
GN 61
DR 49
FA 8
P 100



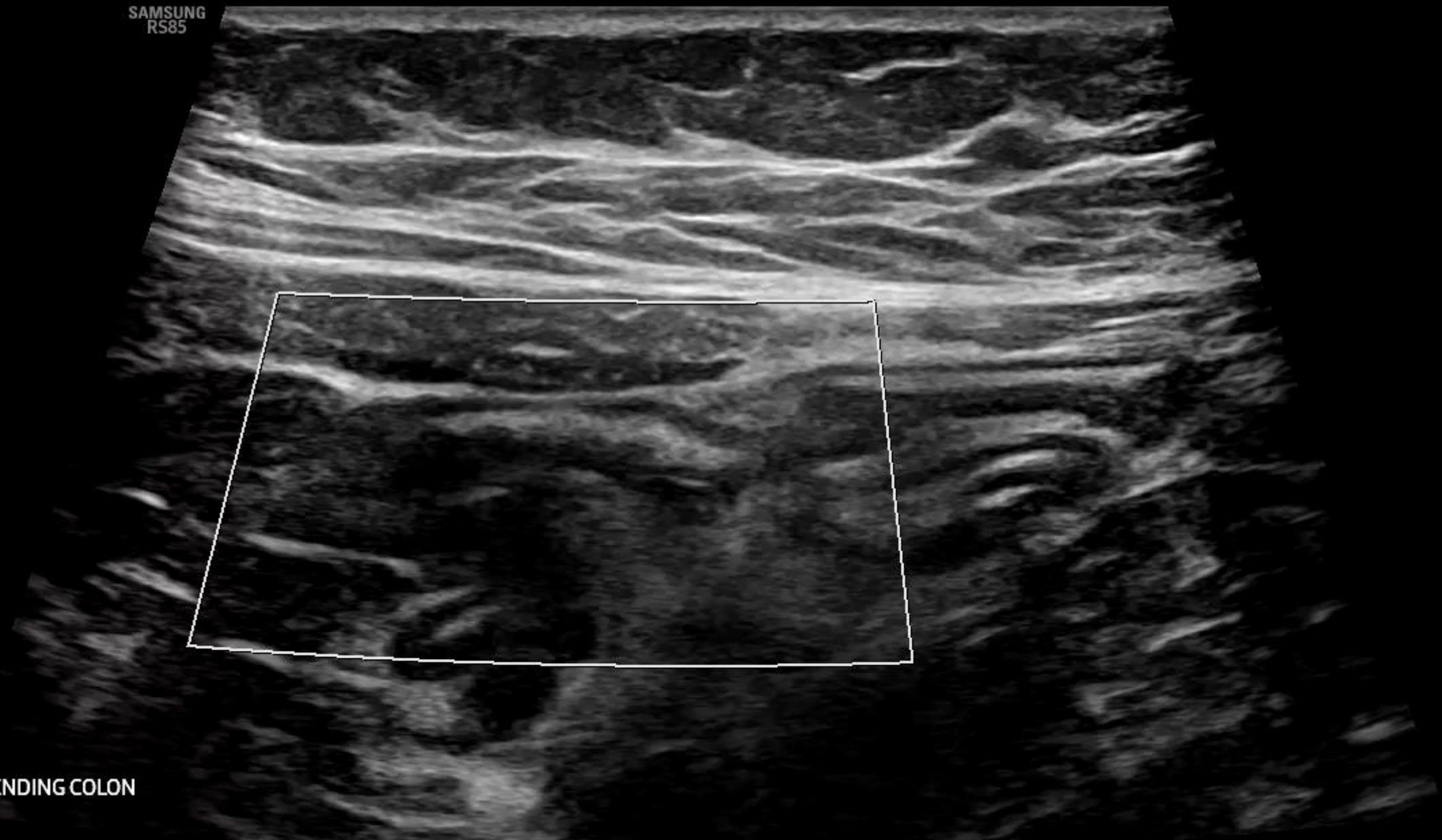
ASCENDING COLON

[Ascending Colon]
BWT (LONG) 3.65 mm

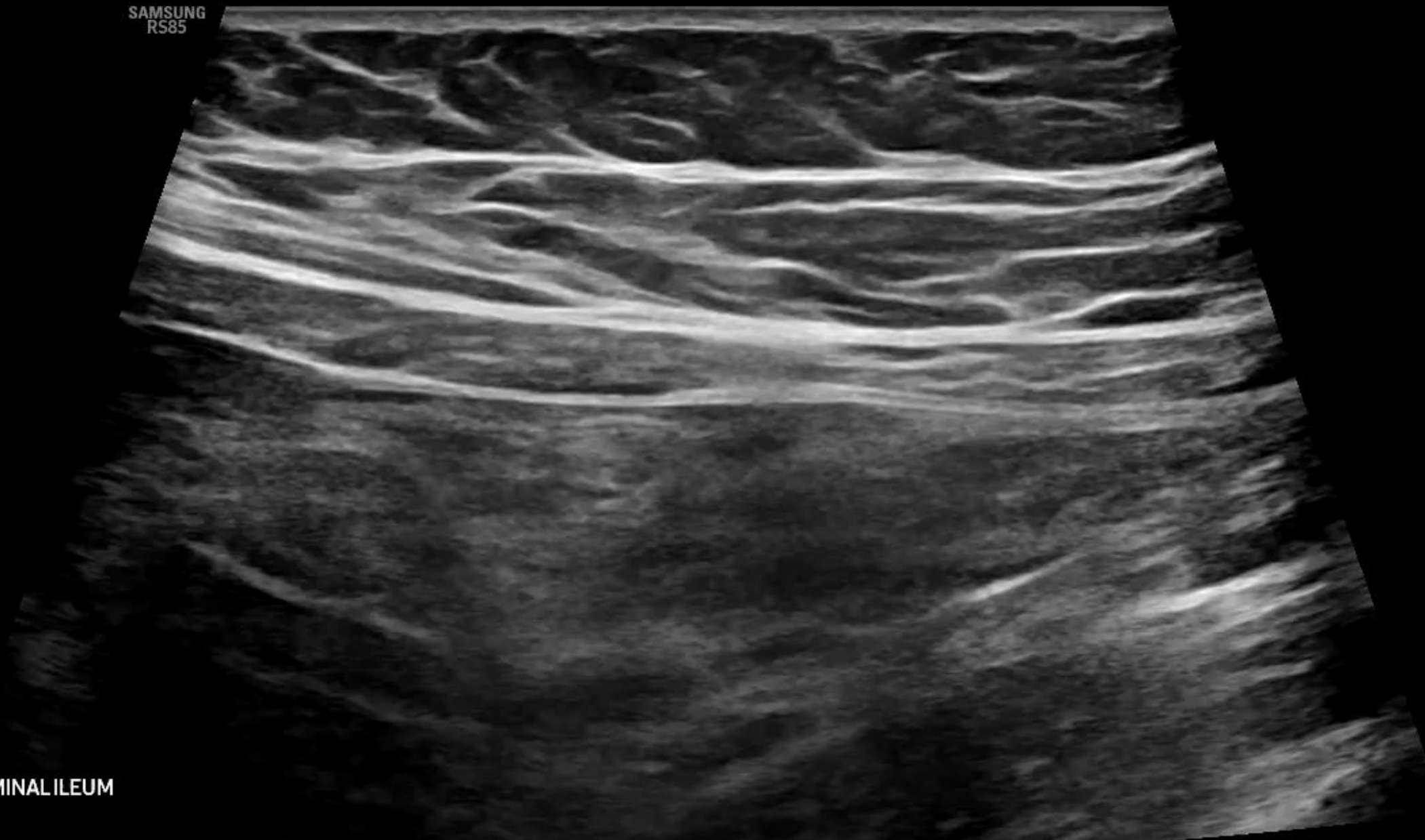
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ASCENDING COLON



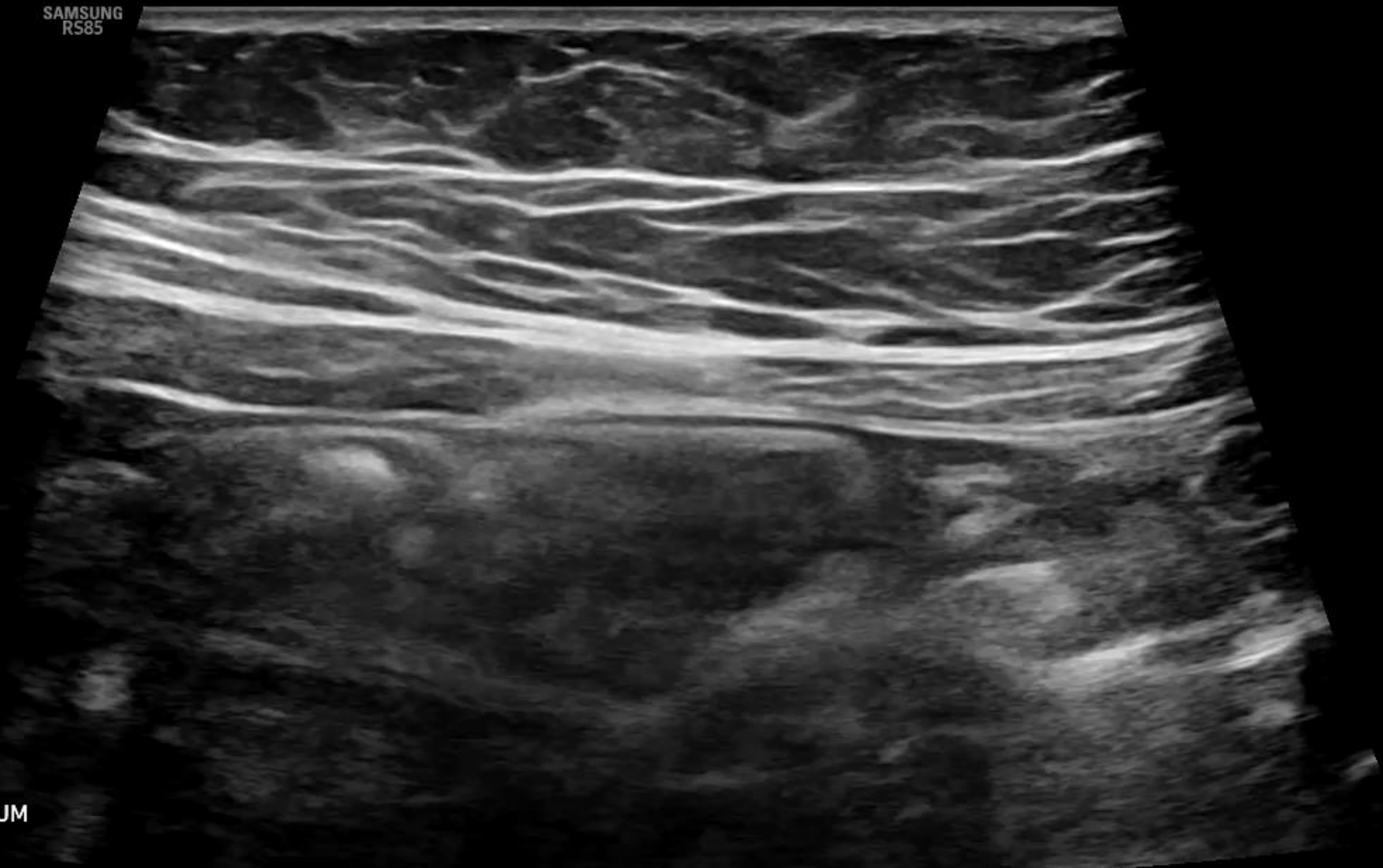
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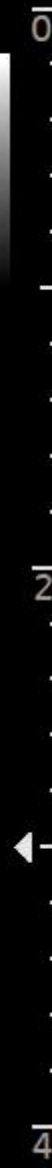
TERMINAL ILEUM



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TERMINAL ILEUM





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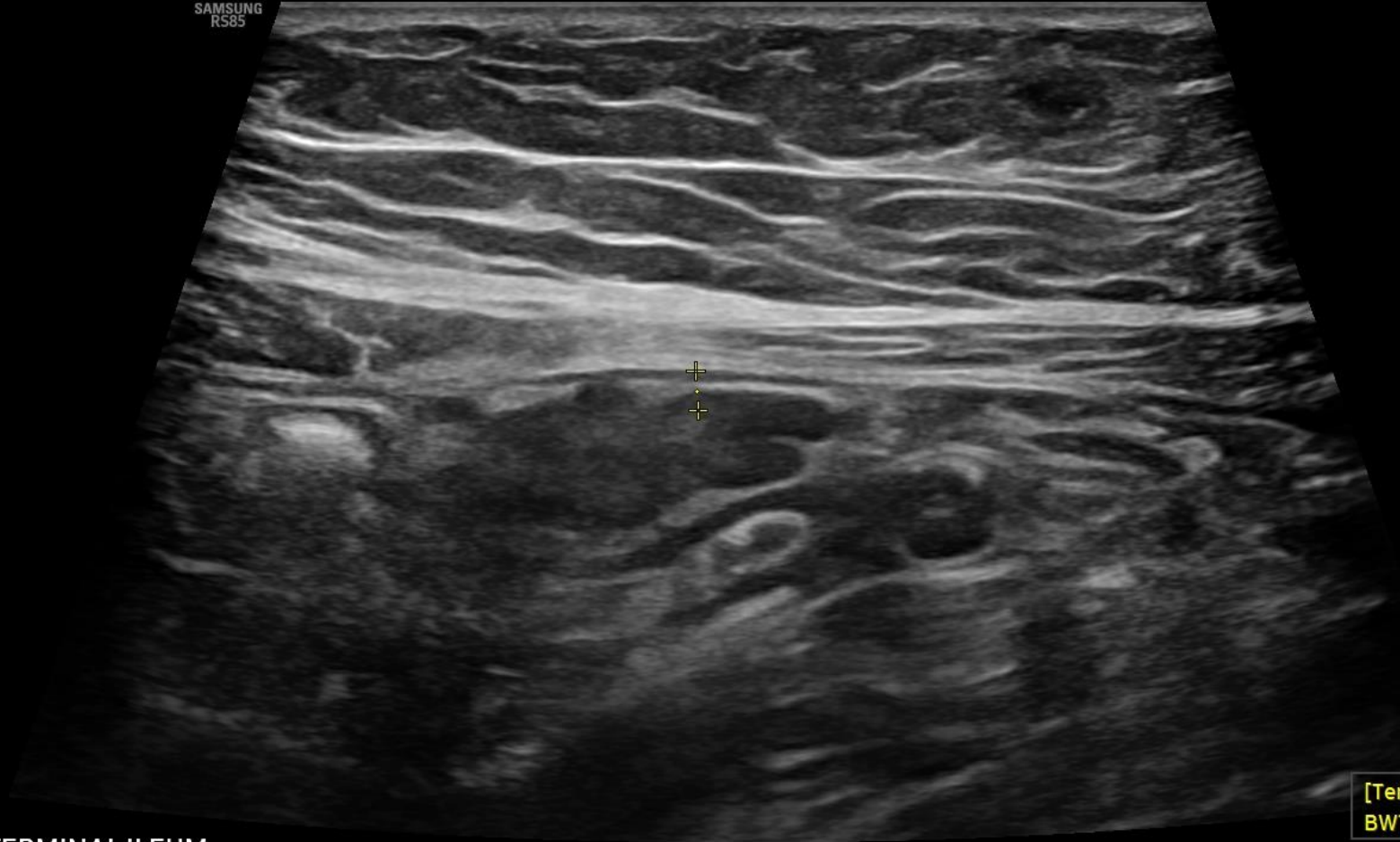


Small Parts /BOWEL- /LA2-14A /FR46Hz /4.5cm

[2D]

Frq Res.1
GN 61
DR 49
FA 8
P 100

SAMSUNG
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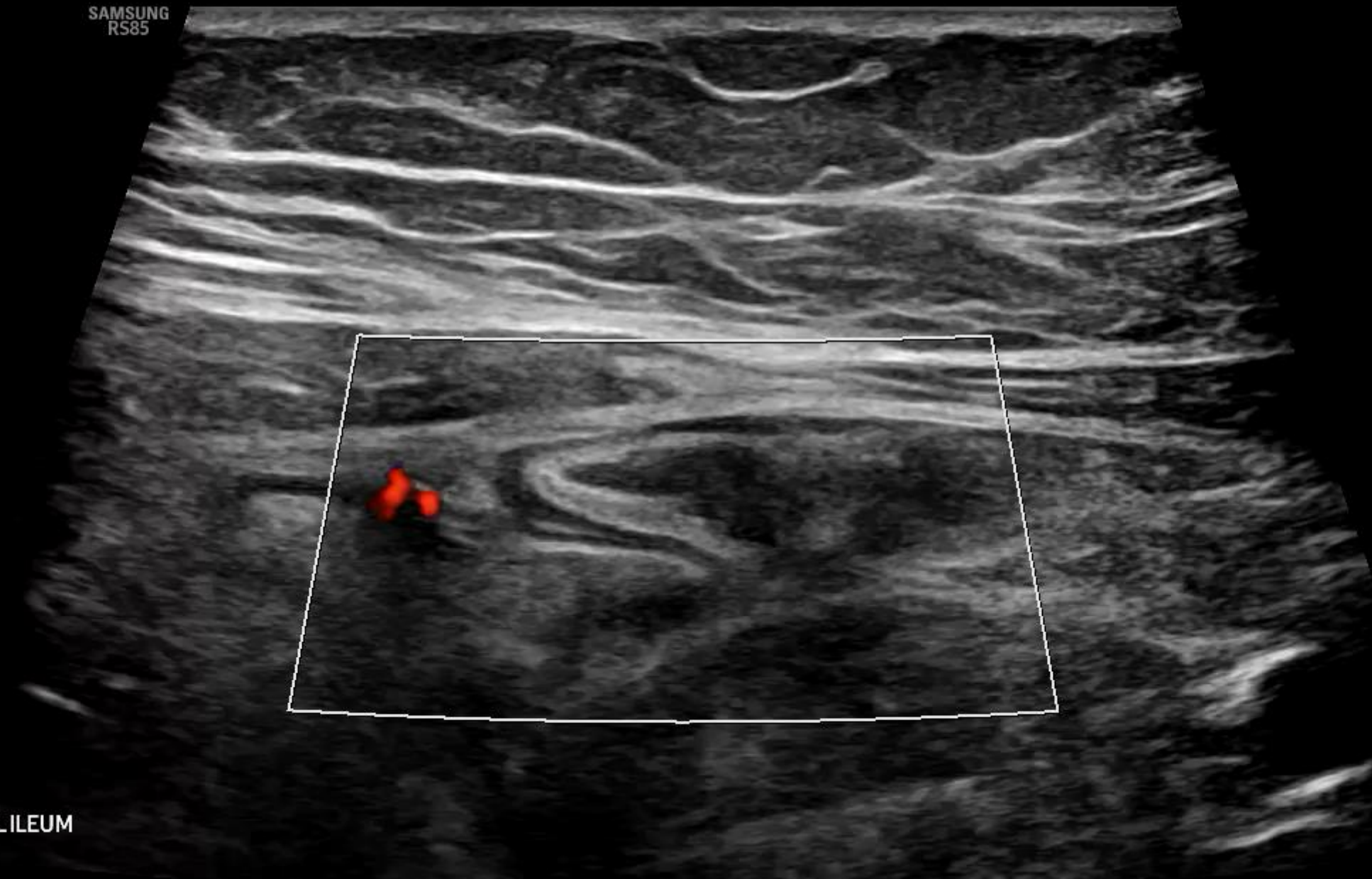
TERMINAL ILEUM

[Terminal ileum]
BWT (LONG) 2.11 mm

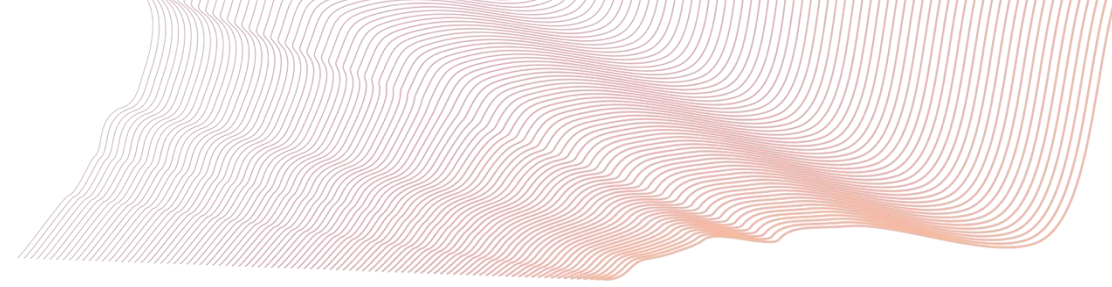
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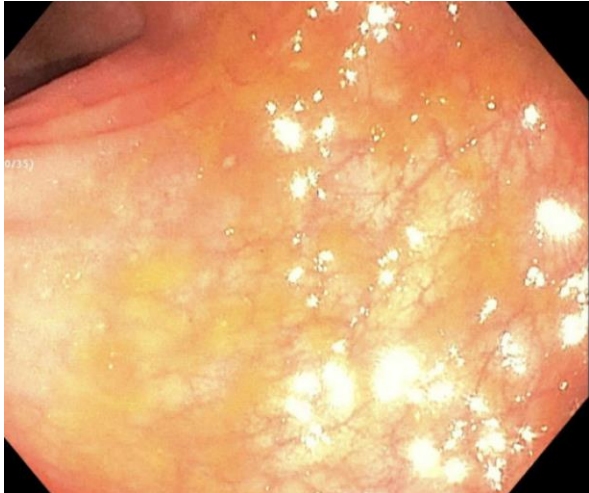
TERMINAL ILEUM



