

Device-assisted Enteroscopy:

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Disclosures:

- Consultant – Olympus USA
- Grant support- Olympus USA

Small bowel imaging:

- CT- enterography
- MR-enterography
- Barium studies

2001

**Video Capsule
Endoscopy
(VCE)**



2001

**Double Balloon
Enteroscopy
(DBE)**



2007

**Single Balloon
Enteroscopy
(SBE)**



2008

**Spiral
Enteroscopy
(SE)**



Source: South Med J © 2010 Lippincott Williams & Wilkins

Indications for deep enteroscopy:

- Small bowel bleeding
- Small bowel polyps and tumors
- Foreign body retrieval
- Histological confirmation
- Tattooing & laparoscopy
- Small bowel stricture
- Altered anatomy endoscopy

Double balloon enteroscopy:

- Devised by Yamamoto in 2001
- First procedure to offer true deep enteroscopy
- Learning curve
- Time consuming
- Pan- enteroscopy in a sub-group of patients
- Therapy possible consistently
- Fuji platform

Single balloon enteroscopy:

- Similar to DBE in many ways
- Depth of insertion not as good as DBE
- Complete enteroscopy less commonly achieved
- Olympus platform

Spiral enteroscopy:

- Fuji DBE or Olympus SBE scope
- Faster
- Quicker learning curve
- Stable platform
- Antegrade enteroscopy
- Retrograde insertion
- Pan-enteroscopy rarely achieved
- Curtain rod pleating

SE vs DBE

Author	Study Design	Patients (#)	Enteroscopy (# patients)	Deepest Insertion avg (cm)	Average Total Time (min)	Diagnostic Yield (%)	Complete Enteroscopy
May et al 2011	P, R, C	10	SE	250*	43*	NA	NA
			DBE	310*	65*	NA	NA
Messer et al 2013	P, R	26	A-SE	268.46*	43.4*	69	12/13 (92%)
			A-SE	78.46*	51.92*		
			A-DBE	346.15*	59.6*	46	1/13 (8%)
			R-DBE	209.23*	76.08*		
Rahmi et al 2013	P, Non-R	241	SE	220	55	70	NA
			DBE	213	60	75	NA
Despott et al 2015	P, T	15	SE	175	28	NA	NA
			DBE	265	54	NA	NA

P: Prospective
R: Randomized
C: Cross-over
T: Tandem

*Statistically significant values

Enteroscopy duration:

Author	Patients (#)	Enteroscopy	Average Time (min)
May et al 2010	100	A-DBE	88.5
		R-DBE	80.5
Takano et al 2011	38	A-DBE	70.4
		R-DBE	90.4
Domagk et al 2011	130	A-DBE	105
		R-DBE	
Efthymiou et al 2012	107	A-DBE	60
		R-DBE	60
May et al 2011	10	SE	43
Messer et al 2013	26	A-SE	43.4
		R-SE	51.92
Rahmi et al 2013	241	SE	55
Despott et al 2015	15	SE	28

A-SBE: antegrade single balloon
enteroscopy
R-SBE: retrograde single balloon
enteroscopy

A-DBE: antegrade double balloon
enteroscopy
R-SBE: retrograde double balloon
enteroscopy

Complete Enteroscopy

Author	Device	Country/Region	Total (%)	Bidirectional (%)	Antegrade (%)
May et al 2010	SBE	Germany	22	20	2
Takano et al 2011	SBE	Japan	0	0	0
Domagk et al 2011	SBE	Europe	10.7	9.2	1.5
Efthymiou et al 2012	SBE	Australia	0	0	0
Yamamoto 2004	DBE	Japan	85.6	78.5	7.1
Mehdizadeh et al 2006	DBE	US	5	5	0
Gerson 2009	DBE	US	8	8	0
Kuga et al 2009	DBE	Brazil	41.6	41.6	NA
May et al 2010	DBE	Germany	66	64	2
Takano et al 2011	DBE	Japan	57	57	0
Domagk et al 2011	DBE	Europe	18.4	16.9	1.5
Efthymiou et al 2012	DBE	Australia	0	0	0
Messer 2013	DBE	Germany	92	92	0
Messer 2013	SE	Germany	8	8	0

Setting up:

