

# IBUS Module 1

Regional Hybrid Workshop

**Intestinal Ultrasound in UC and Acute  
Severe Ulcerative Colitis**

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# Disclosures

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- Consultant for CapsoVision, Inc.

# Acute severe colitis in children vs adults

## Adult (1,2)

Truelove and Witts criteria:

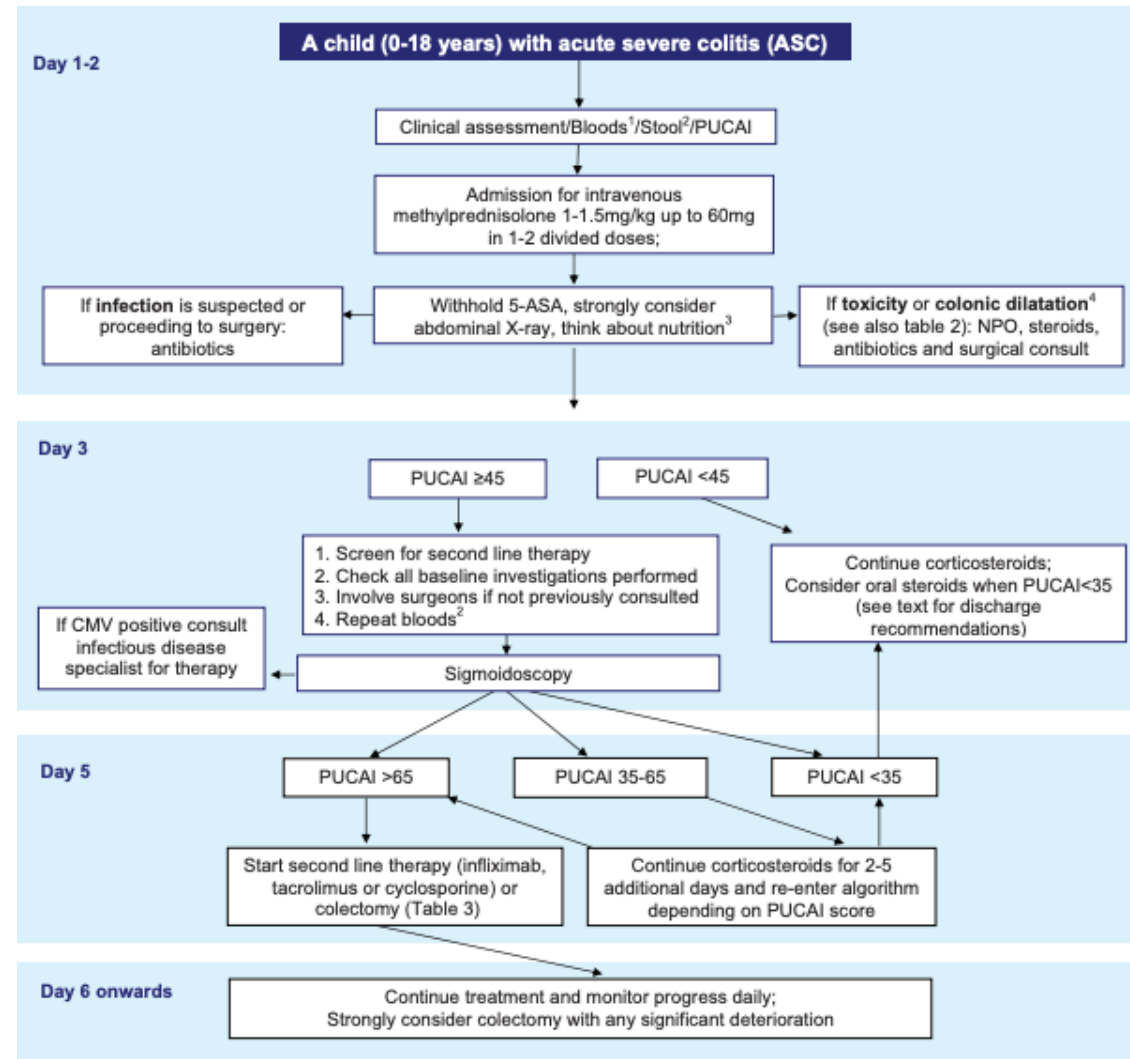
- $\geq 6$  bloody bowel movements/day
- 1 marker so systemic toxicity
  - Heart rate  $>90$  beats/min
  - Temperature  $>37.8^{\circ}\text{C}$
  - Hemoglobin  $<10.5$  g/dL
  - ESR  $\geq 30$  mm/hr

## Children (3)

Pediatric Ulcerative Colitis Activity Index (PUCAI)  $\geq 65$

1. Truelove SC, Witts LJ, *Br Med J*, 1955; 2:1041-1048
2. Feuerstein JD et al, *Gastroenterol*, 2020; 158 (5): 1450-61
3. Assa A et al, *J Peds Gastroenterol Nutr*, 2025 Sep;81(3):816-851. Epub 2025 Jun 17.

# Acute severe colitis guidelines in children



Turner D et al, J Gastroenterol Hepatol, 2018; 67: 292-310

## Patient 1: CP

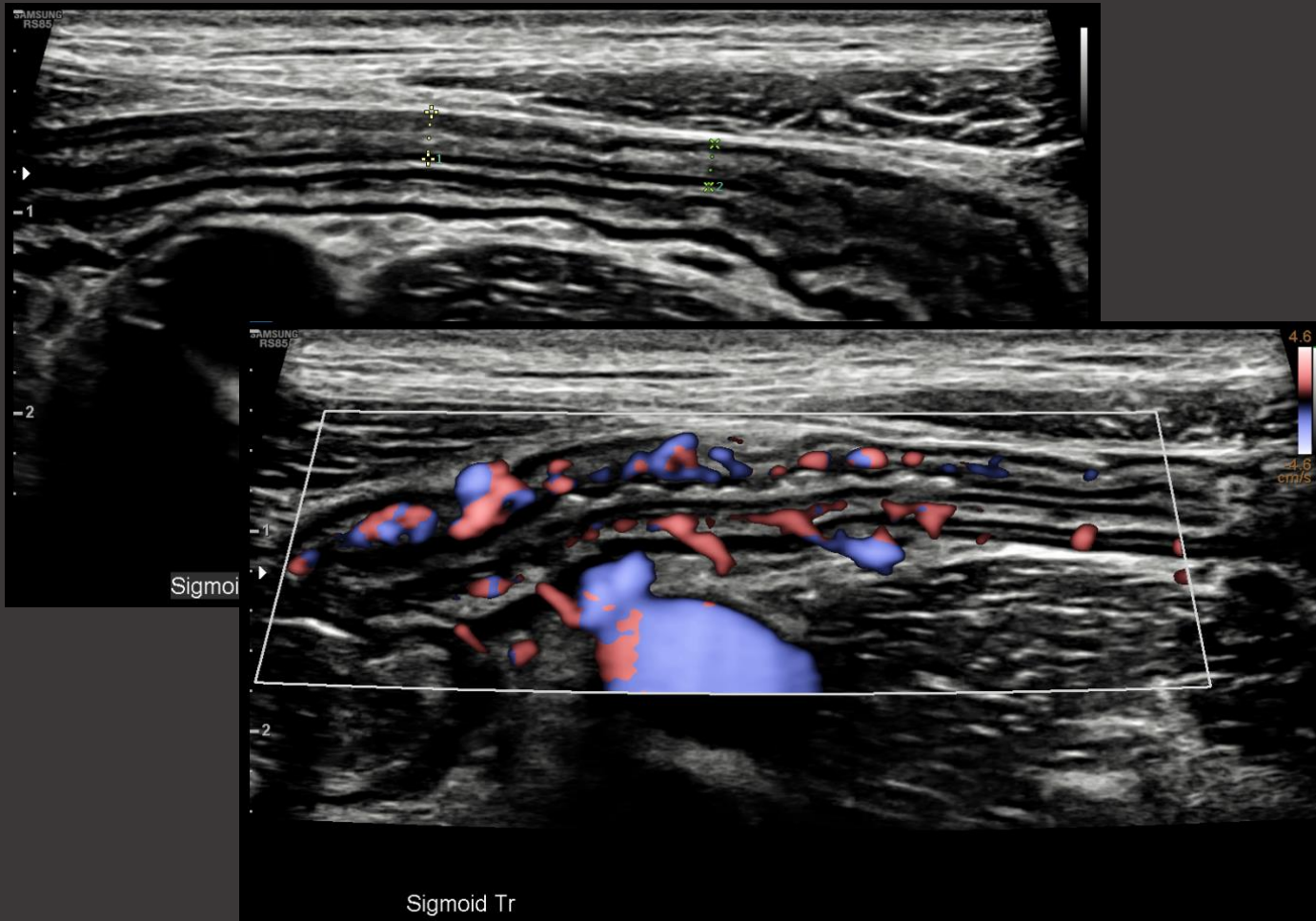
12yo M presenting with 1mo of diarrhea, 10% weight loss, elevated calprotectin (2400)