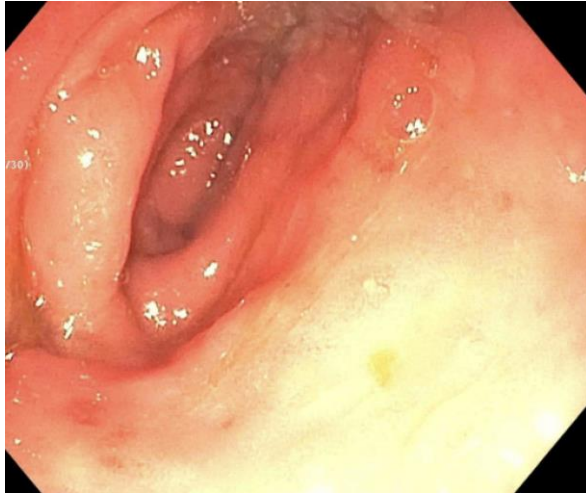
Colonoscopy: April, 20th, 2026



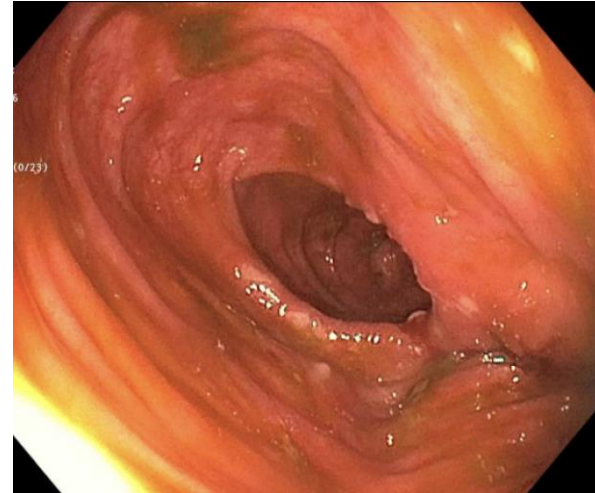
Rectum



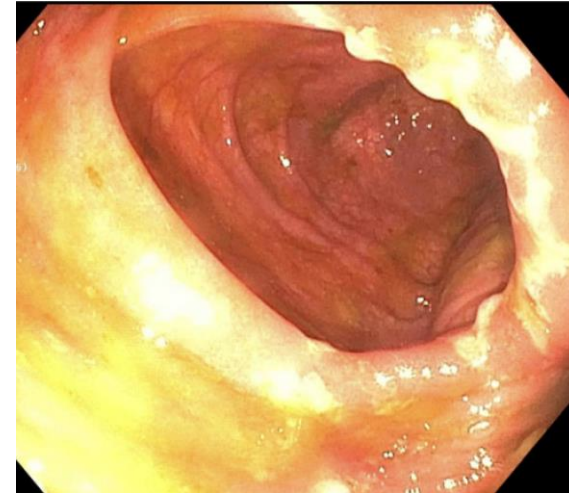
Sigmoid



Ascending



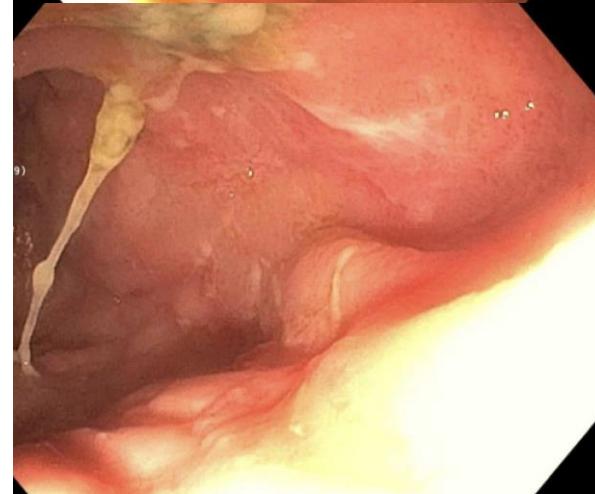
Cecum



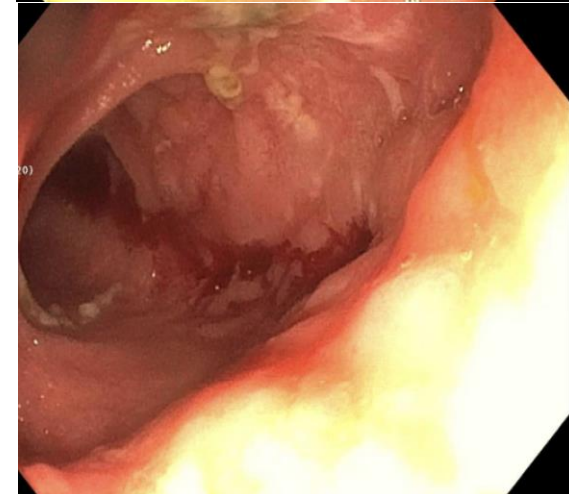
Cecum/ICV



Ileocecal Valve



Terminal Ileum



Terminal Ileum

Case JY

6-year-old female referred by her pediatrician for:

- Abdominal pain
- Iron deficiency anemia
- Fecal occult blood +

Labs 3/7/2025

AST 20

ALT 11

GGT 7

% Iron saturation 3

Iron 10

Ferritin 3

WBC 5.8

Hgb 7.7

Hct 27.5

Plt 376

TSH 1.67

Free T4 1.24

ESR 13

CRP 0.1 mg/L

IgE 239

IgA 125

TTG IgA negative

Endomysial IgA negative

History of Present Illness

- Feeling more tired than usual since December
- Fatigue is stable, not worsening, but also not improving
- Abdominal pain every other day
 - Generalized
 - 15-30 minutes
 - Every other day, unrelated to eating or bowel movements
 - Appetite is normal, without weight loss,
 - Normal growth velocity
- Stool
 - Visible blood, currant jelly like
 - Formed stool with blood mixed in
 - 1-2 bowel movements daily
 - Usually formed, occasional diarrhea
 - Denies urgency, tenesmus, or nocturnal bowel movements

Labs 3/7/2025

AST 20

ALT 11

GGT 7

% Iron saturation 3

Iron 10

Ferritin 3

WBC 5.8

Hgb 7.7

Hct 27.5

Plt 376

TSH 1,67

Free T4 1.24

ESR 13

CRP 0.1 mg/L

IgE 239

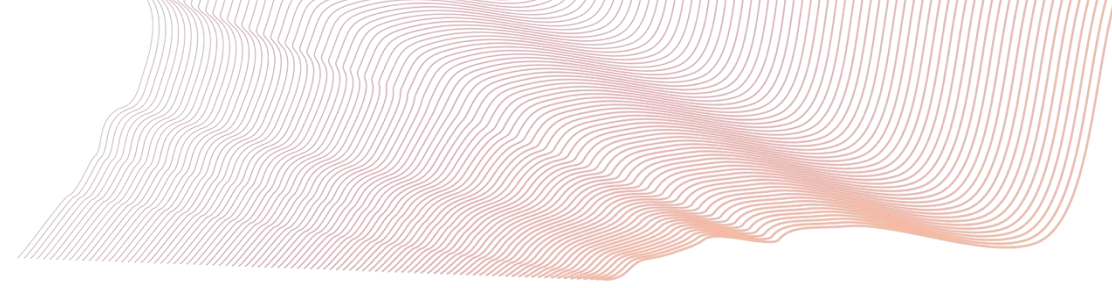
IgA 125

TTG IgA negative

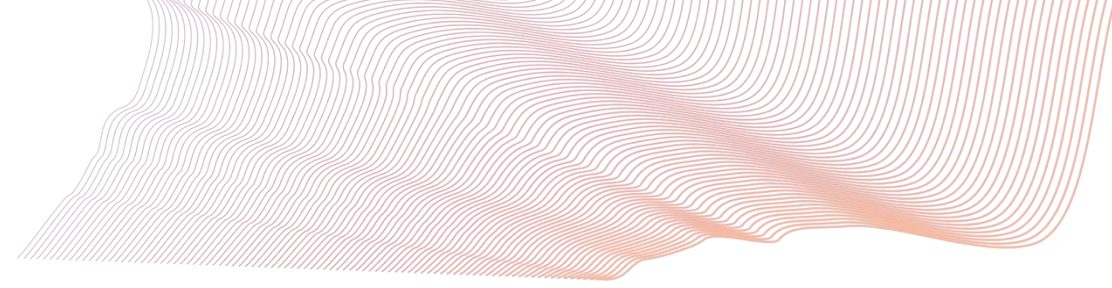
Endomysial IgA negative

Additional History

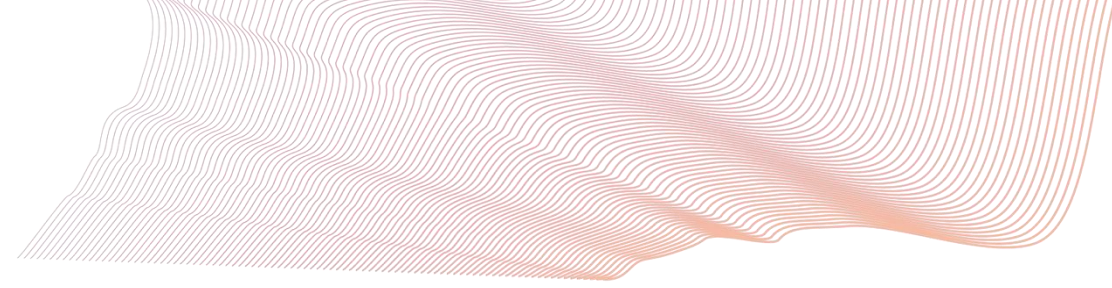
- Diet: Does not include a lot of dairy (6-8 oz per day in the form of milk), otherwise well rounded and diverse with sufficient quantity
- Ethnic Background: Saffardic Jewish
- Family History: Oldest of 4 children, 3 healthy siblings,
 - Father with mild Crohn's disease on 6-MP



Physical Exam is Unremarkable



Differential Diagnosis?



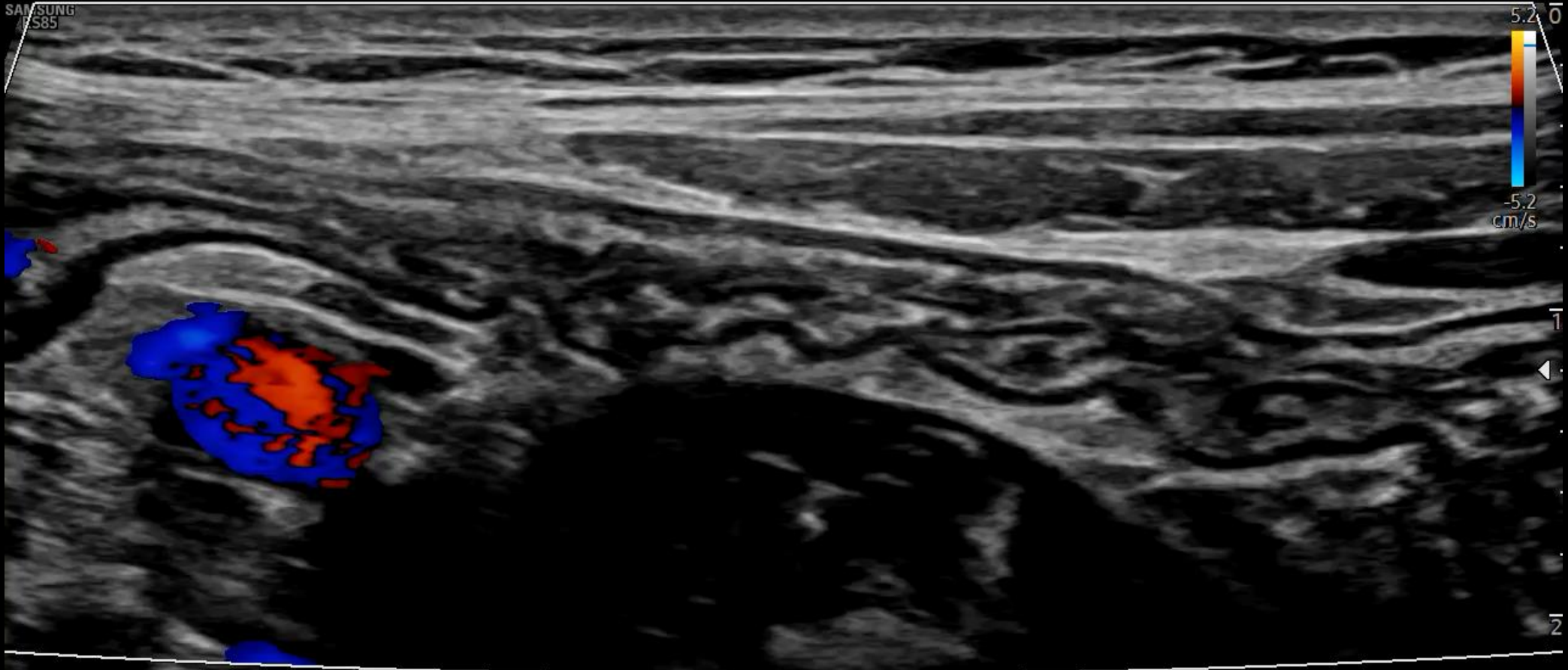
What Do You Want to Do Next?



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[C] Frq Gen. / GN 51 / 0.80kHz / P 100



SAMSUNG
RS85



SIGMOID COLON



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DESCENDING COLON



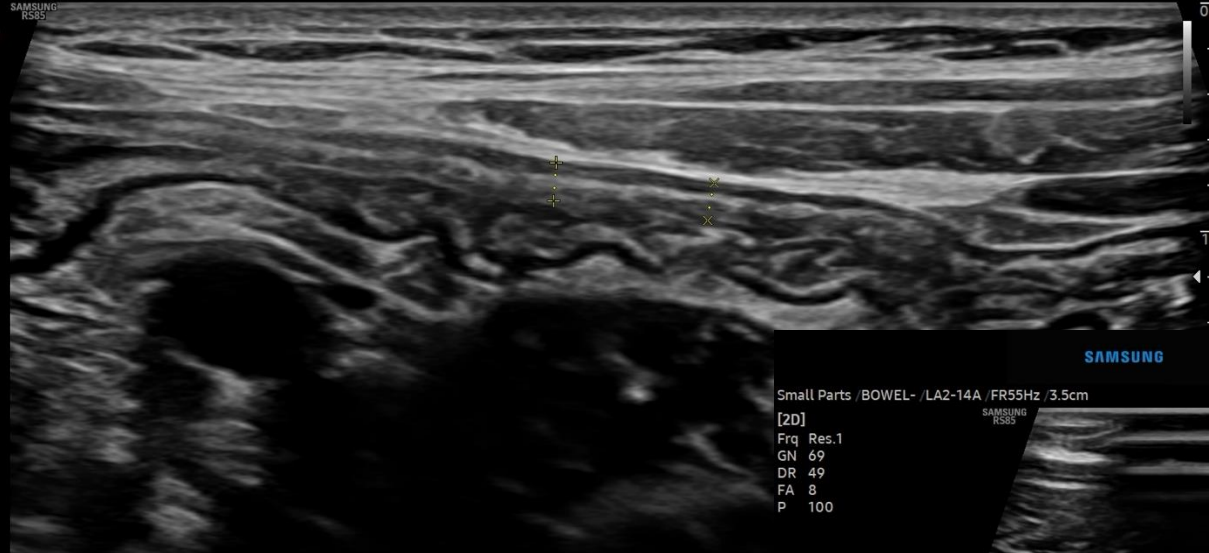
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SAMSUNG

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DR 49
FA 8
P 100



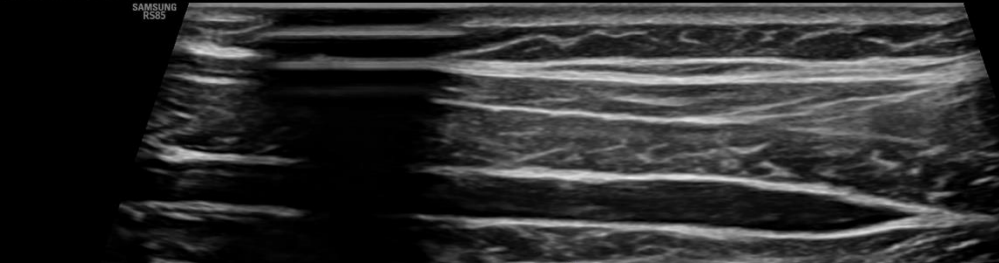
SIGMOID COLON

SAMSUNG

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DR 49
FA 8
P 100



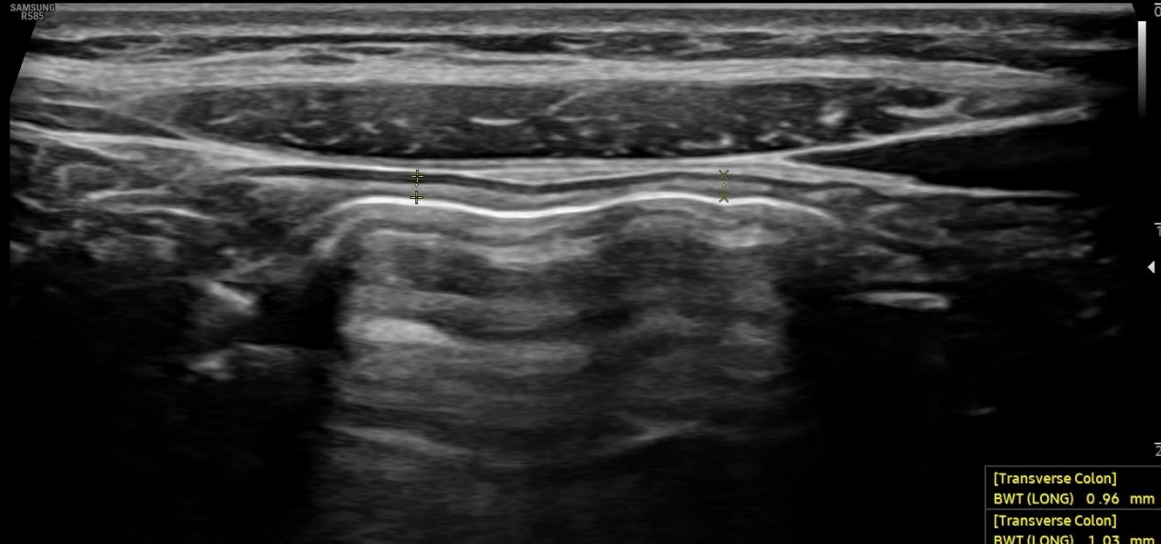
DESCENDING COLON

SAMSUNG

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TIs 0.2 07:58:22 AM

Small Parts /BOWEL- /LA2-14A /FR68Hz /2.5cm

[2D]
Frq Res.1
GN 69
DR 49
FA 8
P 100



TRANSVERSE COLON

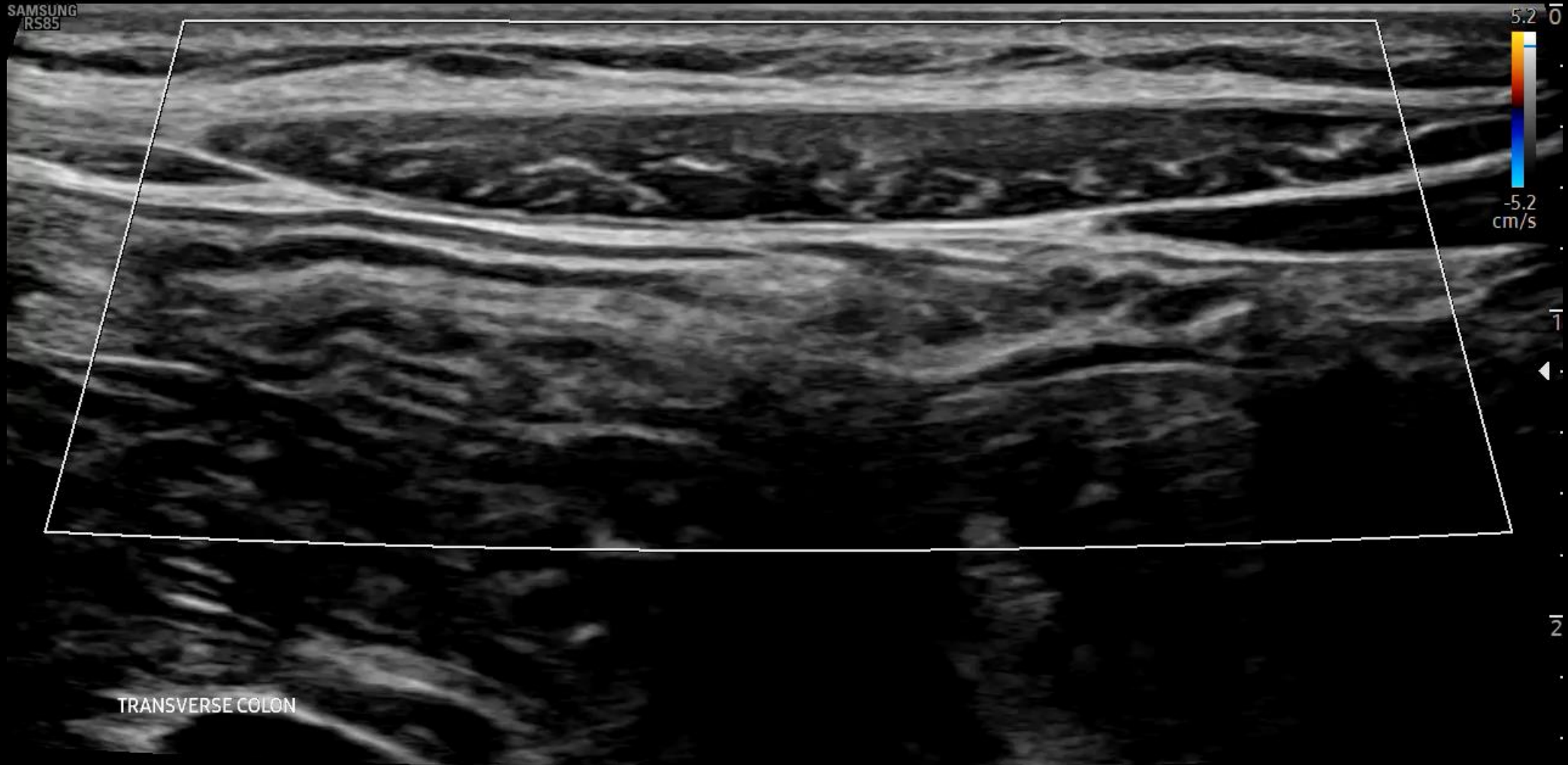
[Transverse Colon]
BWT (LONG) 0.96 mm
[Transverse Colon]
BWT (LONG) 1.03 mm