Had outpatient endoscopy, and appearance was severe, Mayo 3

PUCAI @ admission = 65



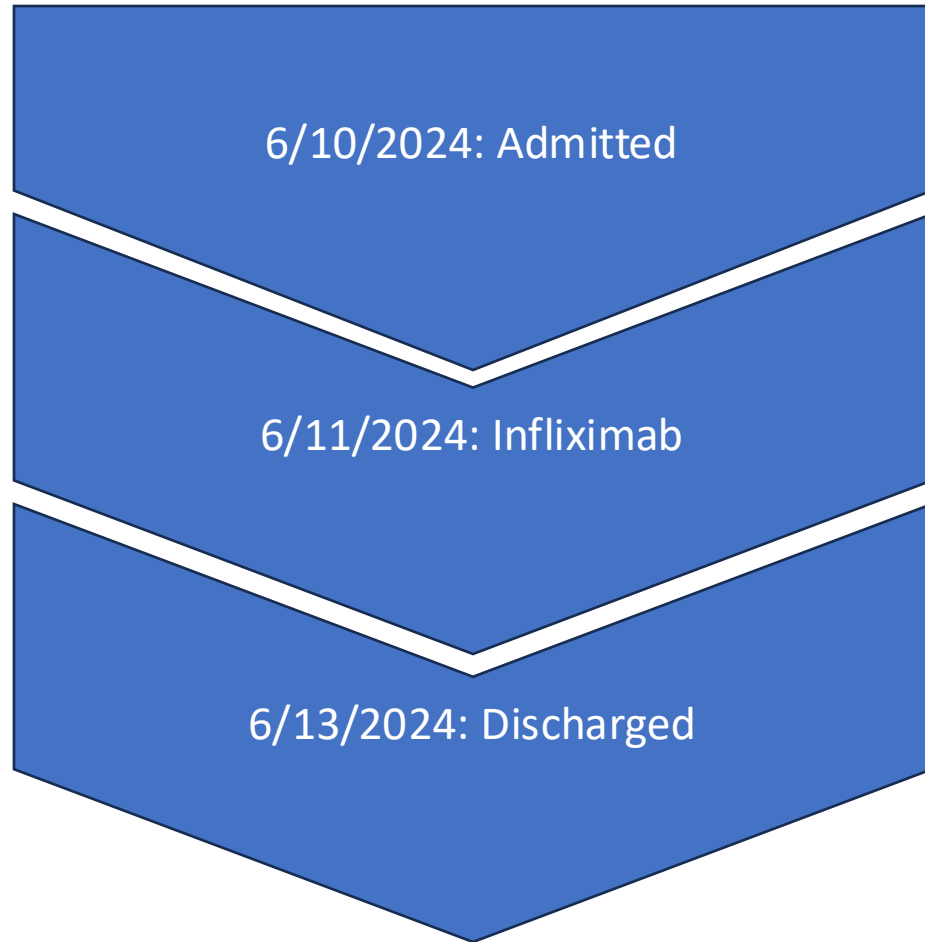
# Patient 1: CP



*What features to do you see?*

- BWT increased?
- Increased ratio of submucosa to total BWT
- Focal loss of stratification
- Hyperechoic fatty tissue
- Increased Doppler activity

# Patient 1: CP



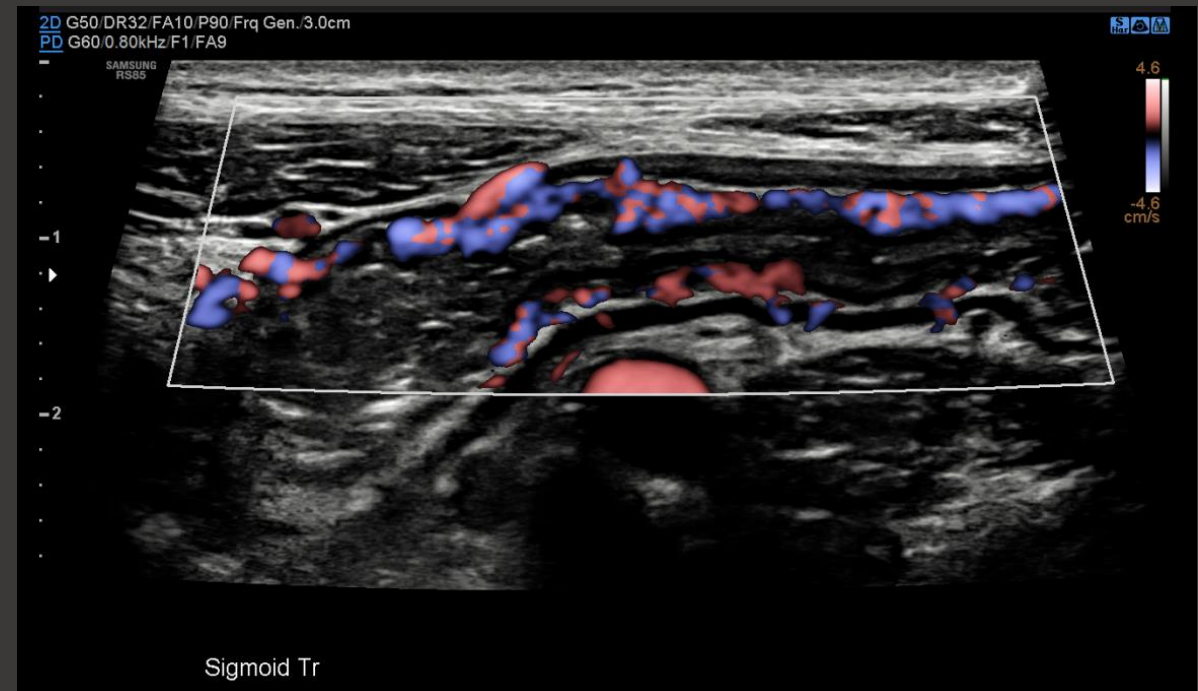
Clinically, PUCAI improved to 35

Improvement in inflammatory biomarkers

- Sed rate 80 -> 82
- CRP 8.2 mg/dL -> 5.4 mg/dL

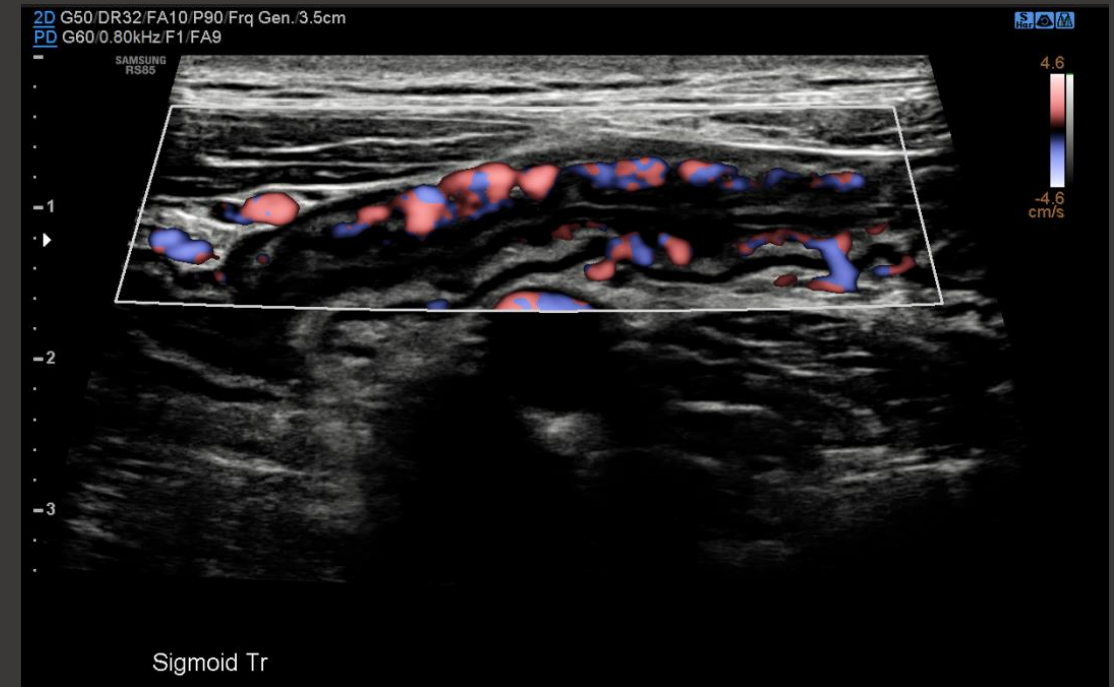
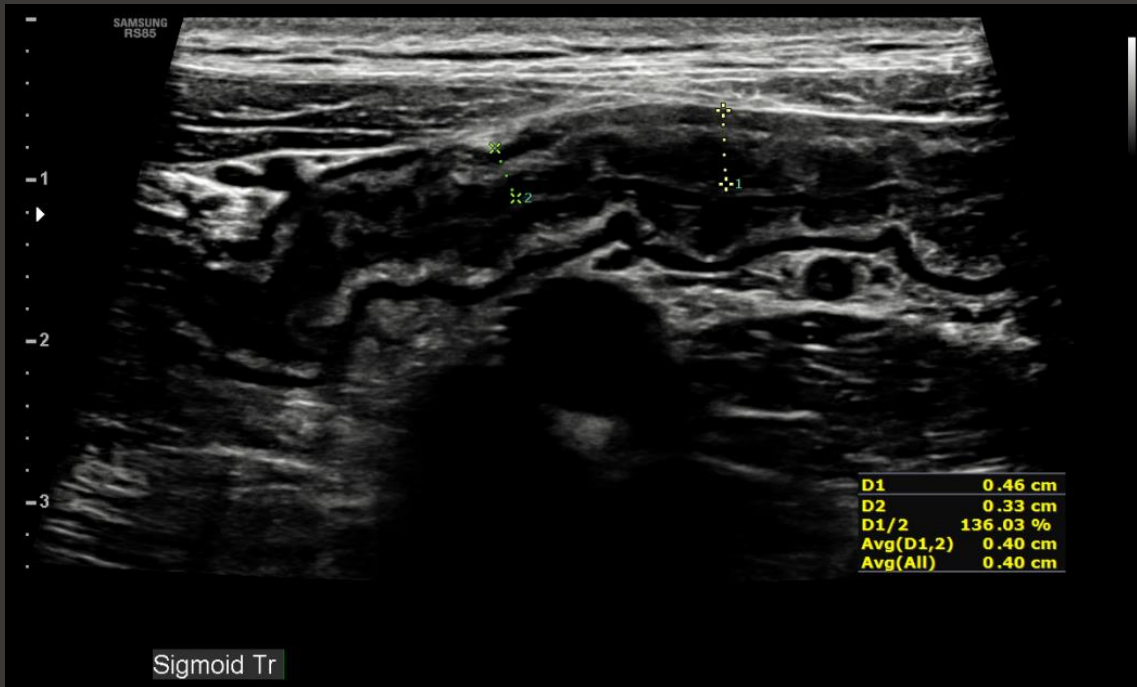
# Patient 1: CP