Small Parts / BOWEL- / LA2-14A / FPS18 / 2.5cm / MI1.3 / TI0.4 / 03-24-2025 07:58:43 AM
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RS85



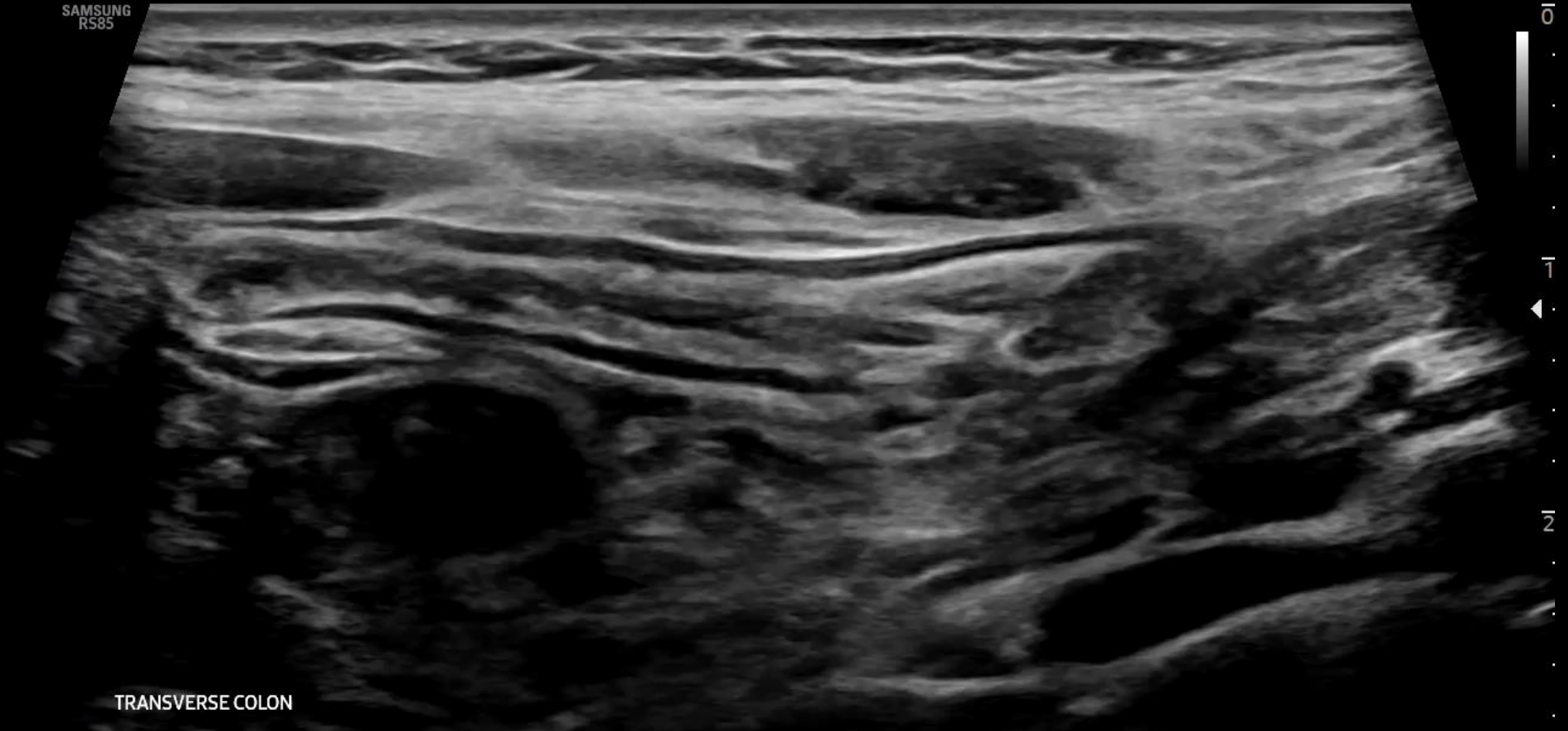
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RS85



TRANSVERSE COLON

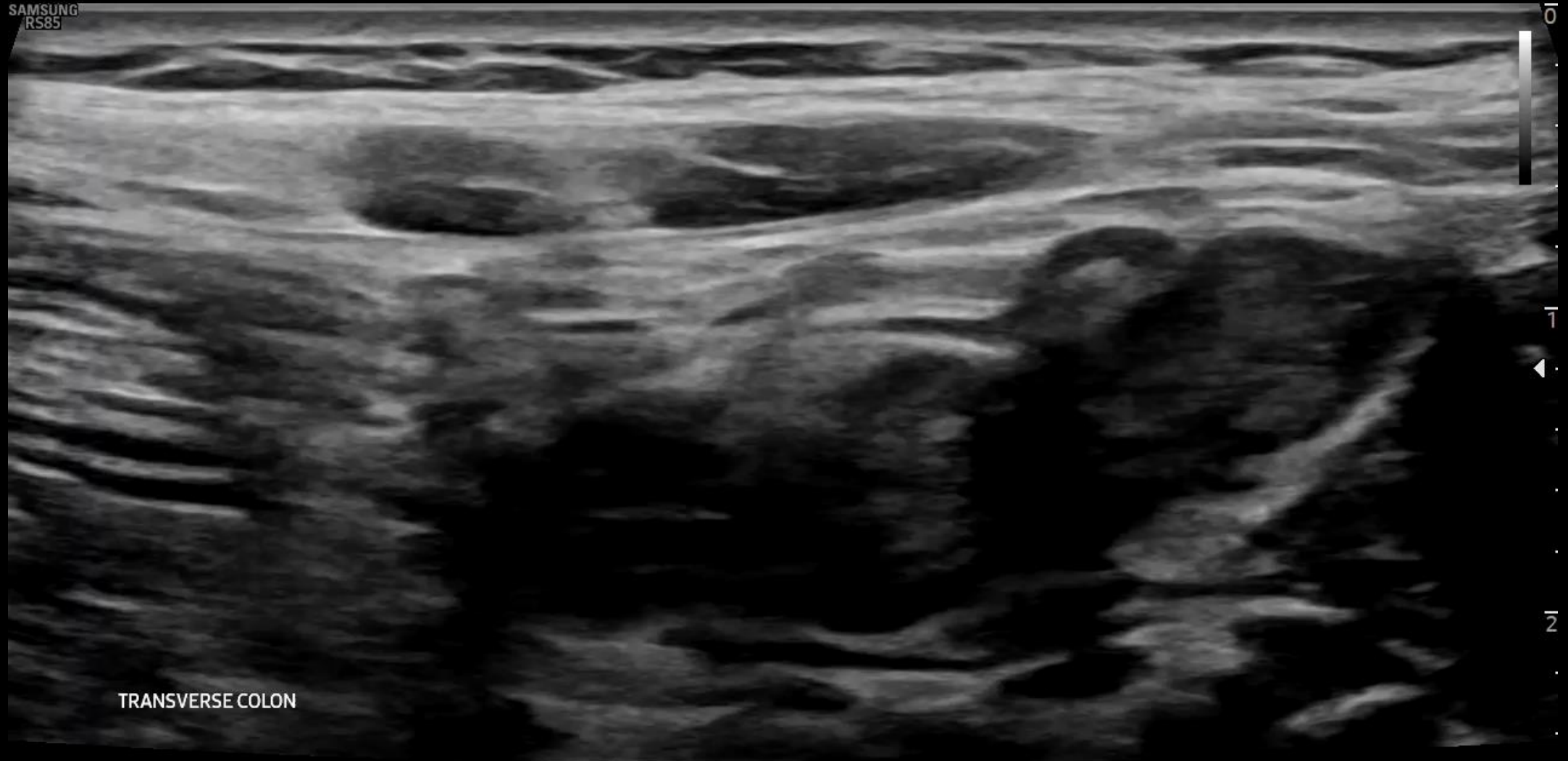




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RS85



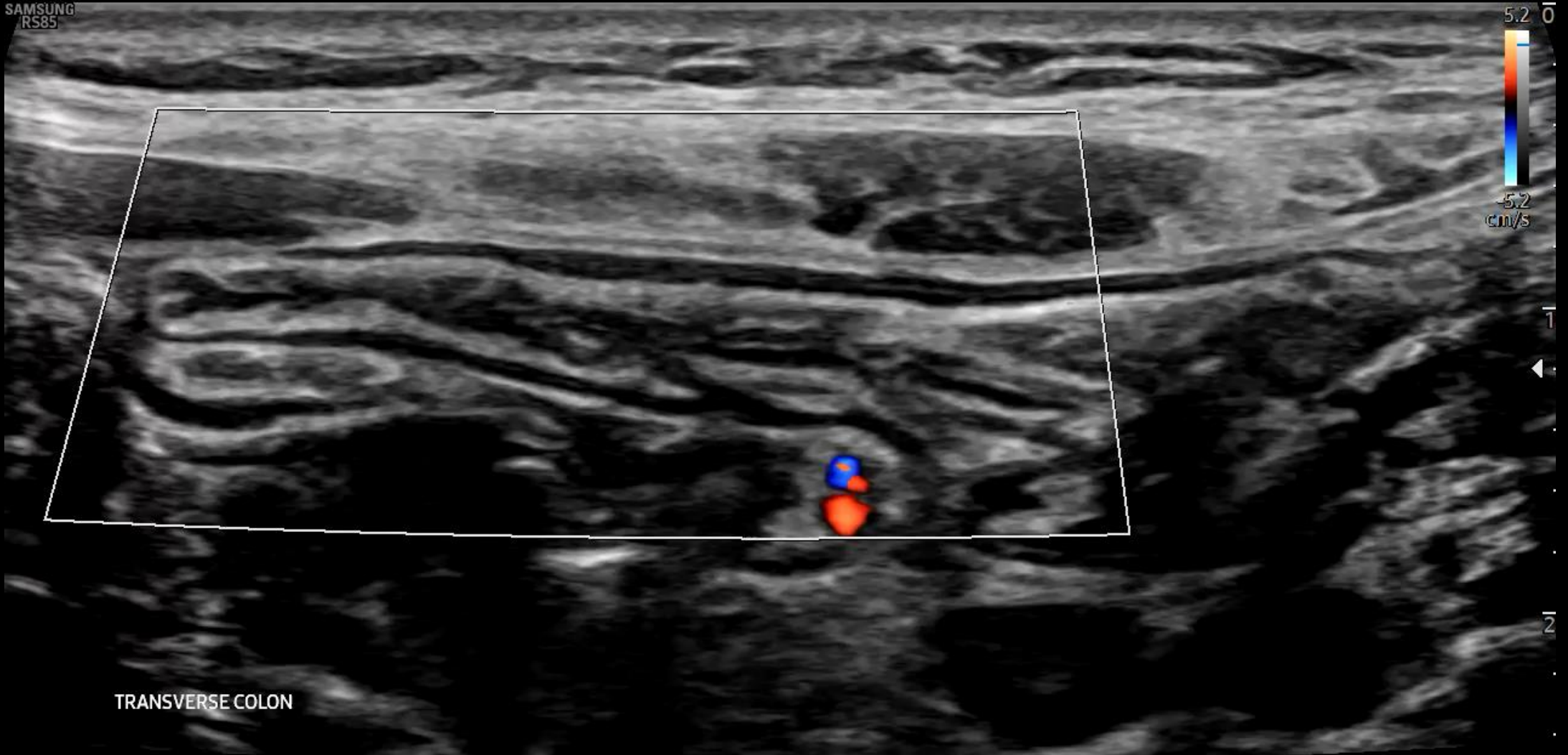
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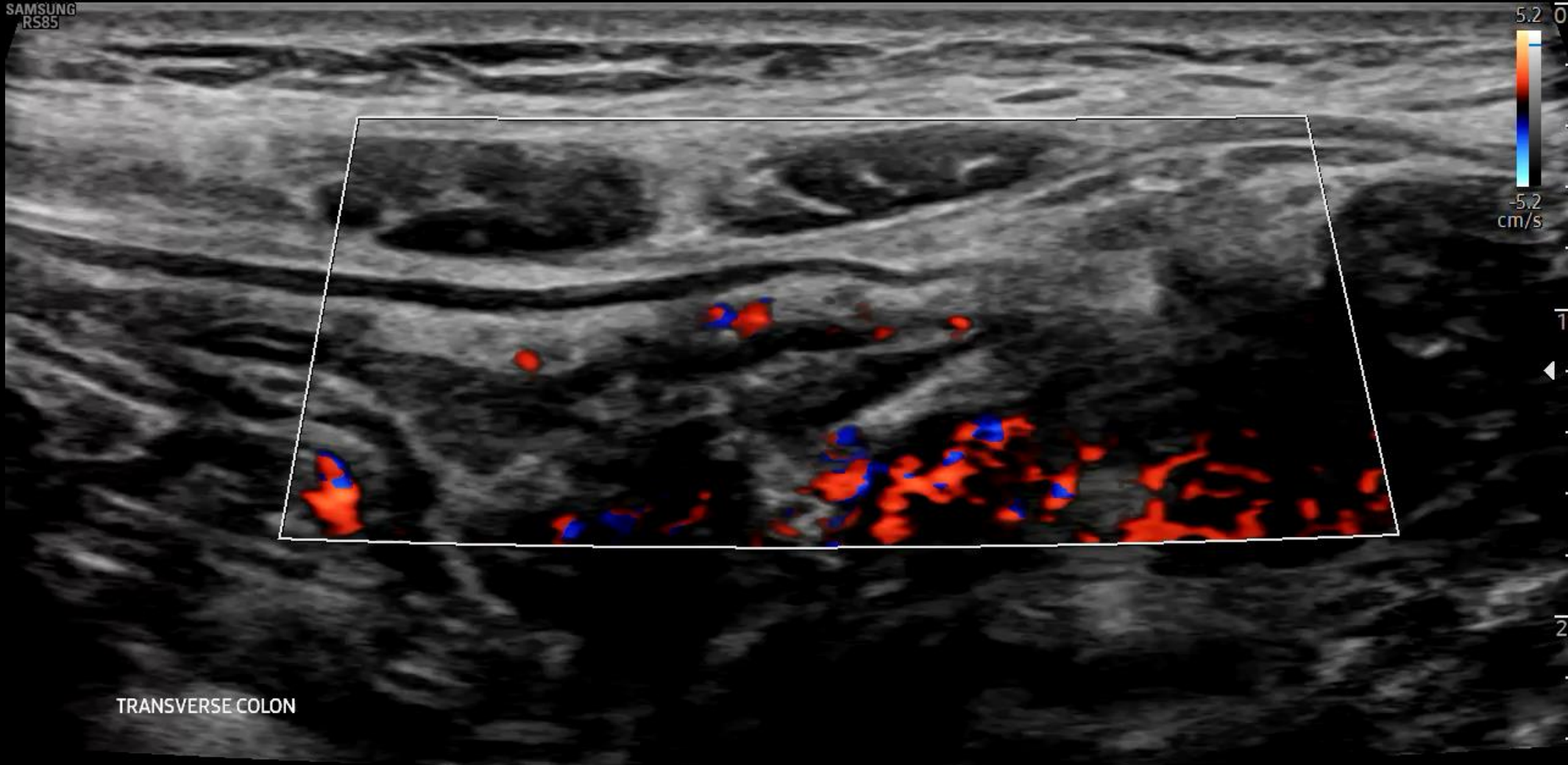
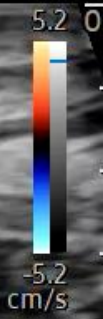
TRANSVERSE COLON



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TRANSVERSE COLON



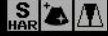
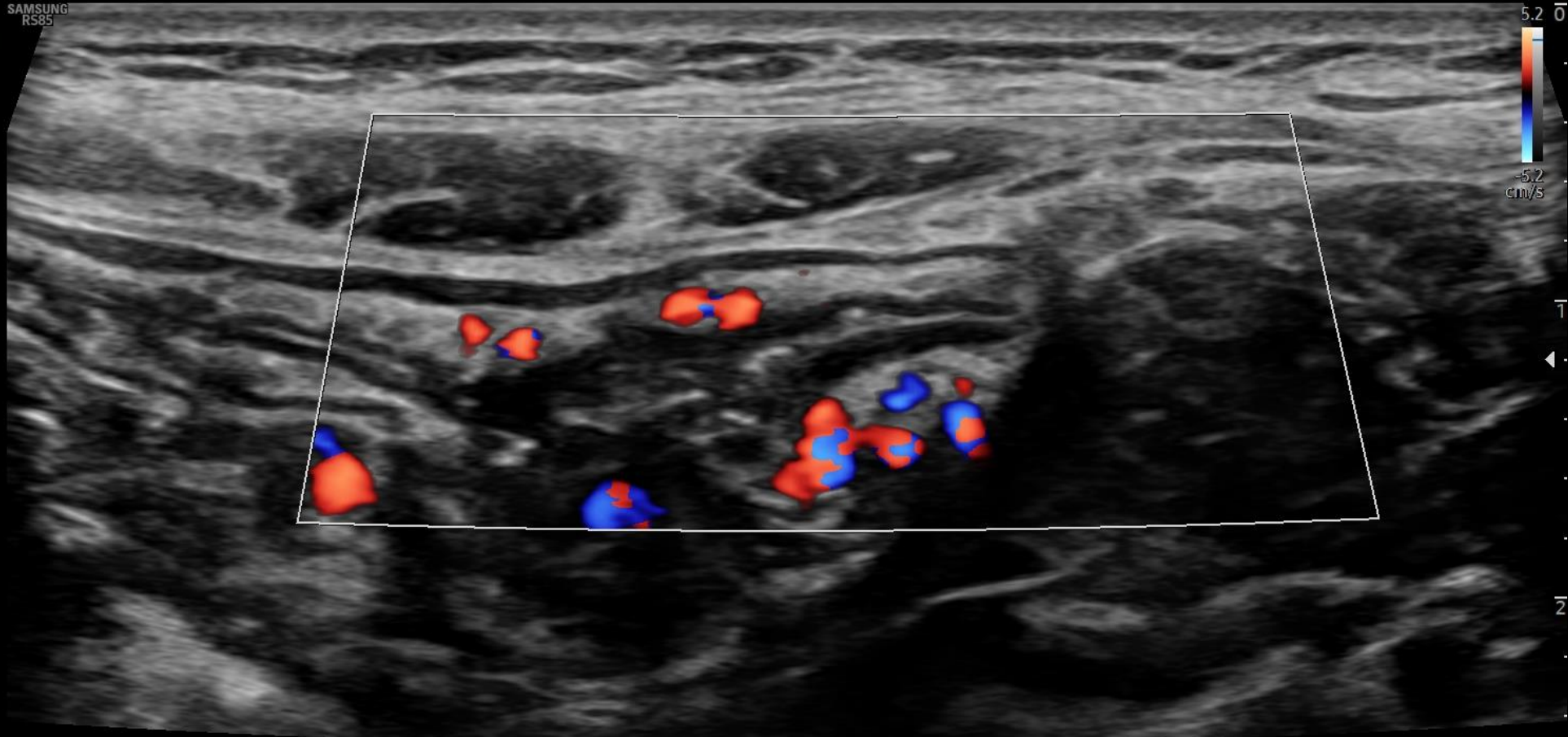
SAMSUNG

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Small Parts /BOWEL- /LA2-14A /FR19Hz /2.5cm

[2D]
Frq Res.1
GN 69
DR 49
FA 4
P 100
[PD]
Frq Gen.
GN 61
0.80kHz
P 100

SAMSUNG
RS85



TRANSVERSE COLON



SAMSUNG

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TIs 0.2 08:01:33 AM

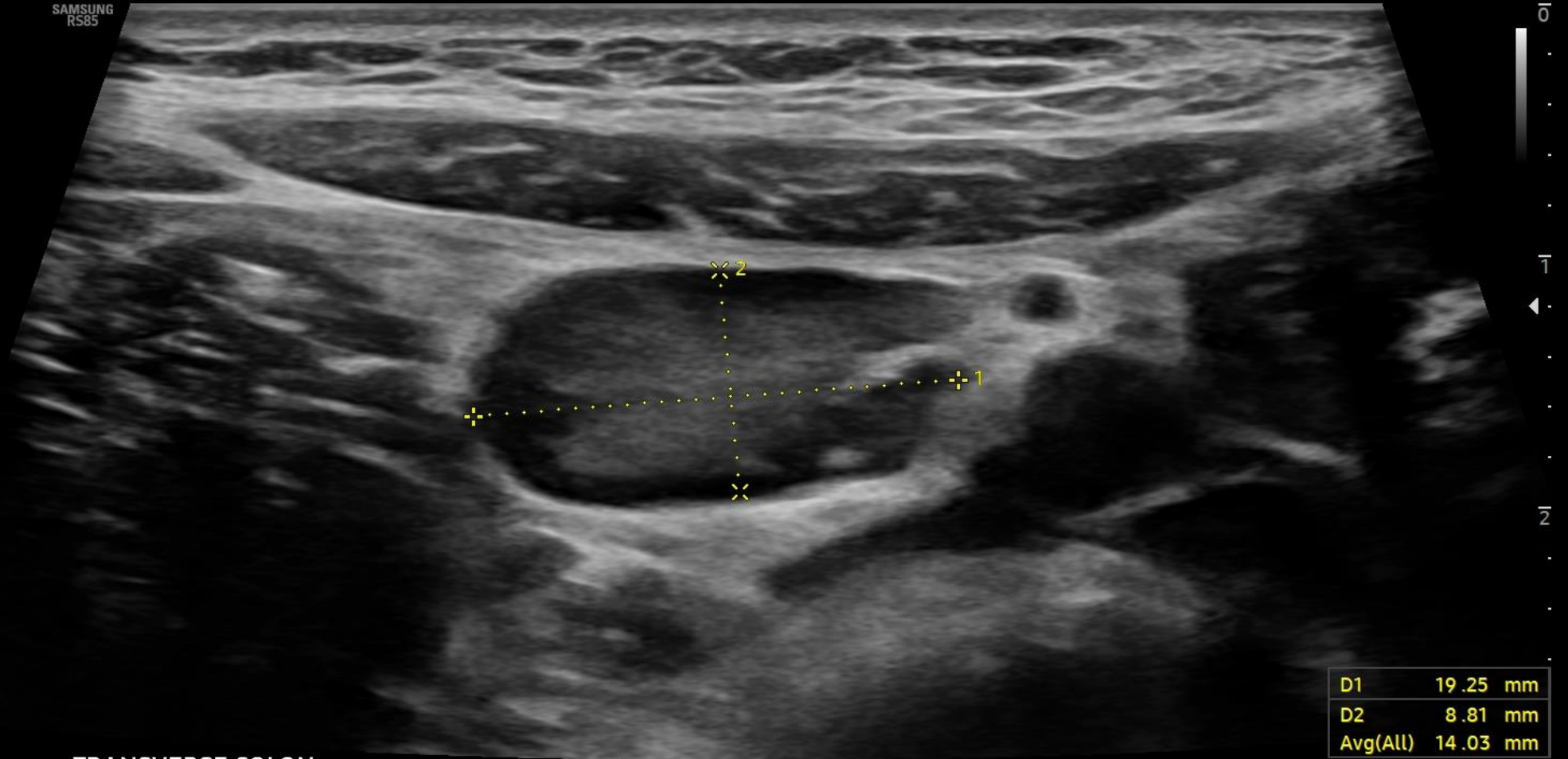


Small Parts /BOWEL- /LA2-14A /FR61Hz /3.0cm

[2D]

SAMSUNG
RS85

Frq Res.1
GN 69
DR 49
FA 8
P 100



TRANSVERSE COLON



SAMSUNG

MI 1.3 03-24-2025

TIs 0.2 08:01:09 AM

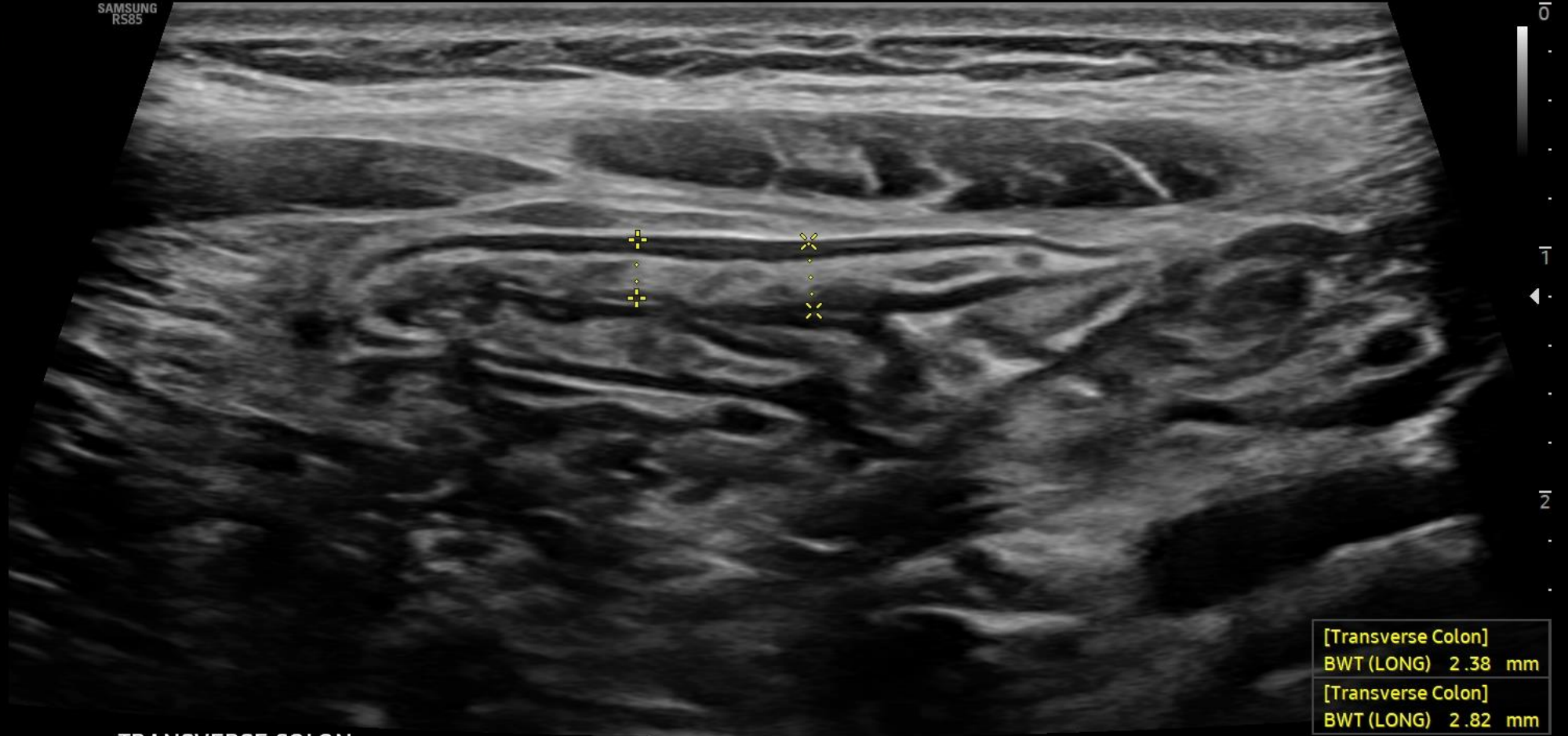


Small Parts /BOWEL- /LA2-14A /FR61Hz /3.0cm

[2D]

SAMSUNG
RS85

Frq Res.1
GN 69
DR 49
FA 8
P 100



TRANSVERSE COLON

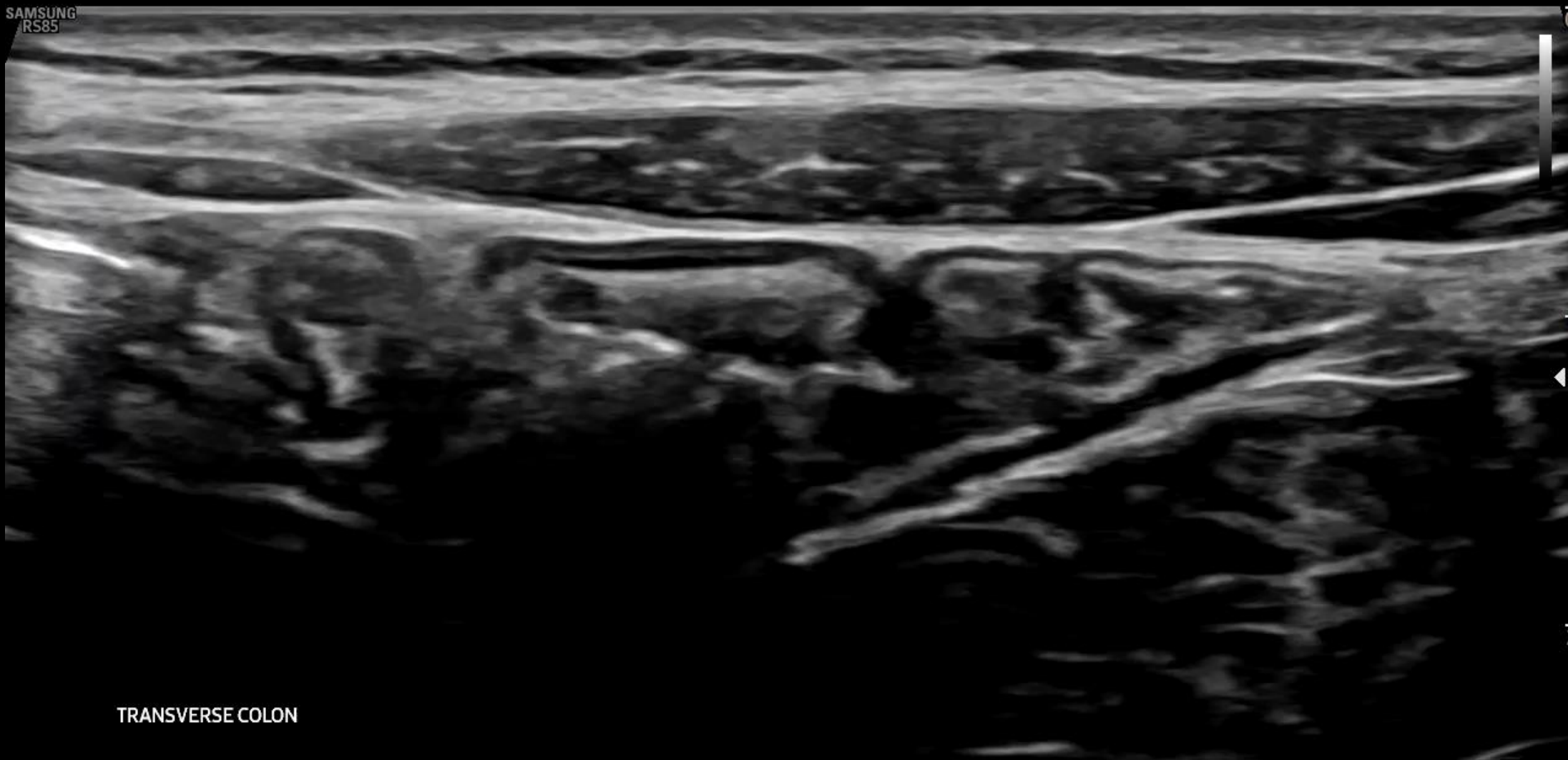
[Transverse Colon]
BWT (LONG) 2.38 mm
[Transverse Colon]
BWT (LONG) 2.82 mm



Small Parts / BOWEL- / LA2-14A / FPS68 / 2.5cm / MI1.3 / TIs0.2 / 03-24-2025 08:03:12 AM
[2D] Frq Res.1/GN 69/DR 49/FA 8/P 100



SAMSUNG
RS85



TRANSVERSE COLON



SAMSUNG

MI 1.3 03-24-2025
TIs 0.2 08:03:57 AM

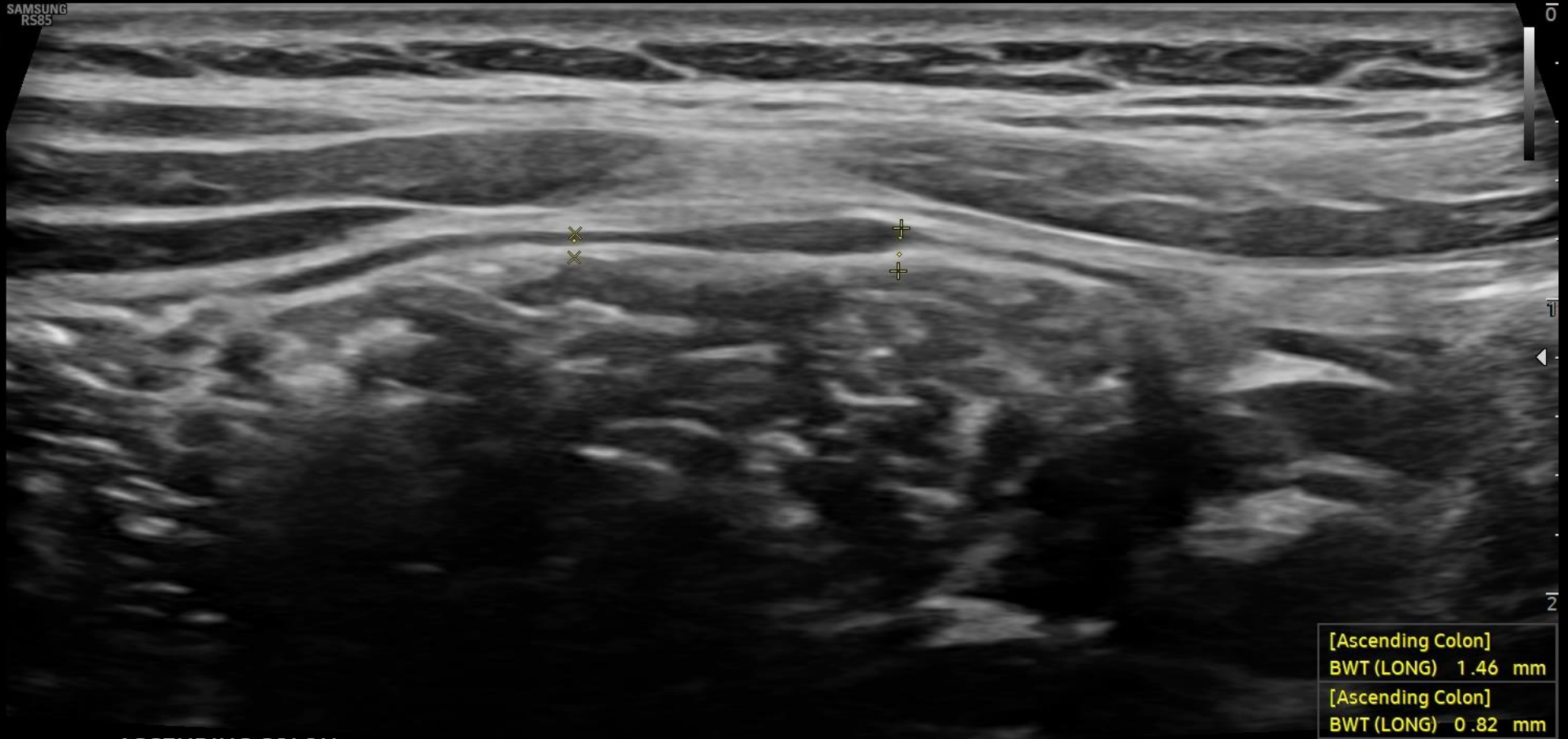
Small Parts /BOWEL- /LA2-14A /FR68Hz /2.5cm



[2D]

SAMSUNG
RS85

Frq Res.1
GN 69
DR 49
FA 8
P 100



ASCENDING COLON

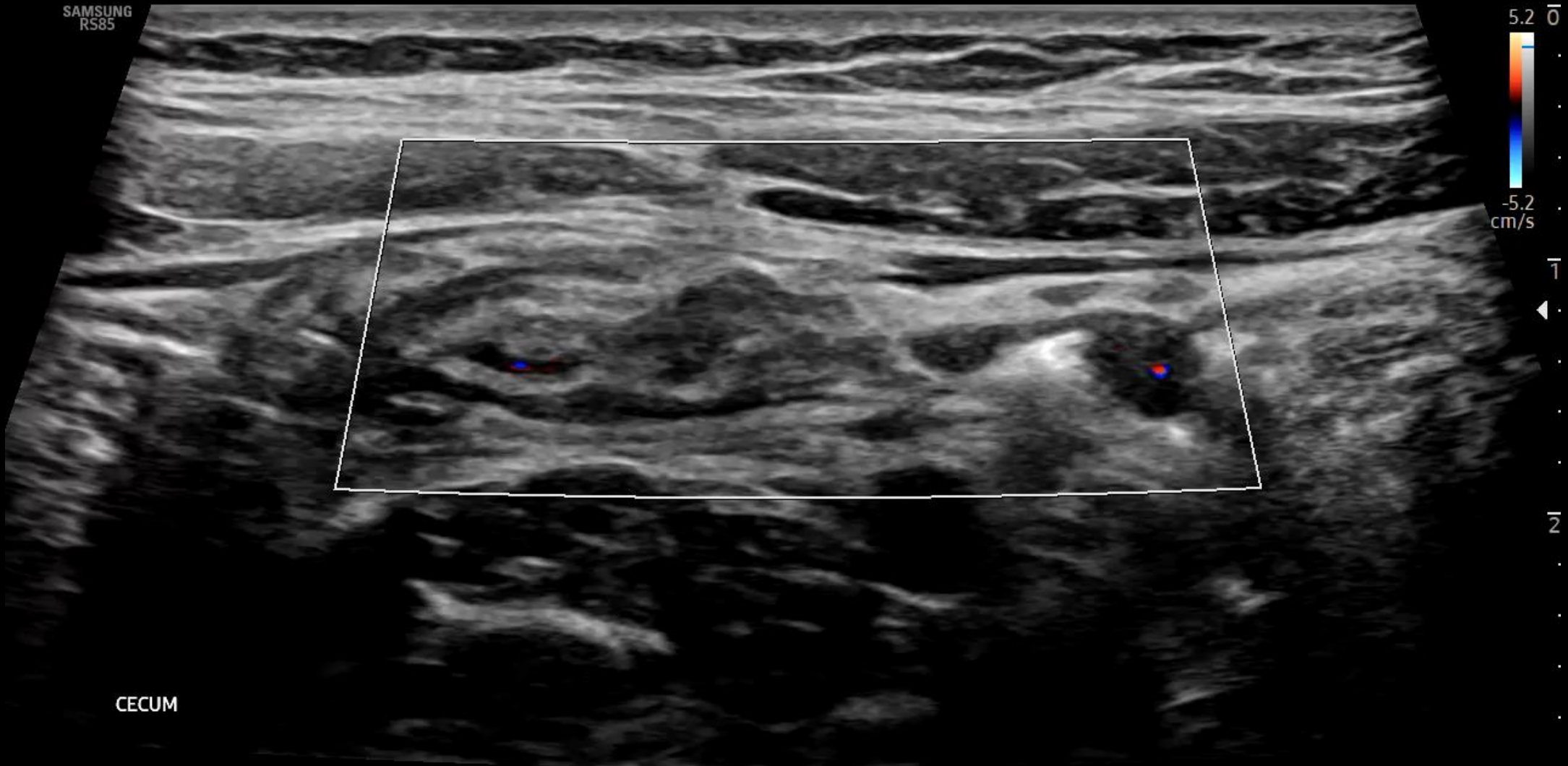
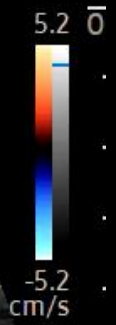
[Ascending Colon]
BWT (LONG) 1.46 mm
[Ascending Colon]
BWT (LONG) 0.82 mm



Small Parts / BOWEL- / LA2-14A / FPS19 / 3.0cm / MI1.3 / TI0.6 / 03-24-2025 08:04:56 AM
[2D] Frq Res.1 / GN 69 / DR 49 / FA 4 / P 100
[PD] Frq Gen. / GN 61 / 0.80kHz / P 100