IUS 6/13 – PUCAI 10



# Patient 1: CP

IUS 7/18 – PUCAI 10



# Patient 1: CP

## Learning points:

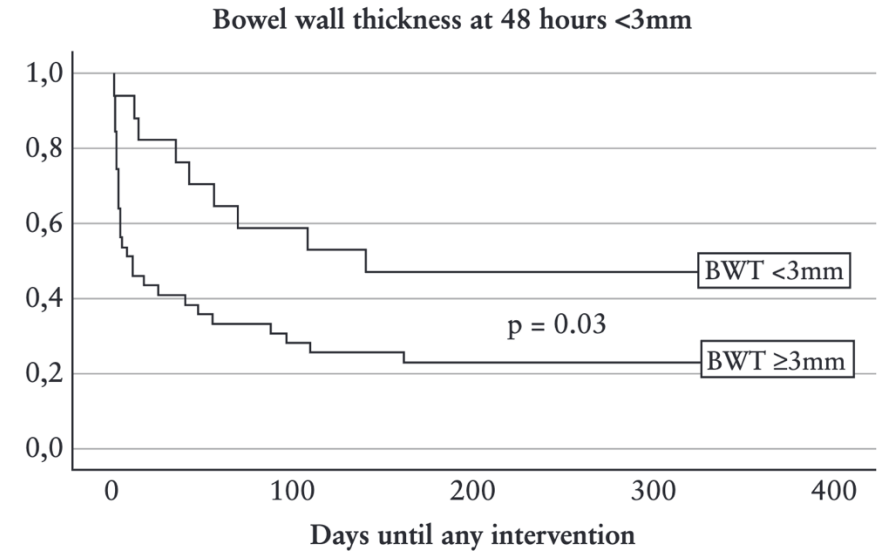
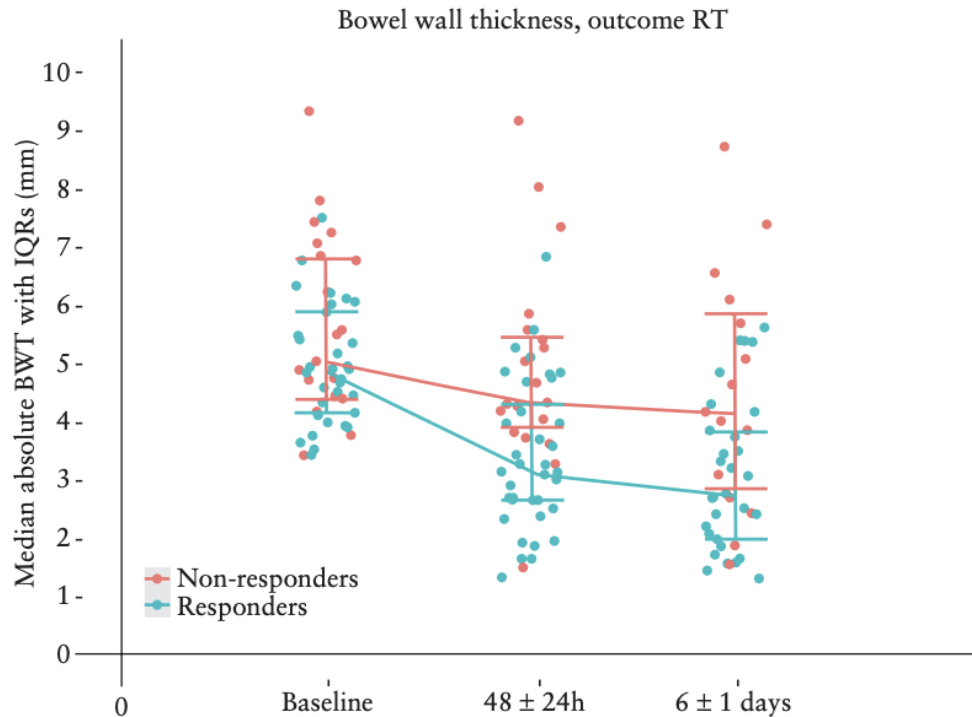
Clinical response does not correlate with ultrasonographic response

IUS indicated poor response ahead of other blood work or calprotectin

## Management plan:

-Optimized dosing and frequency of infliximab

# Increased BWT at 48hr detects non-responders and need for earlier intervention in ASUC (adult data)



	Total (n)	Any intervention (n)	Mean (days)	95%CI	Median (days)	95%CI	p
BWT ≥3mm	39	30	102	56 - 148	11	0 - 27	
BWT <3mm	17	9	199	124 - 274	140	-	0.03

1. Ilvemark JFKF et al. *J Crohns Colitis*. 2022 Nov 23;16(11):1725-1734.
2. Ilvemark JFKF et al. *J Crohns Colitis*. 2024 Jun 28;jjae101. Epub ahead of print.

## Patient 2: JG

### History:

15yo, present to ED for 2 weeks for diarrhea, exacerbated by n/v, fever.

Diagnosed UC 2018 at OSH, lost to follow-up x 3 years, and on no therapy.