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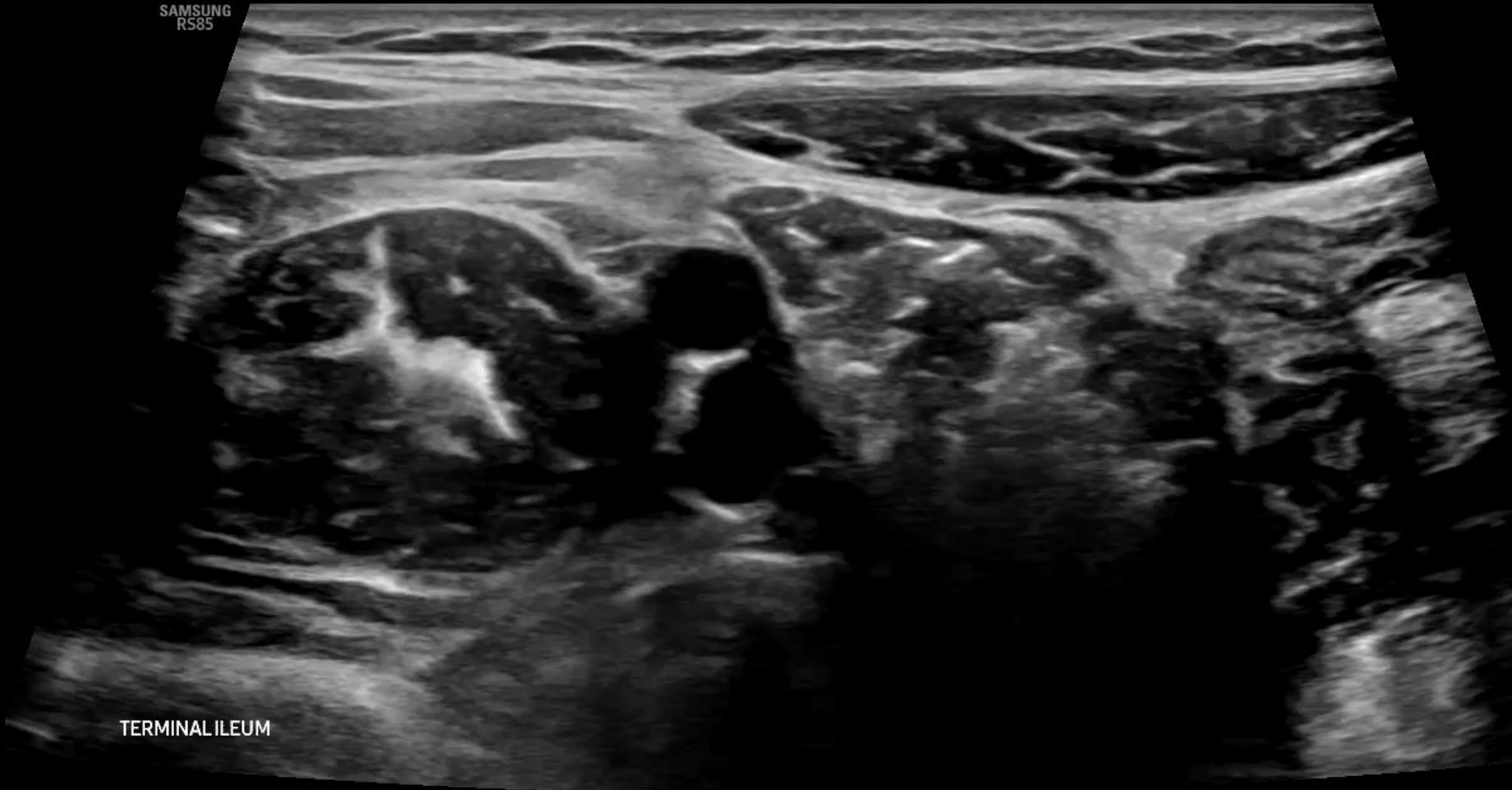
CECUM



Small Parts / BOWEL - / LA2-14A / FPS55 / 3.5cm / MI1.4 / TIs0.2 / 03-24-2025 08:05:40 AM
[2D] Frq Res.1 / GN 69 / DR 49 / FA 8 / P 100



SAMSUNG
RS85



TERMINAL ILEUM

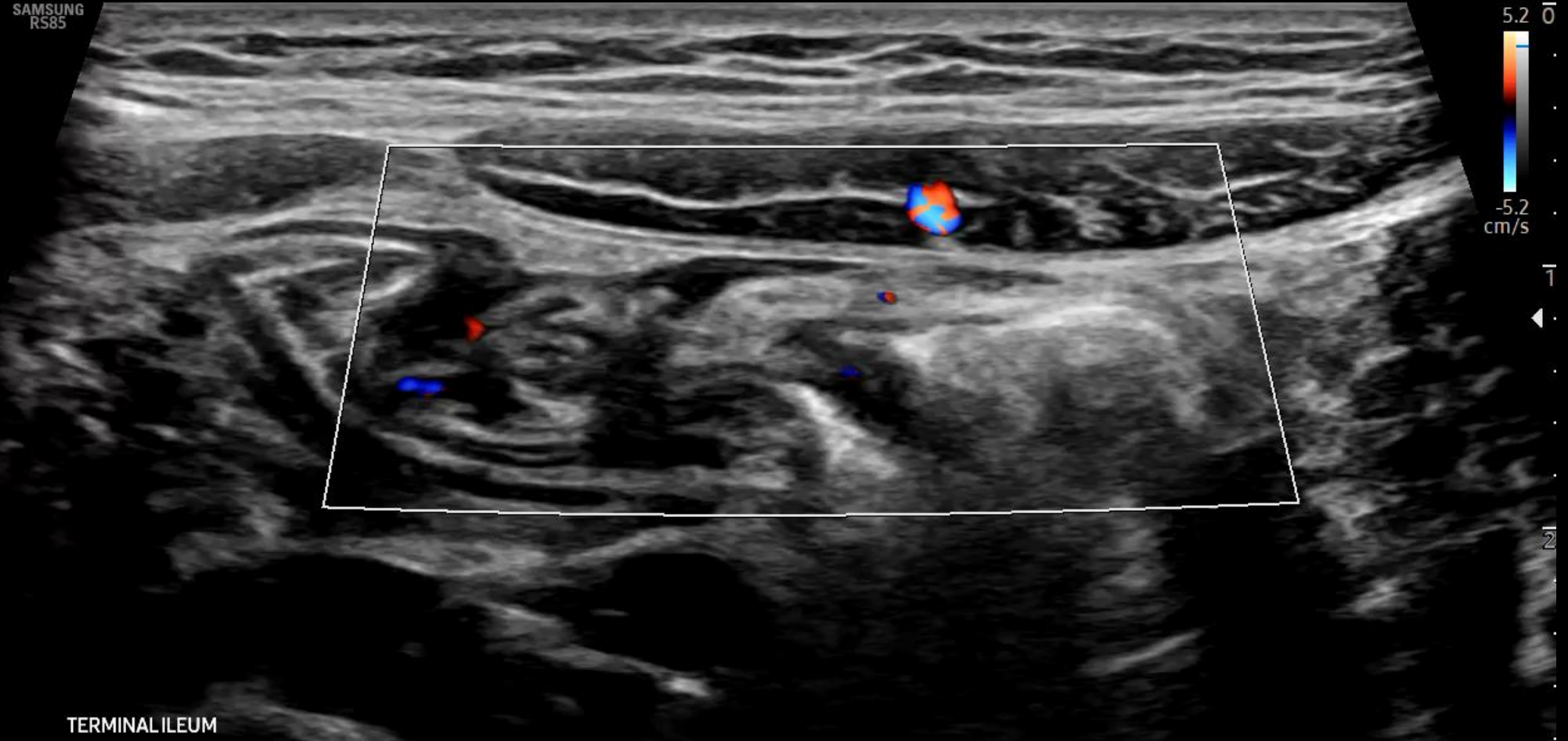




Small Parts / BOWEL- / LA2-14A / FPS19 / 3.0cm / MI1.3 / TIs0.6 / 03-24-2025 08:06:33 AM
[2D] Frq Res.1 / GN 69 / DR 49 / FA 4 / P 100
[PD] Frq Gen. / GN 61 / 0.80kHz / P 100



SAMSUNG
RS85



TERMINAL ILEUM



SAMSUNG

MI 1.3 03-24-2025

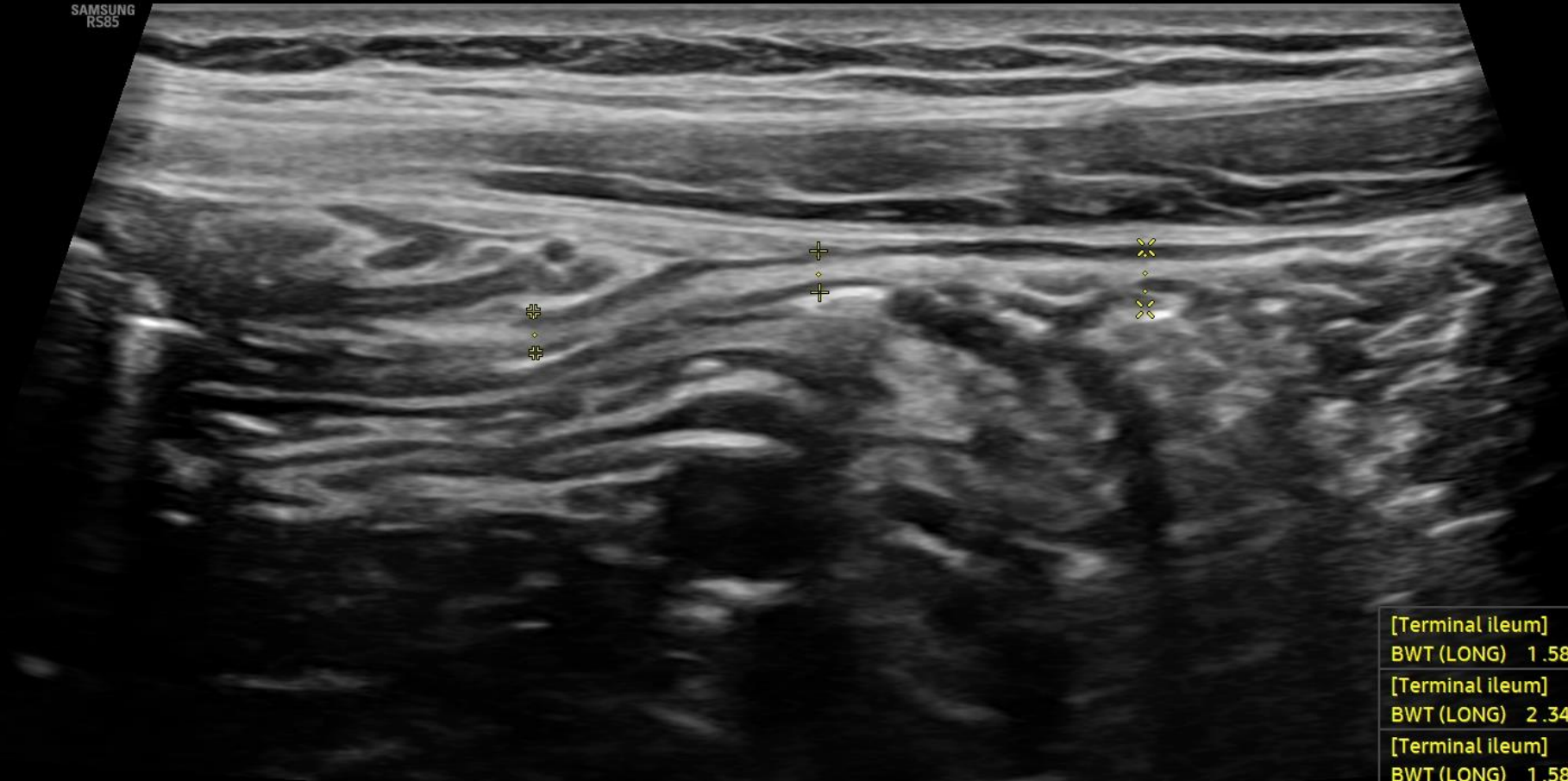
TIs 0.2 08:06:19 AM

Small Parts / BOWEL- / LA2-14A / FR61Hz / 3.0cm

[2D]

SAMSUNG
RS85

Frq Res.1
GN 69
DR 49
FA 8
P 100



[Terminal ileum]
BWT (LONG) 1.58 mm
[Terminal ileum]
BWT (LONG) 2.34 mm
[Terminal ileum]
BWT (LONG) 1.58 mm

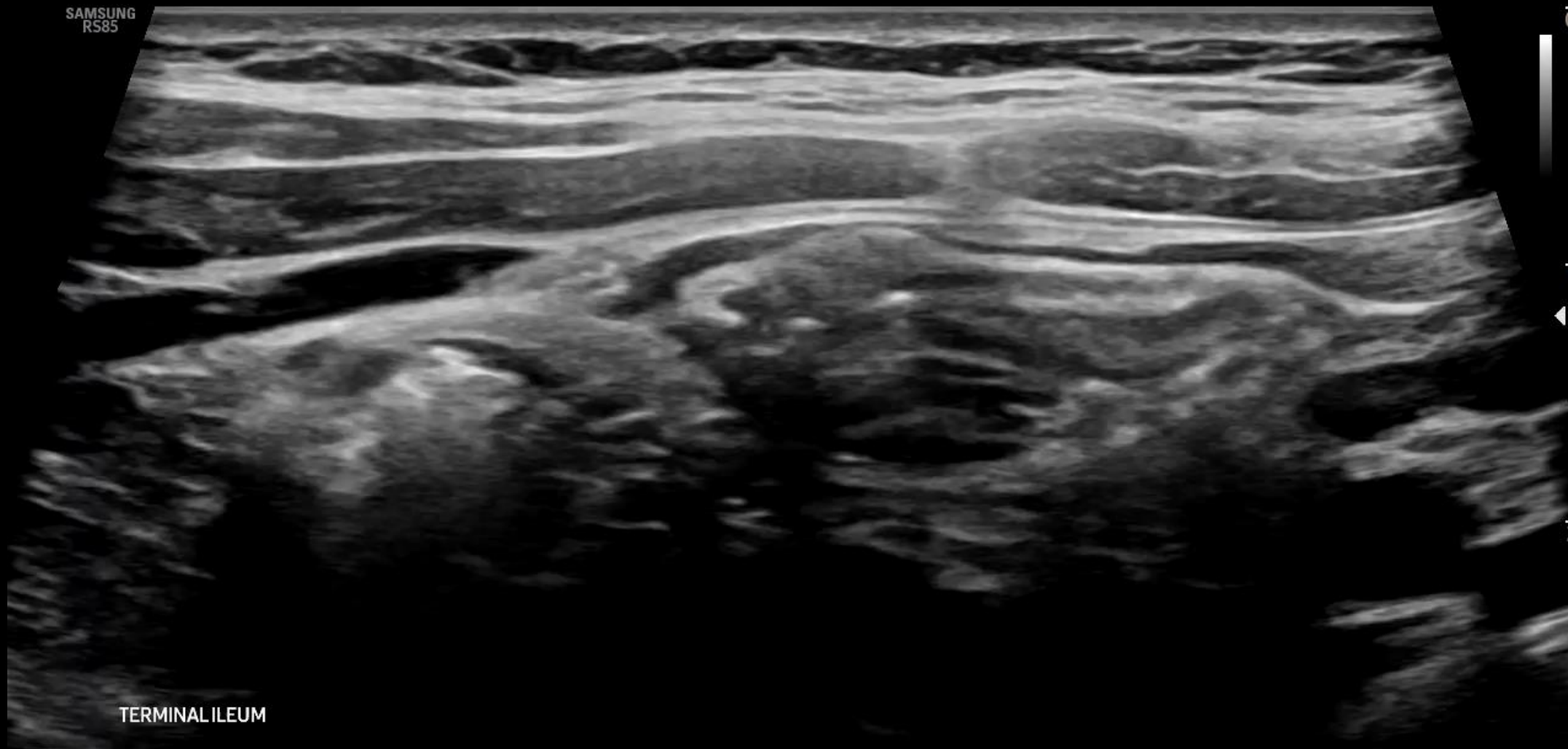
TERMINAL ILEUM



Small Parts / BOWEL- / LA2-14A / FPS61 / 3.0cm / MI1.3 / TIs0.2 / 03-24-2025 08:06:53 AM
[2D] Frq Res.1 / GN 69 / DR 49 / FA 8 / P 100



SAMSUNG
RS85



TERMINAL ILEUM

0

1

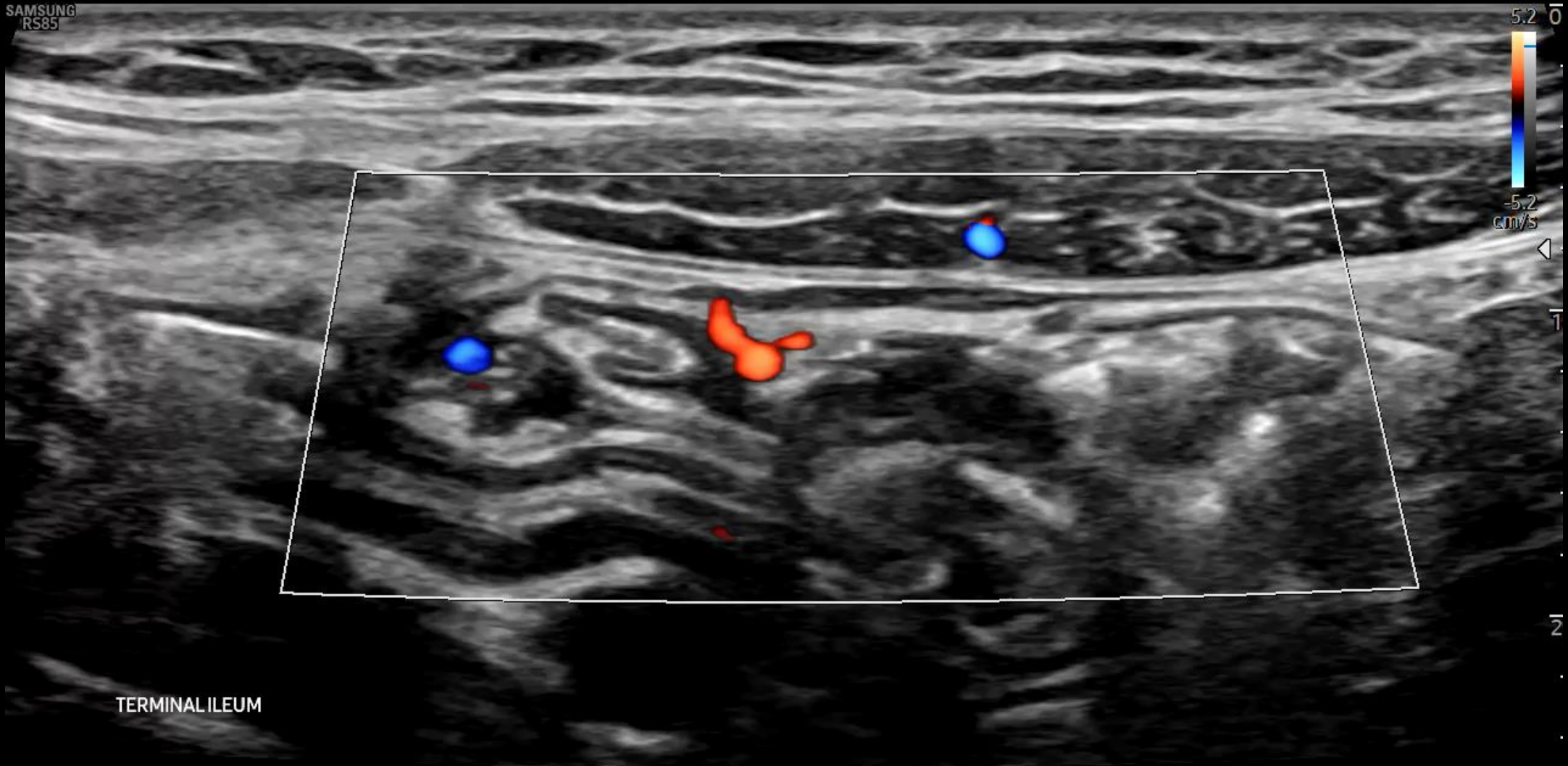
2



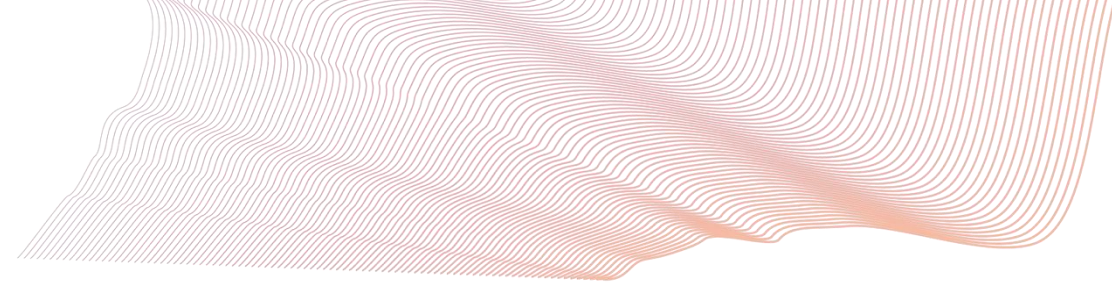
Small Parts / BOWEL- / LA2-14A / FPS19 / 2.5cm / MI0.98 / TI0.6 / 03-24-2025 08:07:21 AM
[2D] Frq Res.1 / GN 69 / DR 49 / FA 4 / P 100
[PD] Frq Gen. / GN 61 / 0.80kHz / P 100



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RS85



TERMINAL ILEUM

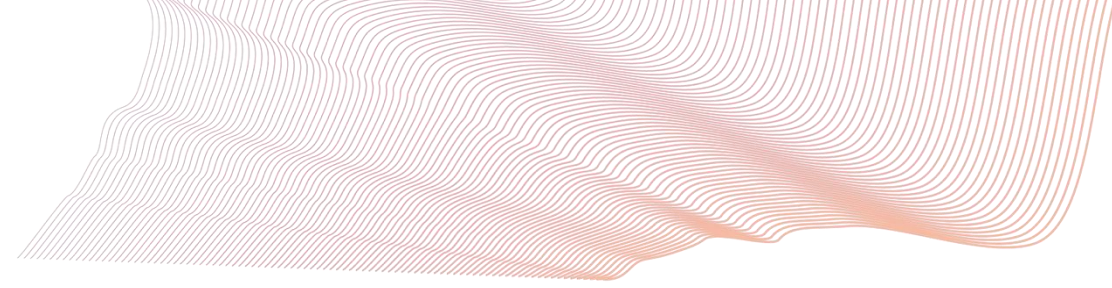


What Do You Want To Do Next?