Returned from Tijuana right before the onset of symptoms

PUCAI @ admission: 75

### Labs:

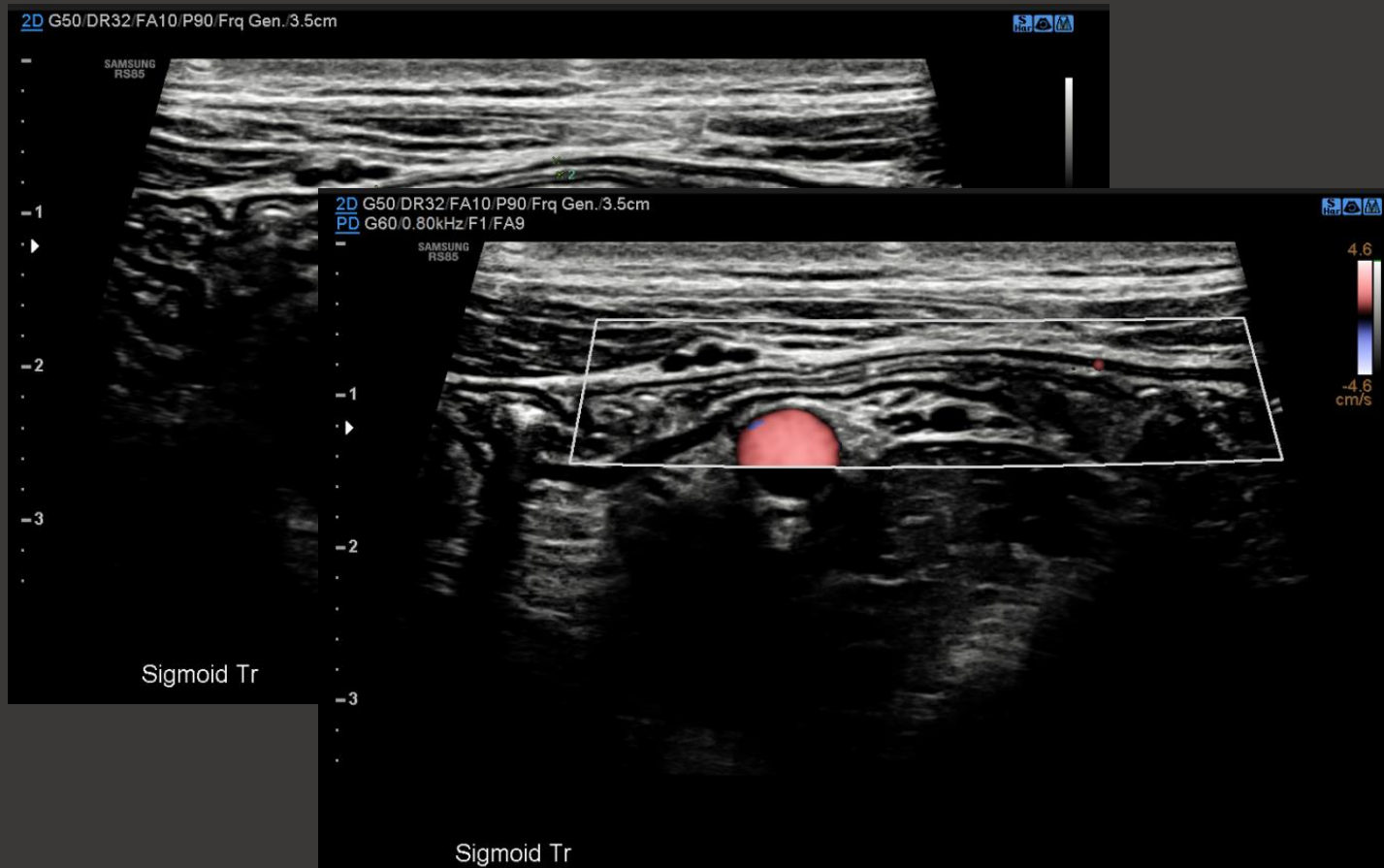
Calpro >3000 ug/g

C. Diff negative

Extended Stool bacterial panel negative

ESR 18, CRP 1.5 mg/dL

# Patient 2: JG

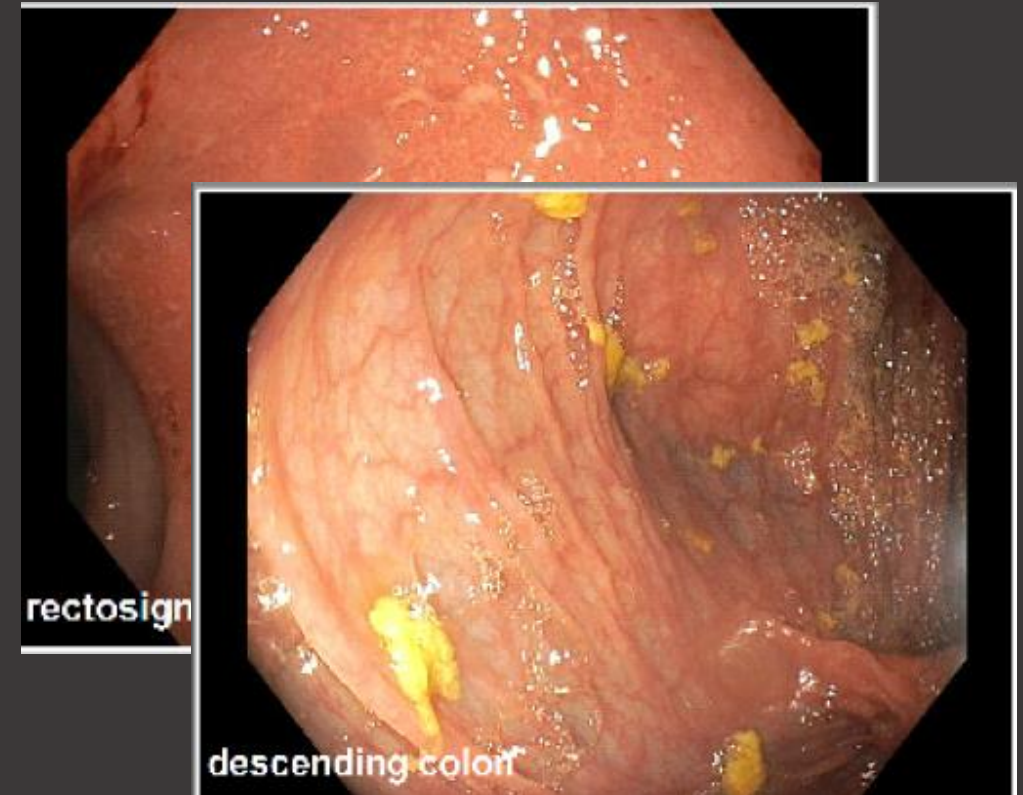
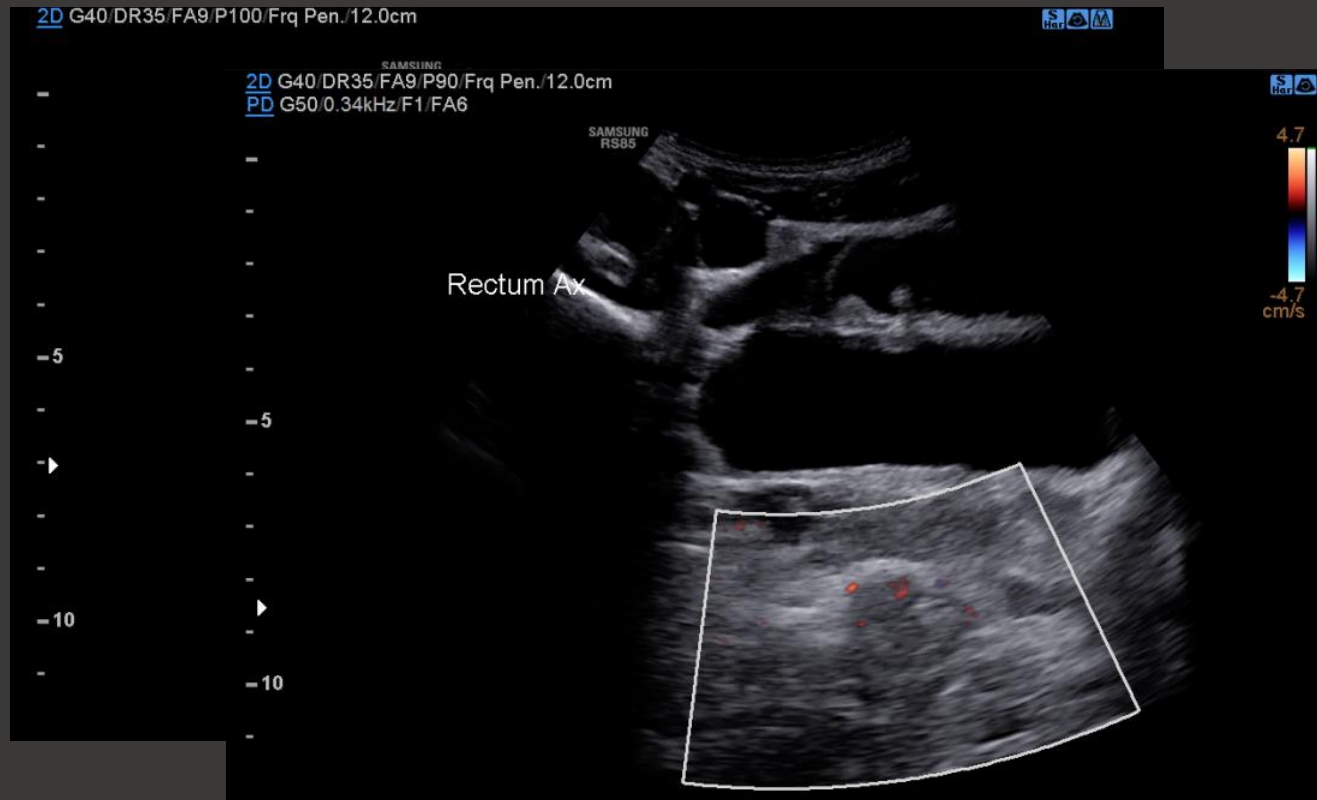


*What features to do you see?*

- Normal BWT
- Submucosa not too prominent
- No Doppler activity
- Peri-intestinal tissue normal

**Why so symptomatic?**

# Patient 2: JG



Severe Proctitis

## Patient 2: JG



Clinically, PUCAI improved to 10

Improvement in inflammatory biomarkers

- Sed rate 18 -> 6
- CRP 1.5 mg/dL -> 1.0 mg/dL

# Patient 2: JG

## Learning points:

Could IUS in the ED avoided this hospitalization?

PUCAI not representative of disease extent in this circumstance

*Durazo F, Michail S, Inflamm Bowel Dis, 2022; 28(suppl 1): S33  
Presented at Crohn's Colitis Congress 2022 & DDW 2022*

PUCAI	ENDOSCOPY								
	Hispanic					Non-Hispanic			
	$\rho_s = 0.65^*$ 95% CI** = (0.52, 0.79)					$\rho_s = 0.79^*$ 95% CI** = (0.70, 0.88)			
	p-value = 0.084***								
		0	1	2	3	0	1	2	3
	0	8	8	3	3	11	3	3	0
	1	5	4	11	3	2	3	9	2
2	3	2	10	11	0	1	8	14	
3	0	0	2	23	0	0	2	18	
* Spearman Correlation Coefficient									
**Confidence Interval									
***p-value for comparison of correlation coefficients									
PUCAI	PATHOLOGY								
	Hispanic					Non-Hispanic			
	$\rho_s = 0.64^*$ 95% CI** = (0.52, 0.77)					$\rho_s = 0.73^*$ 95% CI** = (0.62, 0.85)			
	p-value = 0.300***								
		0	1	2	3	0	1	2	3
	0	10	6	6	0	9	5	3	0
	1	3	10	10	0	0	5	10	1
2	0	7	15	4	0	2	17	4	
3	0	2	10	13	0	0	8	12	

# Patient 3: MB

## History:

11yo F with UC

- Diagnosed 06/2023 - Mesalamine
- H. 03/2024 - worsening symptoms, poor response to steroids, C. Diff +
- Received 1 dose Adalimumab + Steroid + fidox

Readmitted 4/16 - completed Steroid wean 4/13

- PUCAI 85

## Labs:

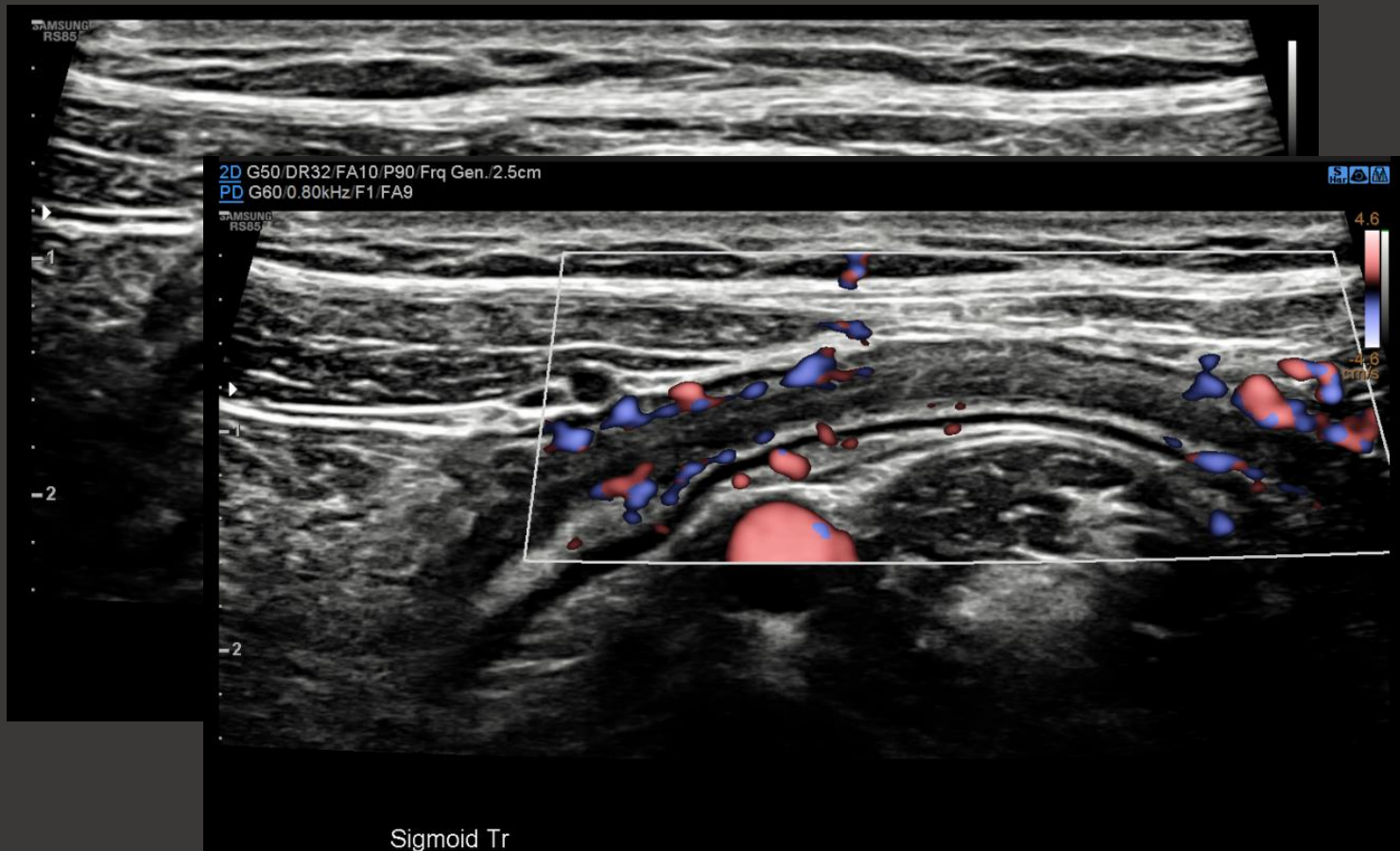
Calpro 2152.6 ug/g

C. Diff Negative

ESR 5, CRP <0.5 mg/dL

# Patient 3: MB

- IUS 4/17 – PUCAI 70



*What features to do you see?*

- BWT increased?
- Increased ratio of submucosa to total BWT?
- Focal loss of stratification
- Normal peri-intestinal fat
- Increased Doppler activity