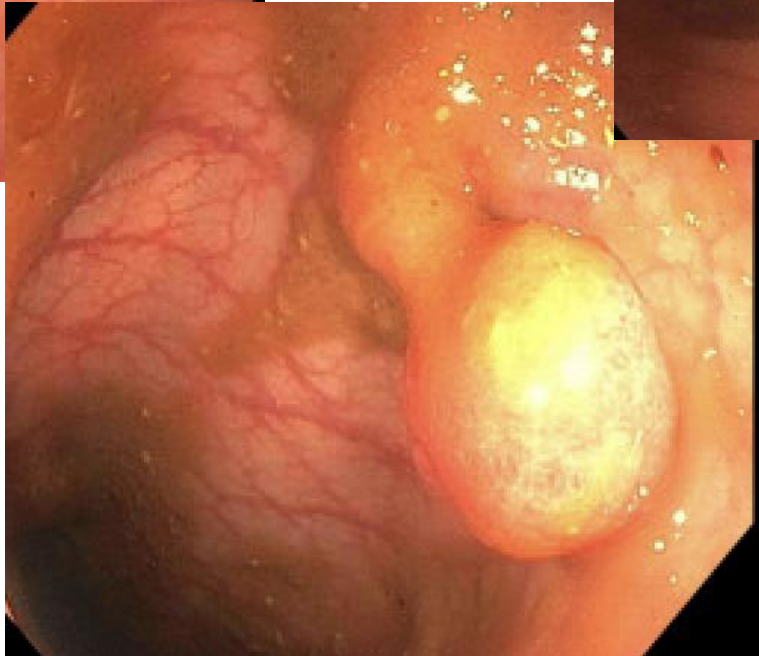
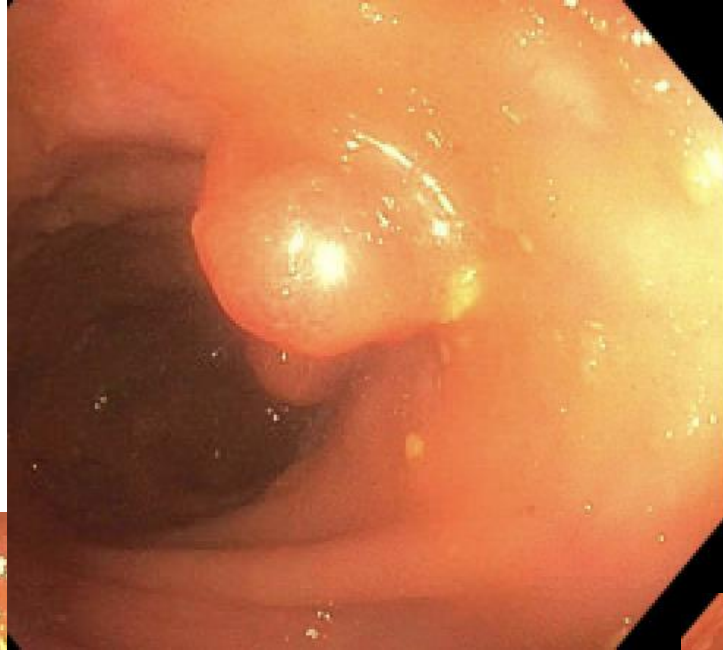
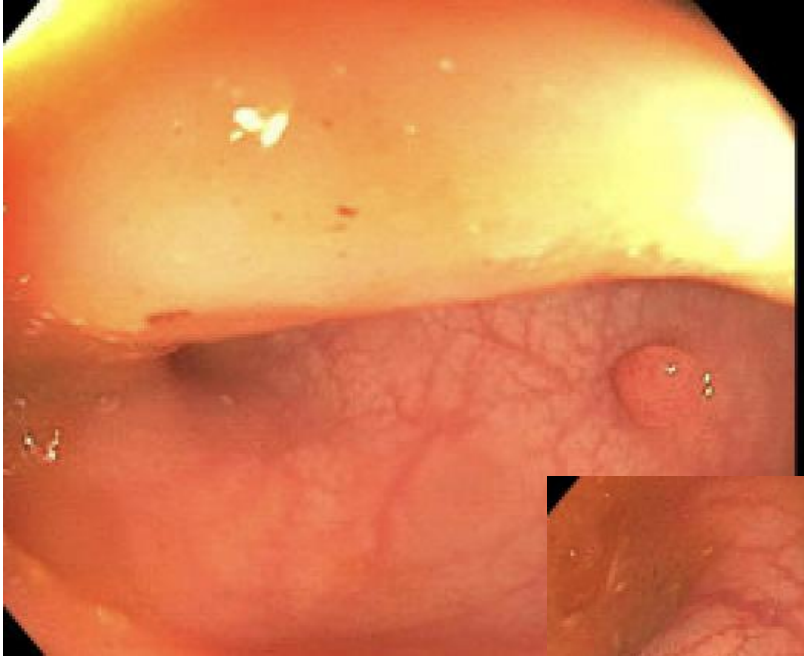
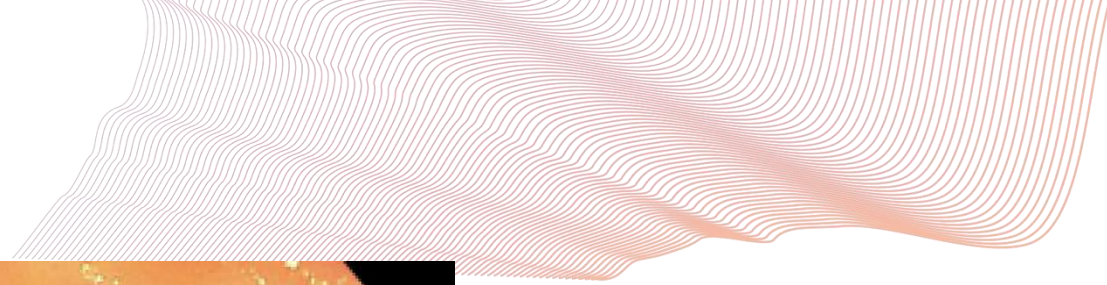
Additional Tests

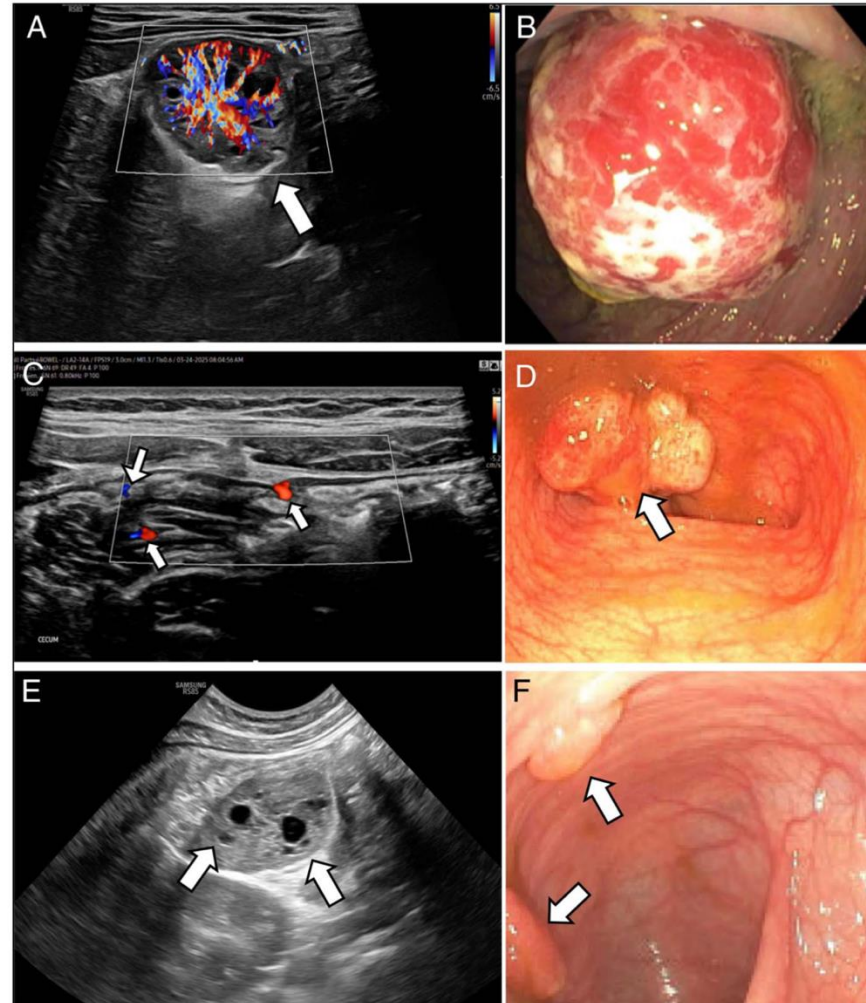
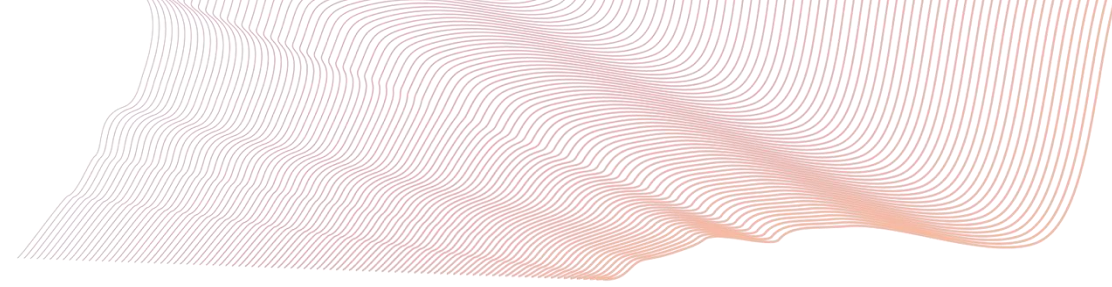
- She refuses to undergo any additional lab evaluation
- Stool studies
 - GI PCR Panel negative
 - C.diff PCR negative

Component	3/27/25 1321
Ref Range & Units	
CALPROTECTIN, FECAL	1,820 ^
0 - 120 ug/g	
Comment: **Results verified by repeat testing**	
Concentration	Interpretation Follow-Up
< 5 - 50 ug/g	Normal None
>50 -120 ug/g	Borderline Re-evaluate in 4-6 weeks
>120 ug/g	Abnormal Repeat as clinically indicated



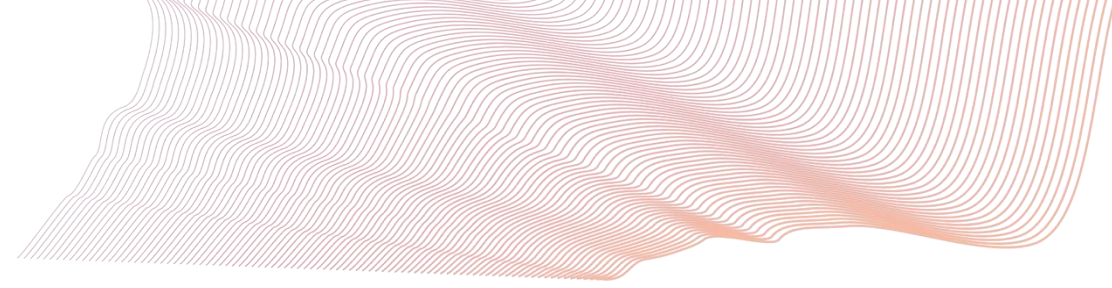
Endoscopy and Colonoscopy





Key Takeaways

- Protruding polyps in children often present with visible transmural changes on IUS that can mimic IBD
- Systematic approach is key
- Children age ≤ 6 may have difficulty cooperating or sitting still
- Abnormalities on diagnostic screening IUS should prompt earlier endoscopy and colonoscopy for further diagnostic evaluation

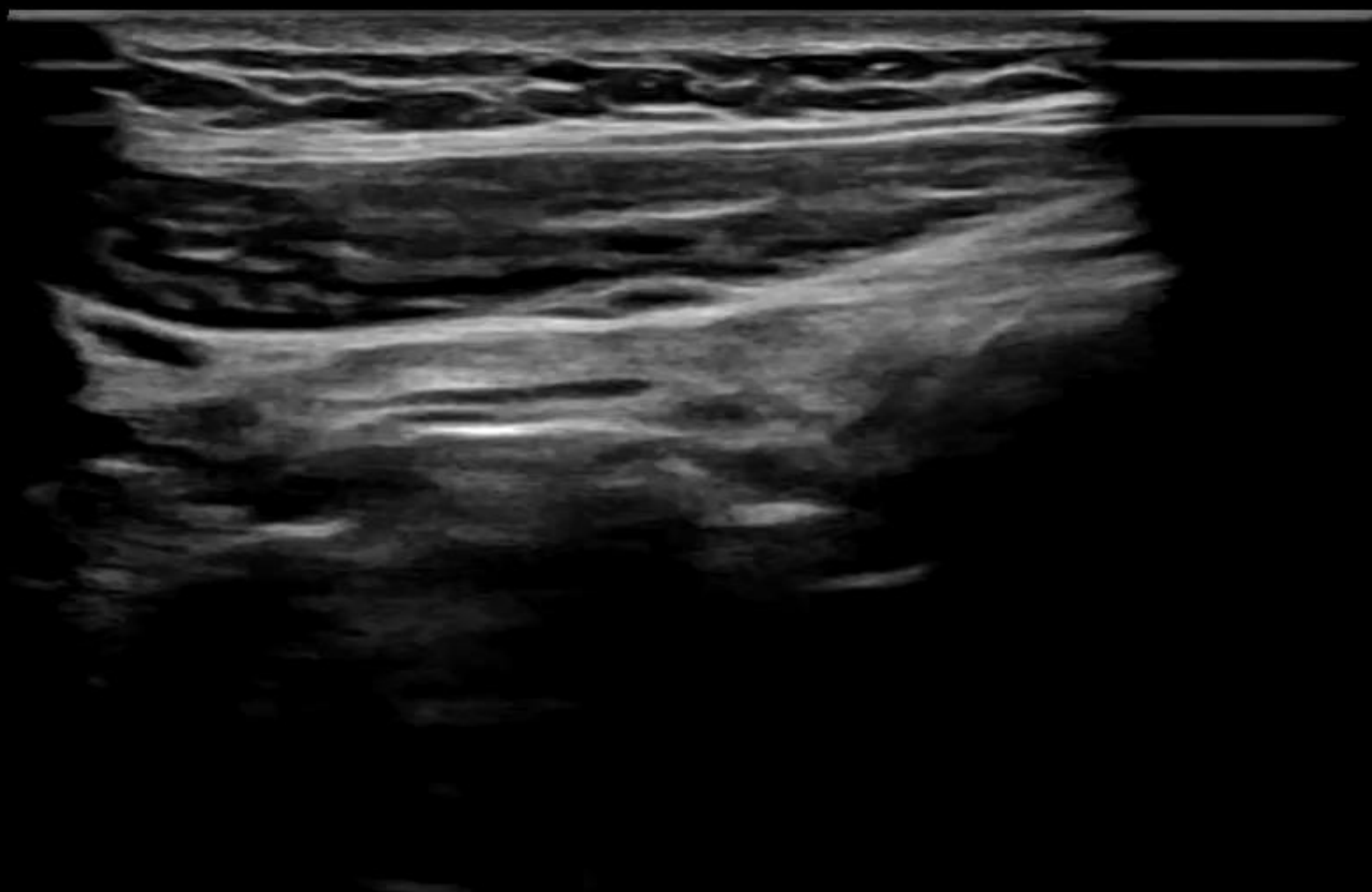


Case SA

10 yo female with a history of severe UC currently in clinical remission for 9 months on dual therapy with Upadacitinib and guselkumab

- PUCAI = 0
- Fecal calprotectin = 181 ug/g
- Labs normal

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SIGMOID COLON

← 2

Small Parts / BOWEL - / LA2-14A / FPS20 / 2.0cm / MI1.3 / TI10.6 / 03-26-2026 02:36:24 PM

[2D] Frq Res.1 / GN 61 / DR 49 / FA 4 / P 100

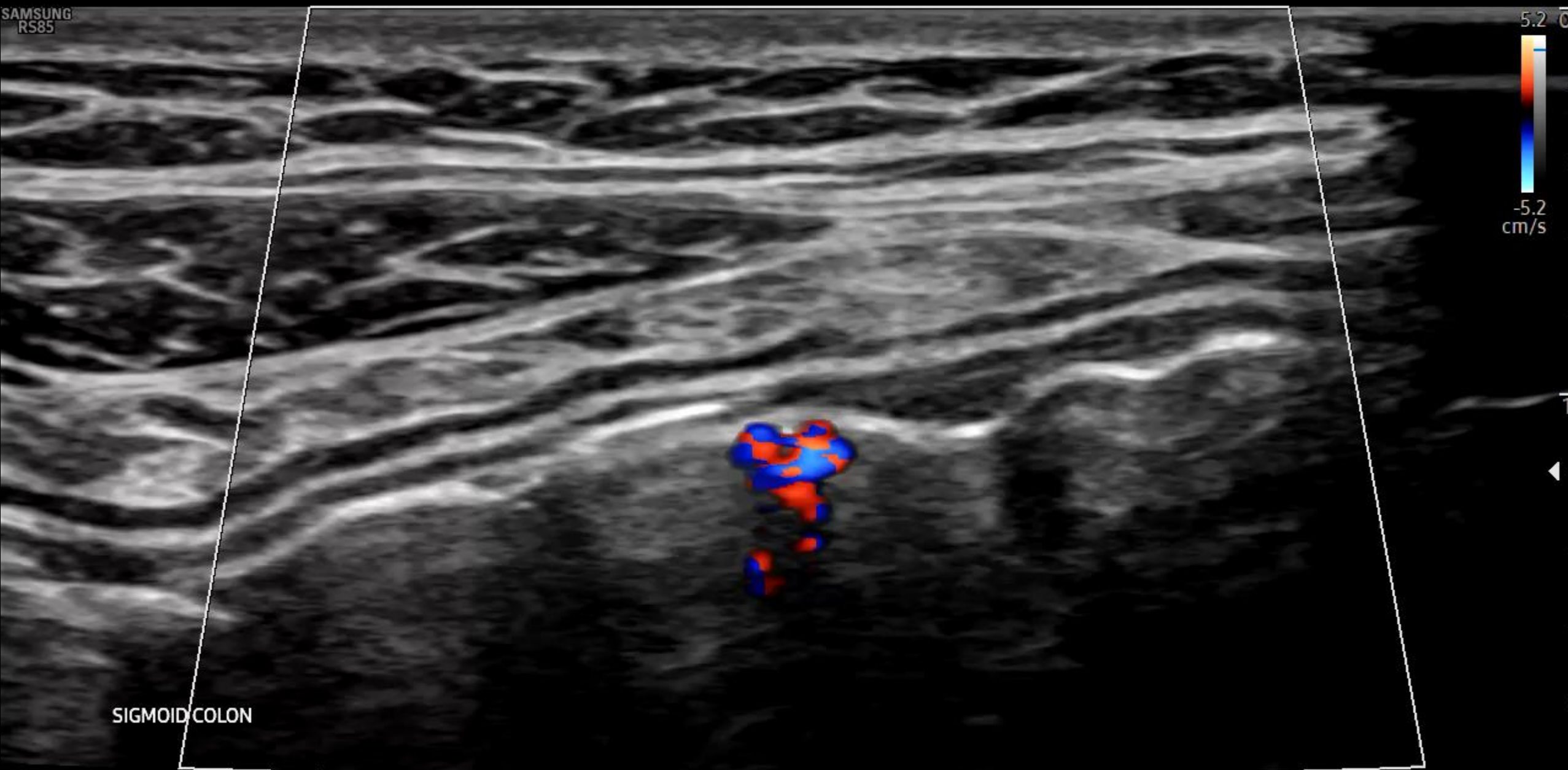
[PD] Frq Gen. / GN 61 / 0.80kHz / P 100

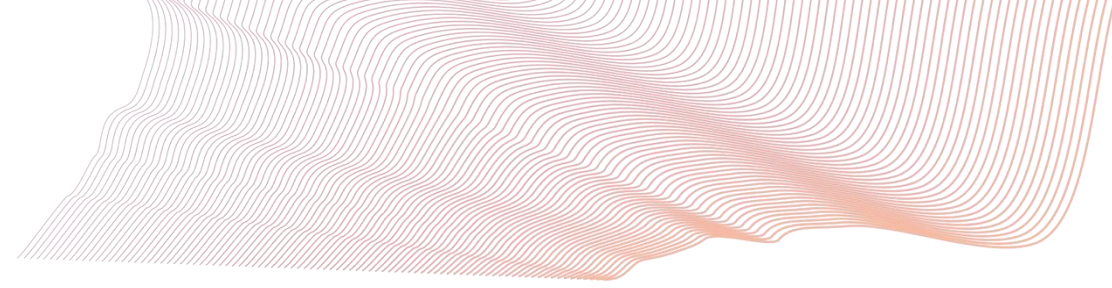


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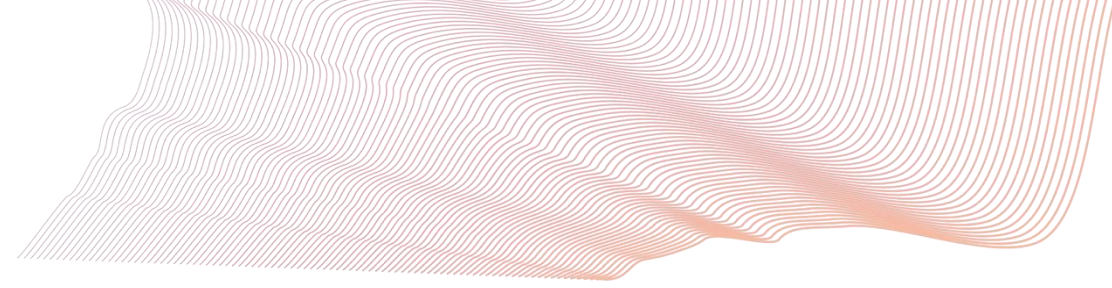
SIGMOID COLON