## Patient 3: MB

Offered switch to Upadacitinib vs Infliximab

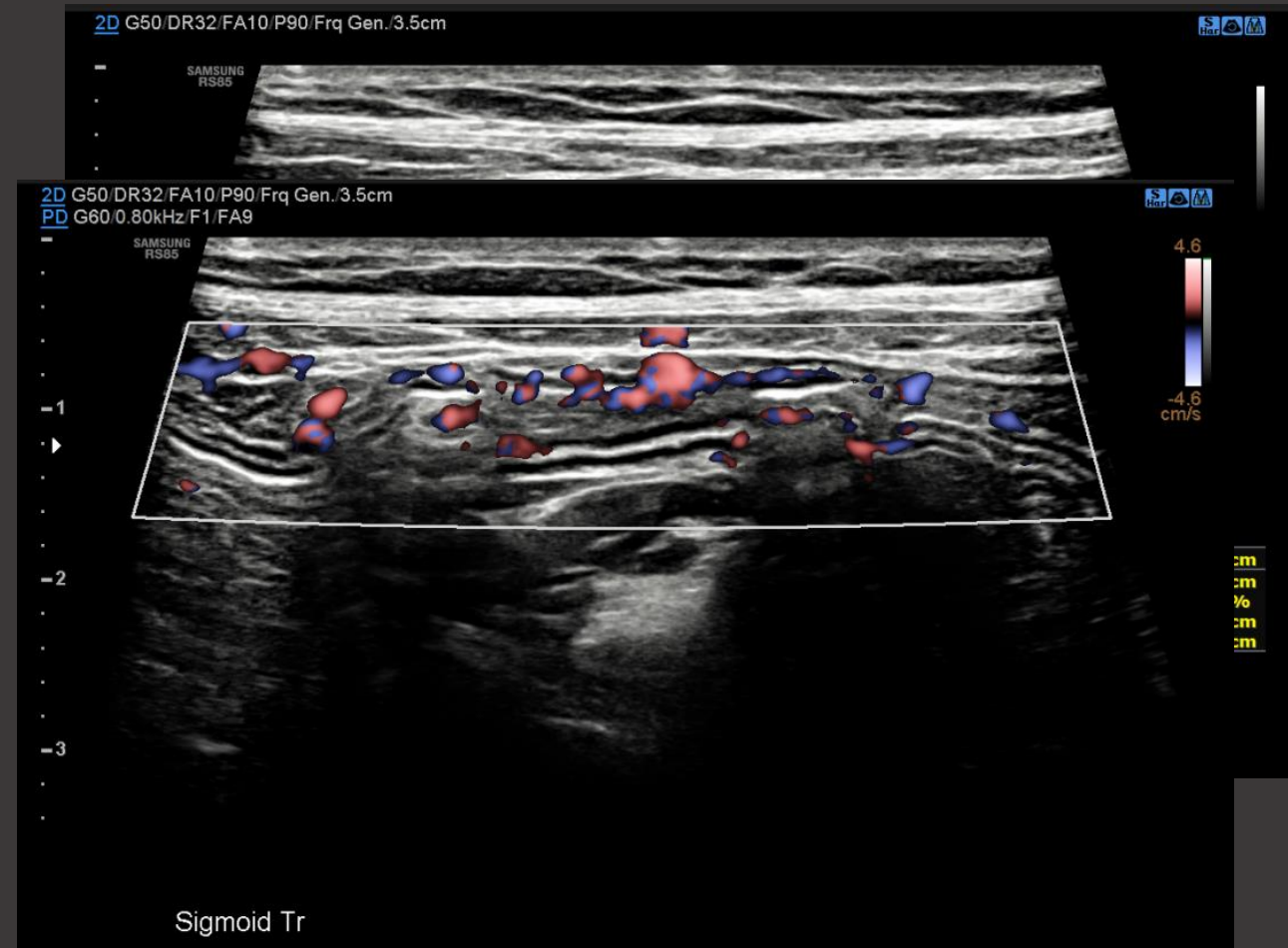
- Shared decision-making to proceed with infliximab due to family history of clotting disorder and Steroids

PUCAI improved to 15 after split dose infliximab and pain management

Steroid taper planned.

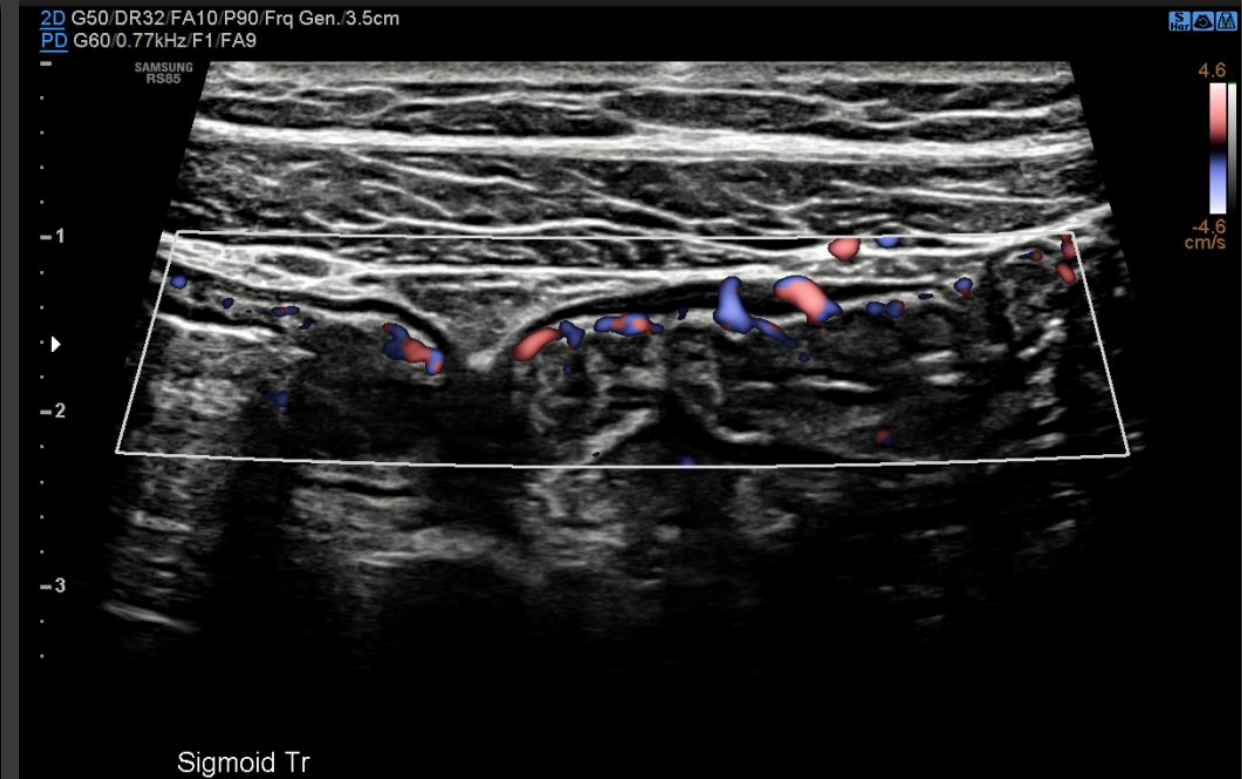
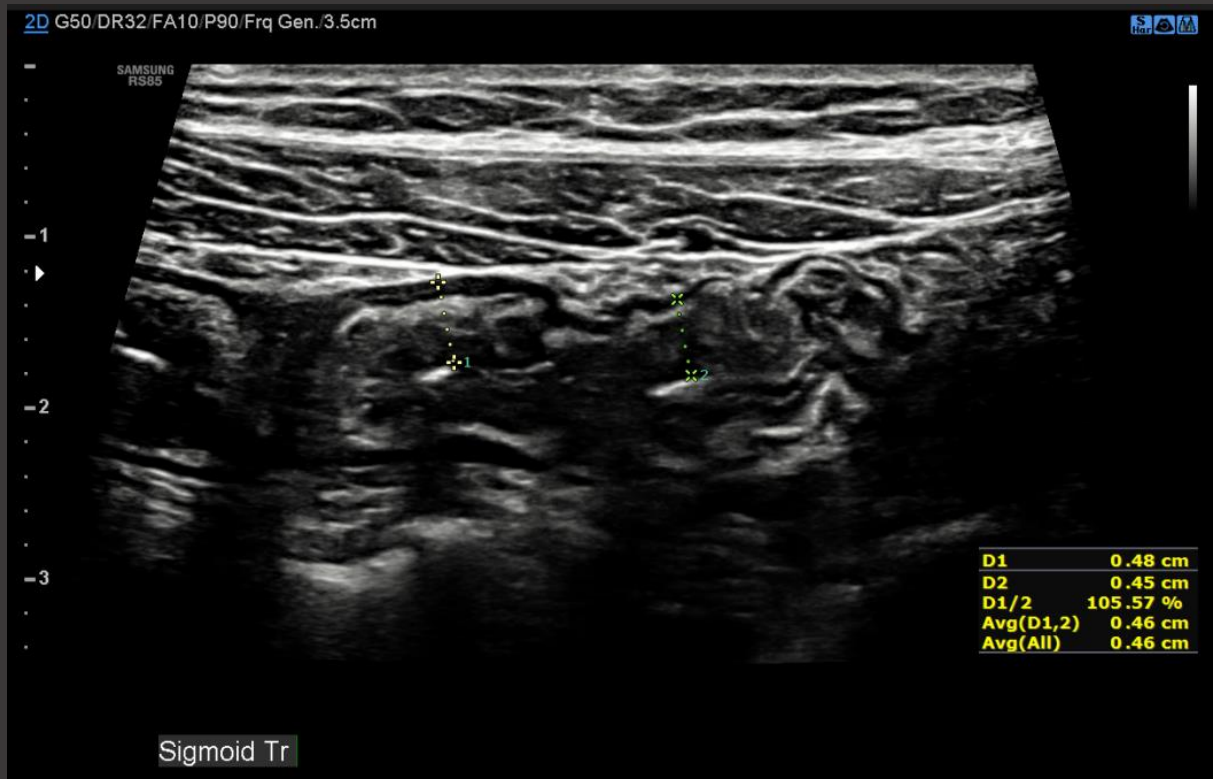
## Patient 3: MB

- Readmitted – abdominal pain, hematochezia and diarrhea
- C. difficile 4/15 negative
- Off steroids, last infliximab 5/3
- PUCAI 80



# Patient 3: MB

5/14 – PUCAI 60 (steroid started), C. Diff Positive



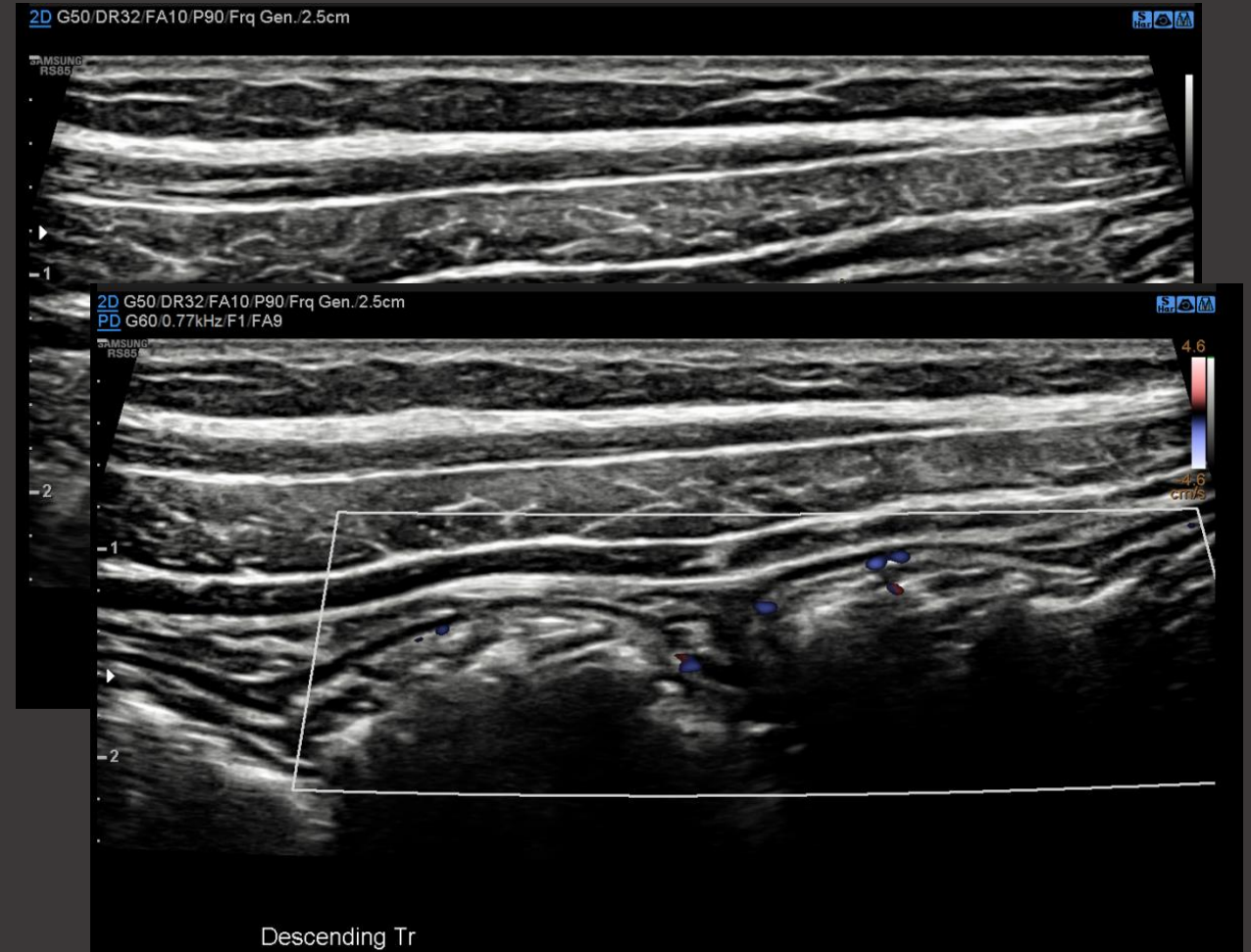
# Patient 3: MB

5/16 – PUCAI 40, on steroid and fidaxomicin



# Patient 3: MB

- Outpatient Follow-up 6/05
- PUCAI = 20 (due to stool frequency, abdominal pain and poor activity tolerance)
- Infliximab and Steroids down to 20mg daily



## Patient 3: MB

Well until came off steroids 7/18

7/18-7/22: increase in abdominal pain, frequency and diarrhea

7/22: C. Diff +, started Fidaxomicin, with improvement in stool frequency and bleeding

Weight loss of 2Kg

PUCAI: 15 (pain, frequency and semi-formed)

# Patient 3: MB



## Patient 3: MB

### Learning points:

IUS abnormal despite improving PUCAI

Disease distribution clear

Dynamic changes can be seen within days of treatment changes

### Management plan:

-Evaluated infliximab levels (98)

-Proposed change of therapy to Upadacitinib

# Conclusion

- IUS is a great tool for assessing disease activity in Ulcerative Colitis, even in the setting of low to no symptoms
- Evidence that it is predictive of treatment failure in ASUC
- Changes are dynamic and can show rapid changes