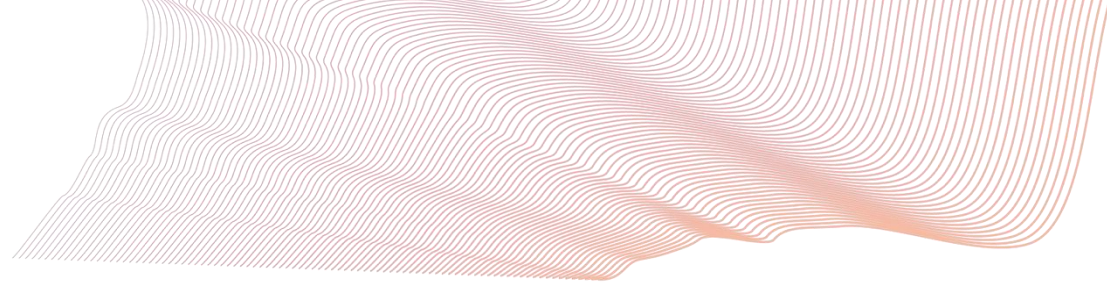
Key Takeaway

Use the color Doppler as the “tie breaker” to determine activity vs. chronicity when the submucosa is hyperechogenic and/or thickened to > 50% of the bowel wall in children



Technicalities in Children \leq 5 years

- Anterior abdominal compartment is smaller
- Proximal small bowel loops often lie superior to the sigmoid colon and descending colon

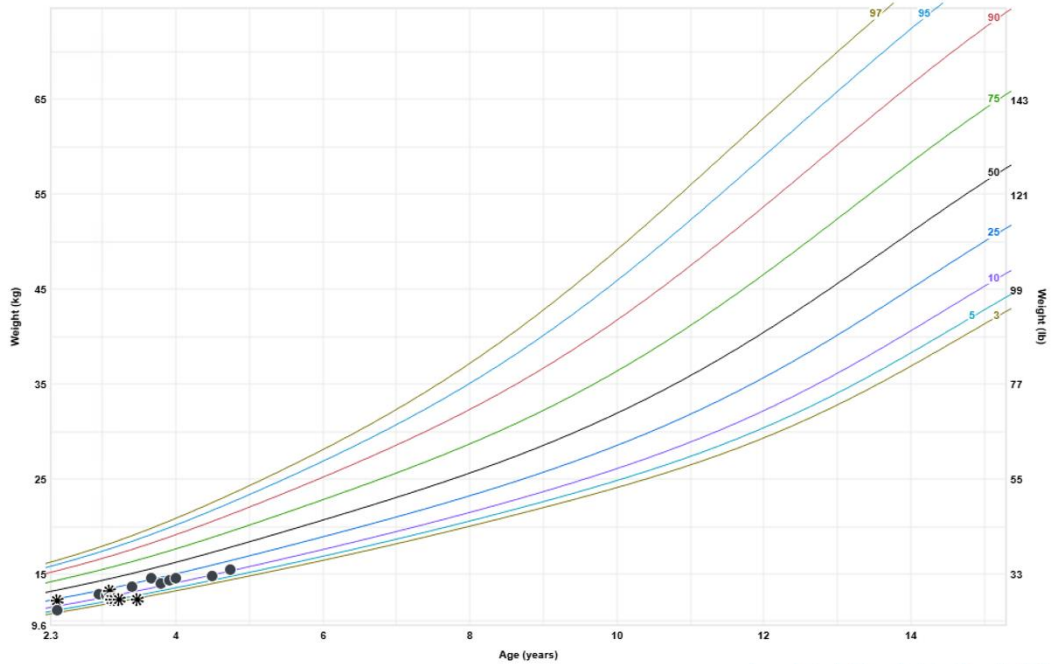


Ca

• 4

• C

• G

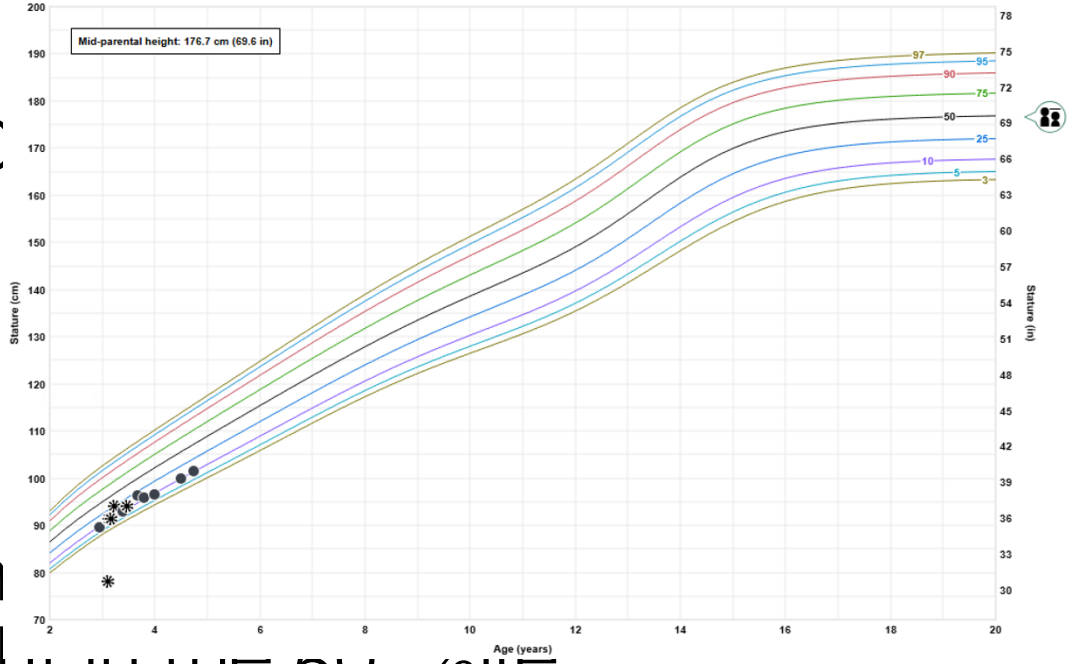


• C

mi

xin

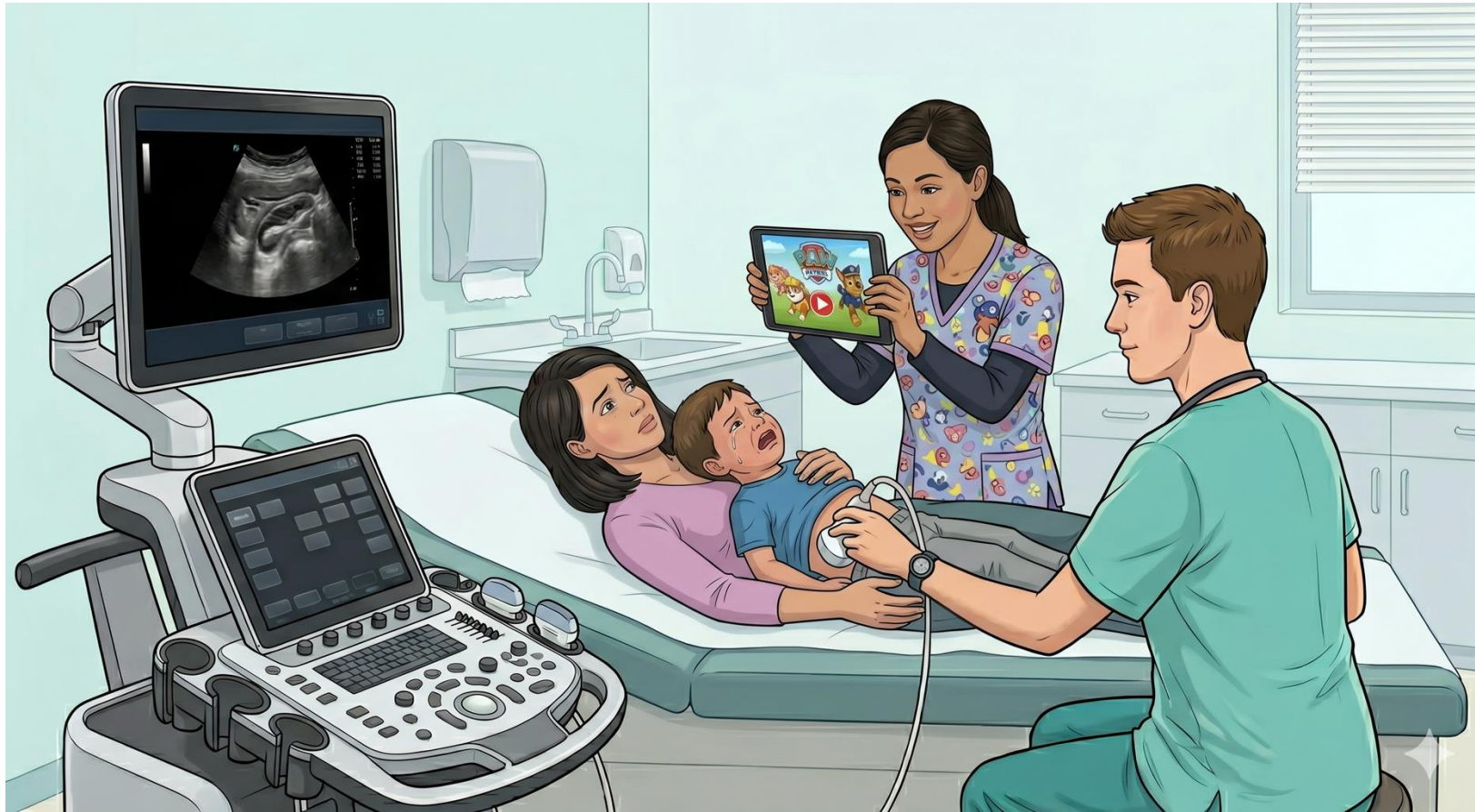
height



percentile weight and parental height
(screenshot)

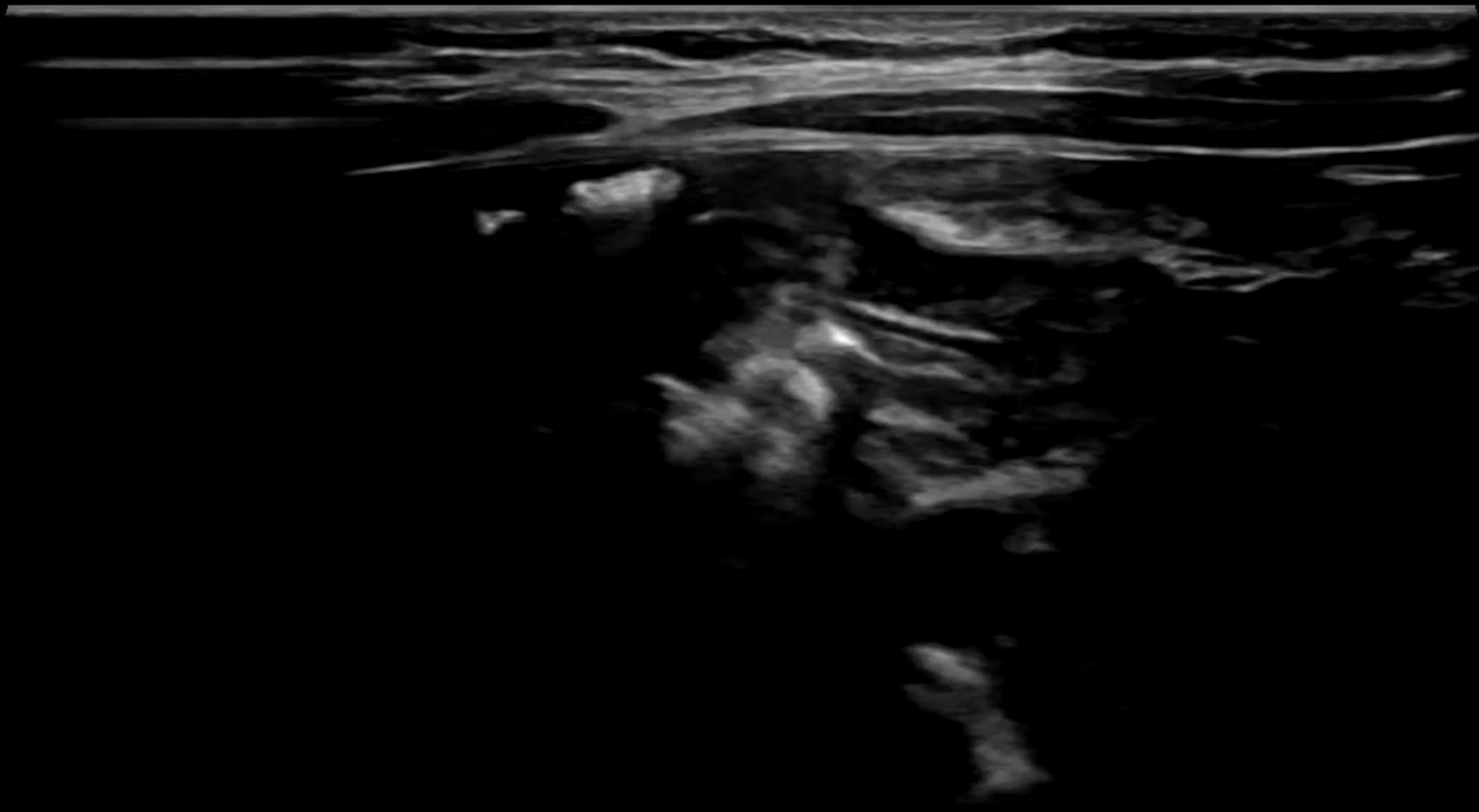
• Fecal calprotectin 28 ug/g

Cooperation Can Be a Challenge





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R585





SAMSUNG

MI 1.3 04-15-2026
TIs 0.2 09:00:59 AM

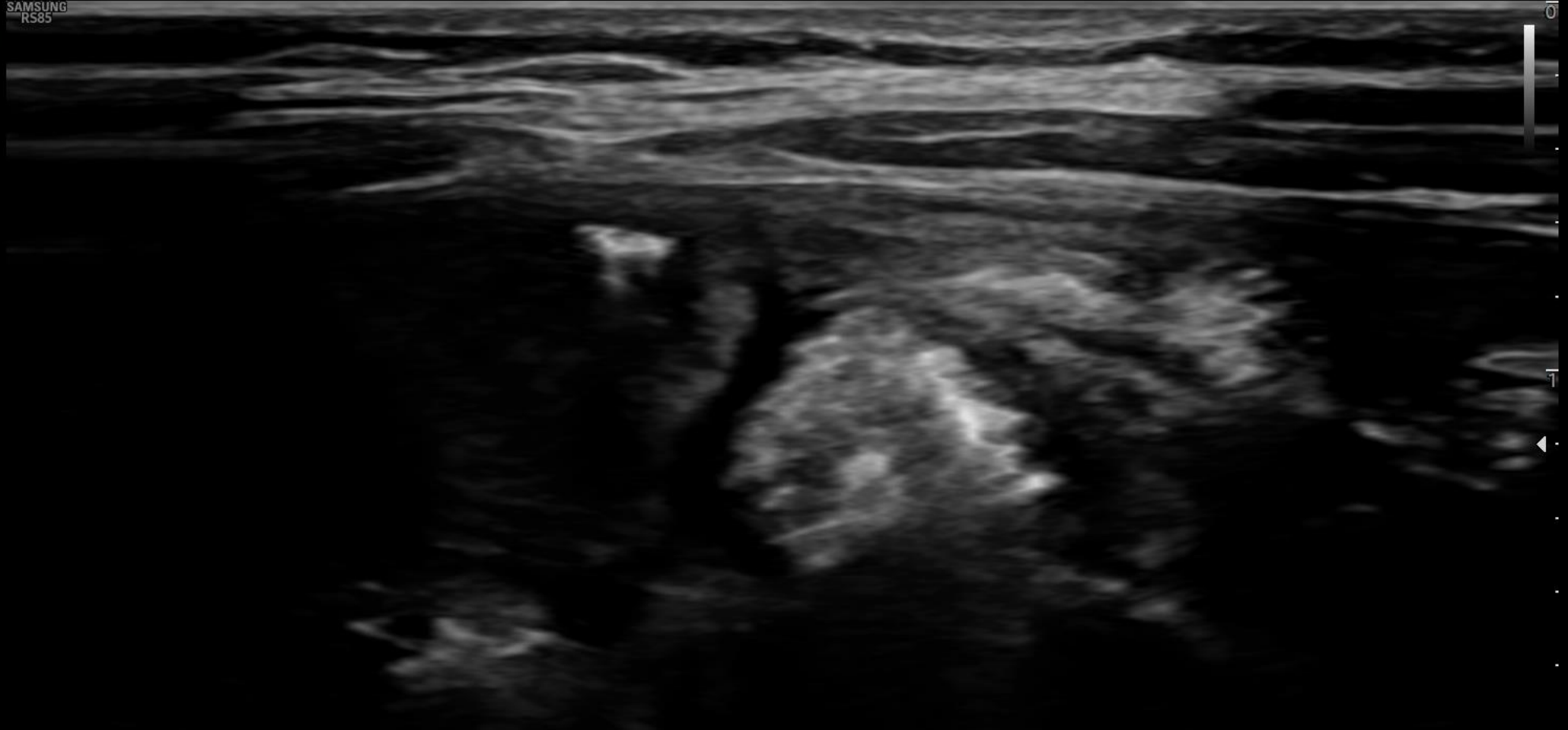
Small Parts / BOWEL- / LA2-14A / FR78Hz / 2.0cm



[2D]

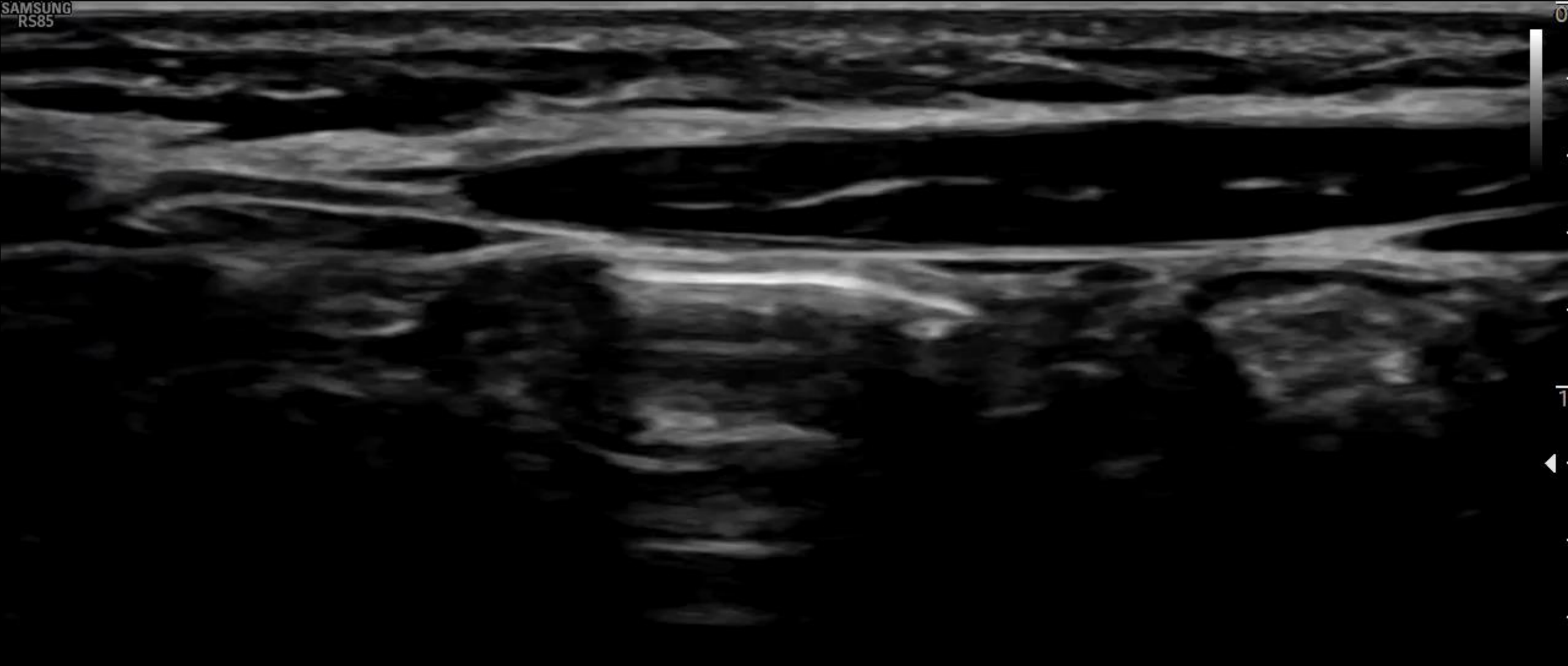
SAMSUNG
RS85

Frq Res.1
GN 61
DR 49
FA 8
P 100



SIGMOID COLON

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R585



TRANSVERSE COLON



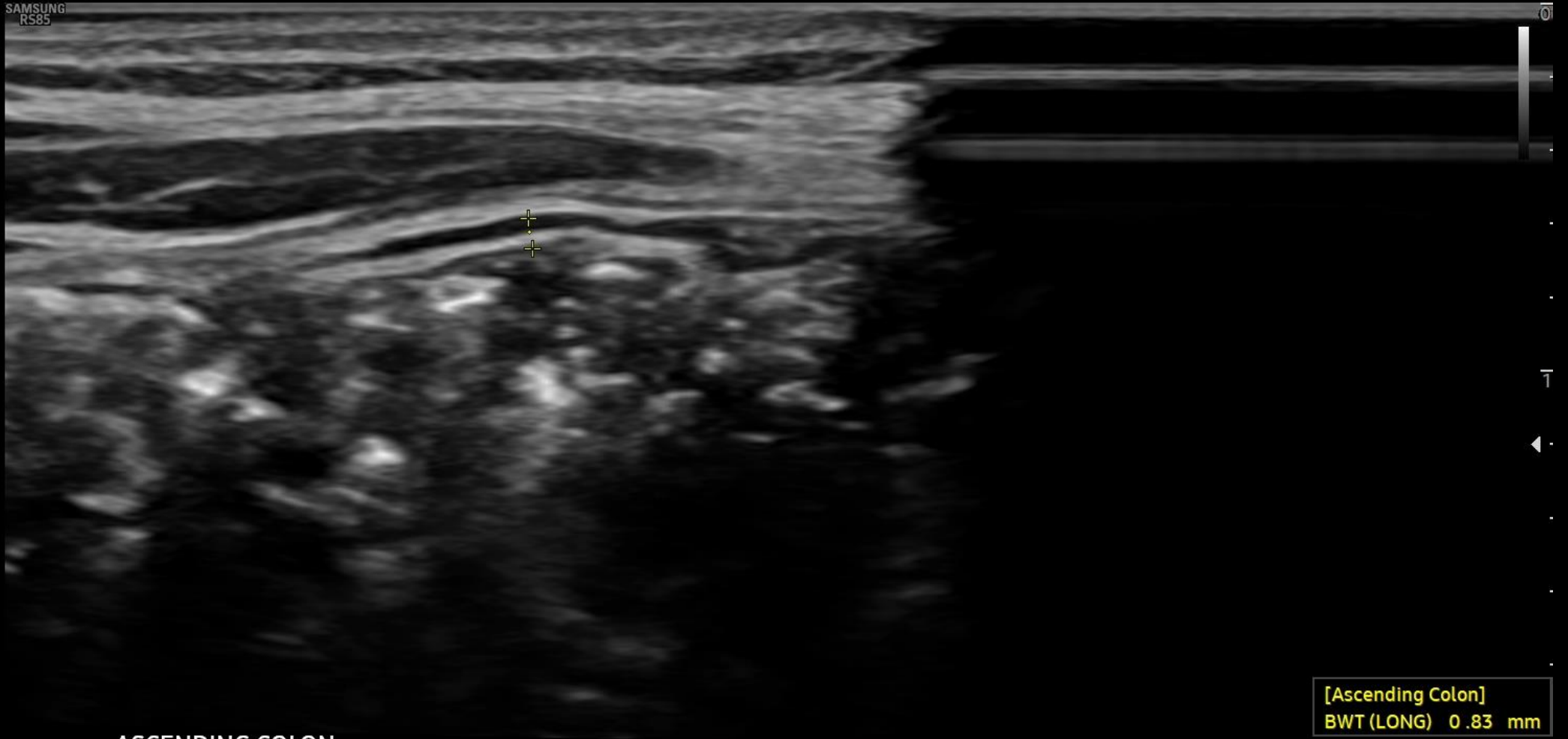
SAMSUNG

MI 1.3 04-15-2026
TIs 0.2 09:02:54 AM

Small Parts /BOWEL- /LA2-14A /FR78Hz /2.0cm



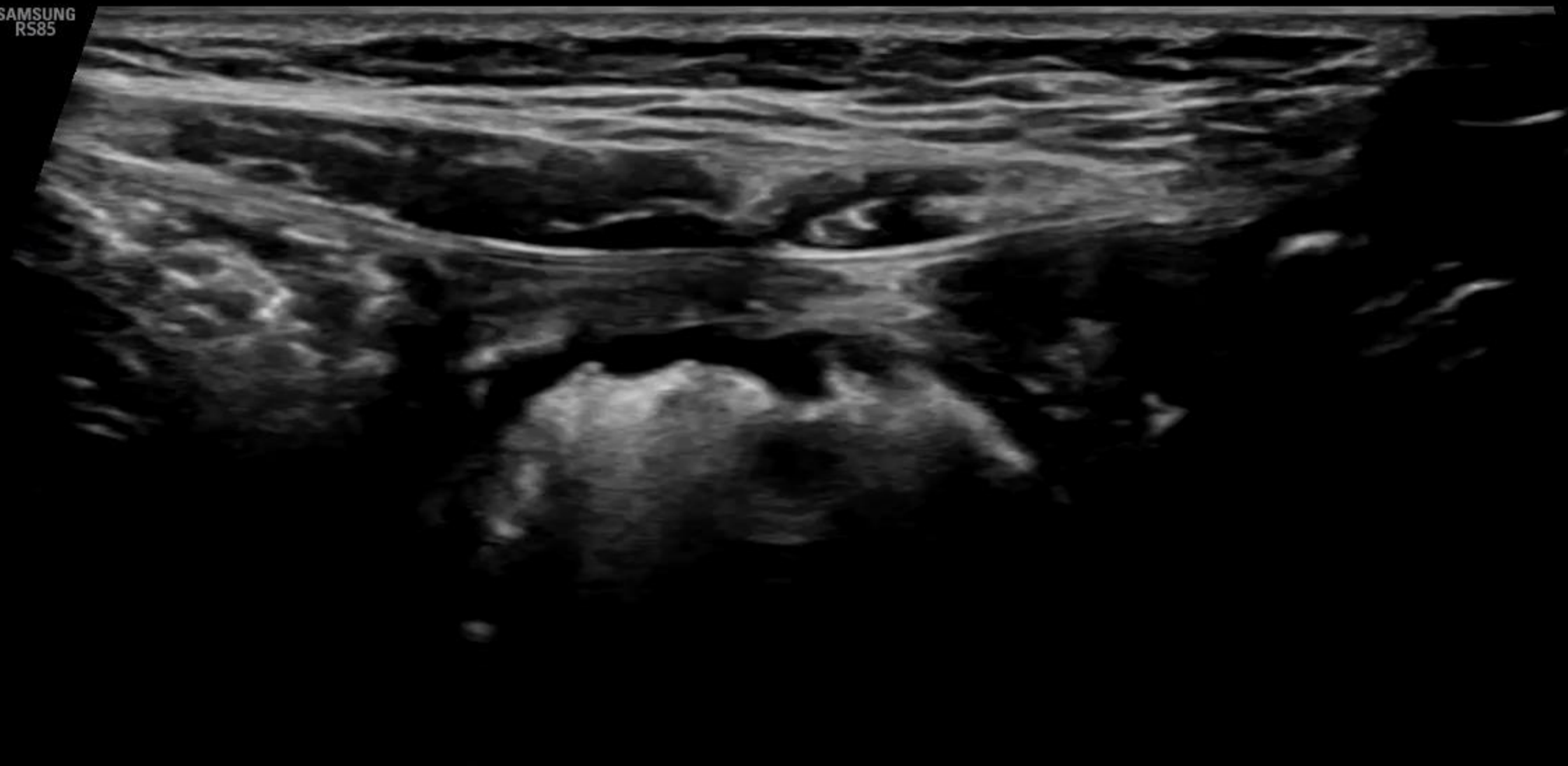
[2D]
Frq Res.1
GN 61
DR 49
FA 8
P 100



ASCENDING COLON

[Ascending Colon]
BWT (LONG) 0.83 mm

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RS85



TERMINAL ILEUM





SAMSUNG

MI 1.4 04-15-2026
TIs 0.2 09:04:31AM

Small Parts /BOWEL- /LA2-14A /FR61Hz /3.0cm

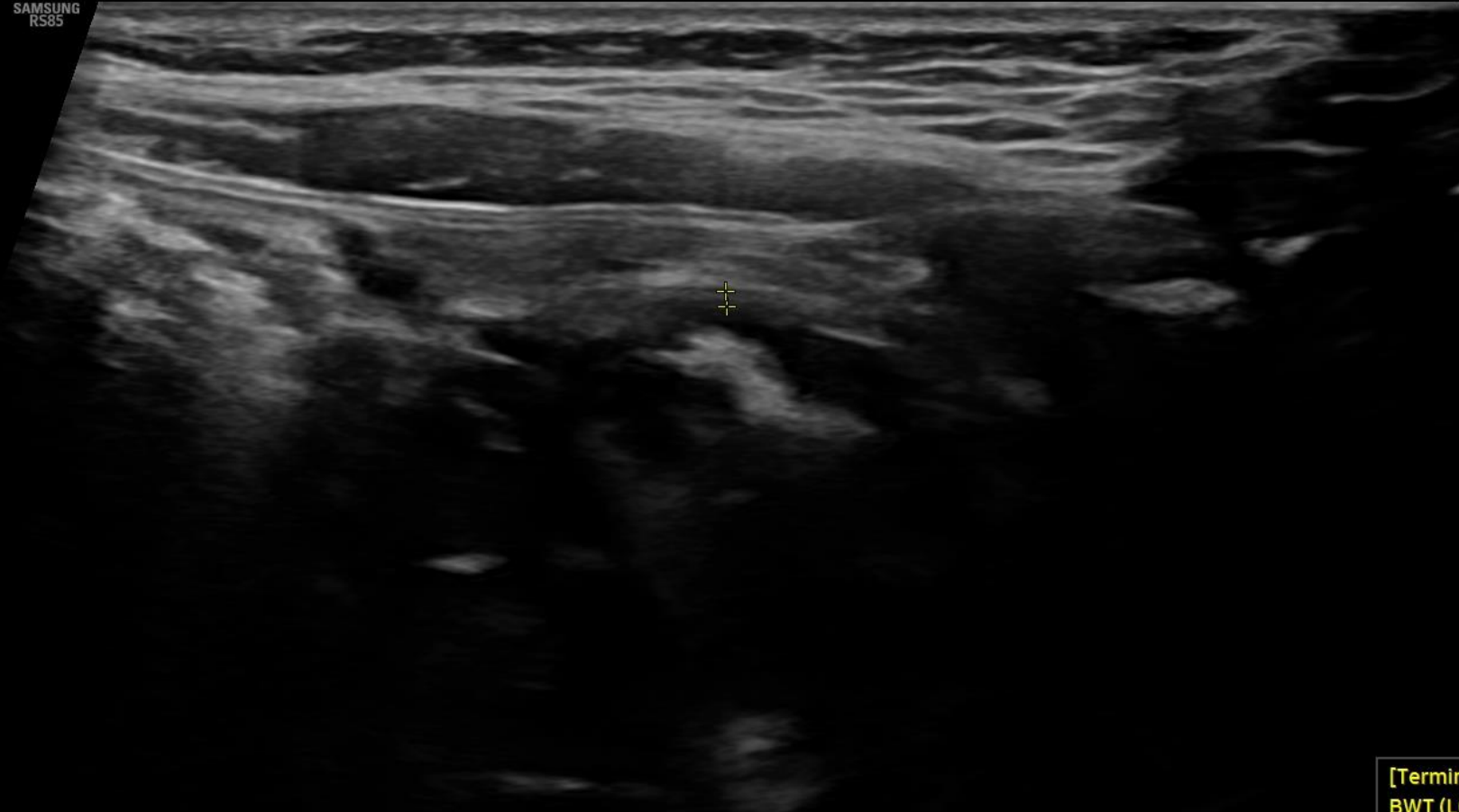
[2D]

SAMSUNG
RS85

Frq Res.1
GN 61
DR 49
FA 8
P 100



0



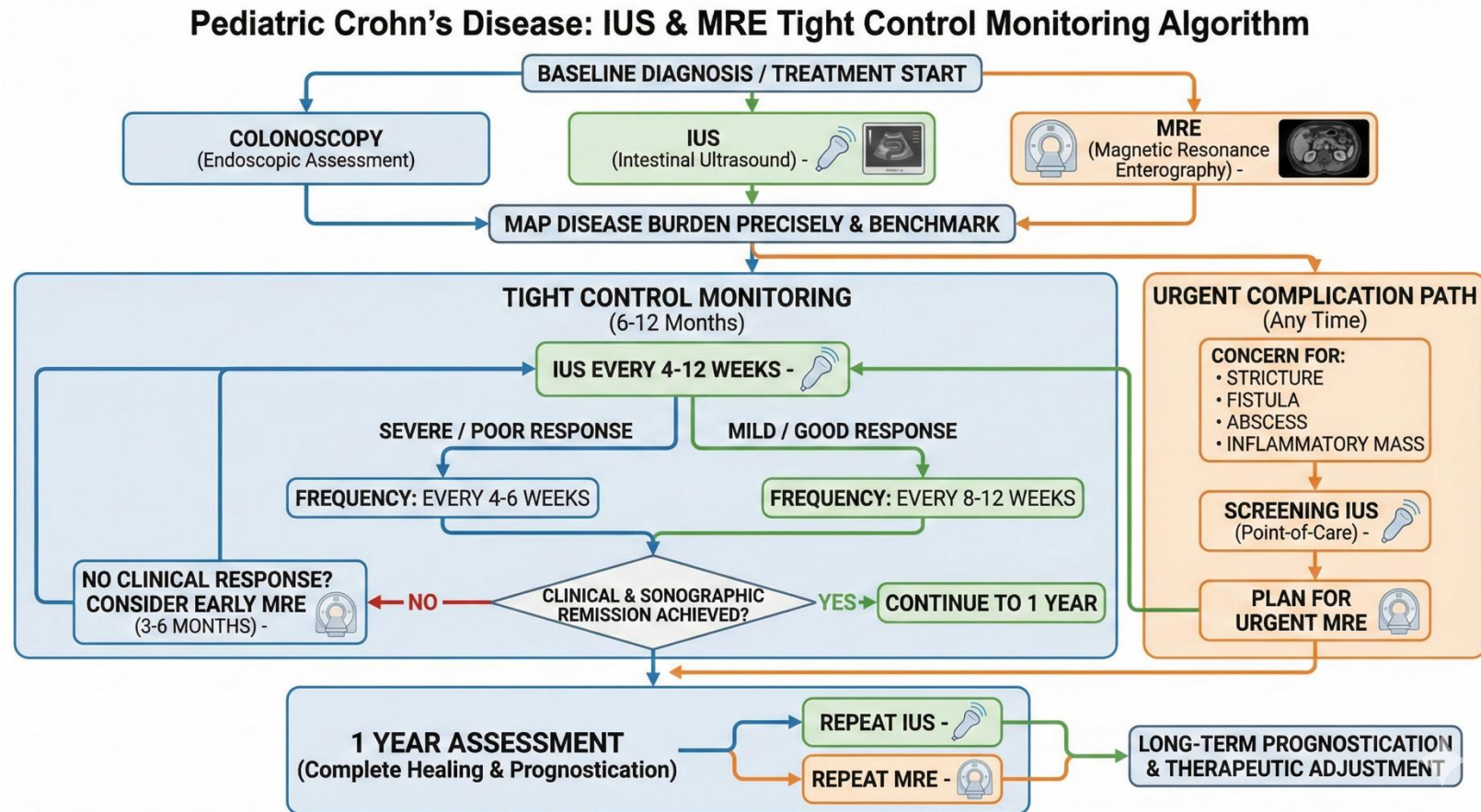
1

2

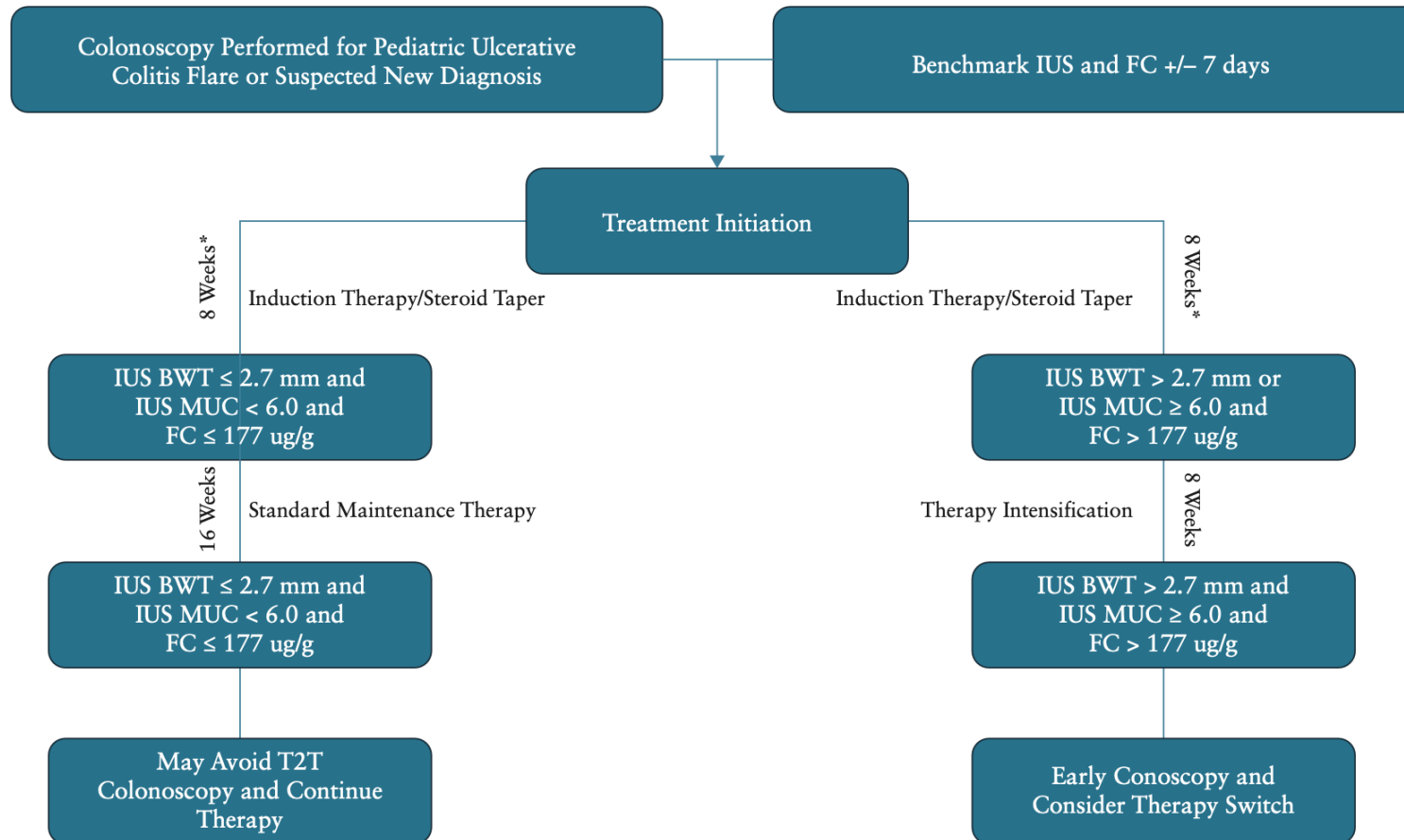
TERMINAL ILEUM

[Terminal ileum]
BWT (LONG) 0.56 mm

My Approach to Monitoring Pediatric CD



My Approach to Monitoring Pediatric UC



* Consider earlier IUS and FC evaluation if no clinical response or inability to wean off systemic corticosteroids



international bowel
ULTRASOUND GROUP

Q&A