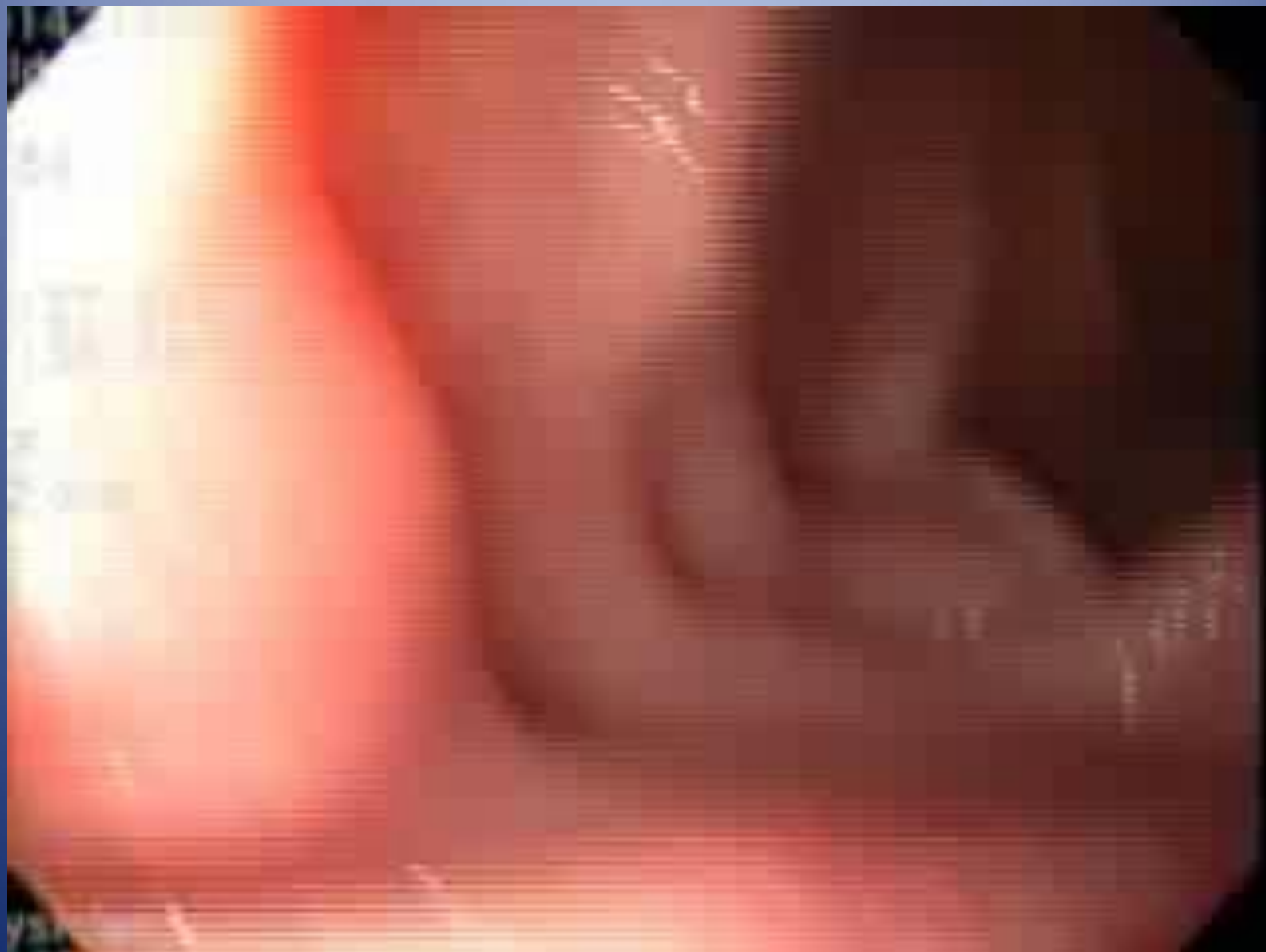
- VCE, CT-enterography, MR-enterography
- Upper 2/3 and lower 1/3
- Spirus/ DBE from above
- DBE from below

Discussion points:

- Where am I?
- How far can one go?
- 250- 300 cm from above
- 120-200 cm from below
- Adhesions

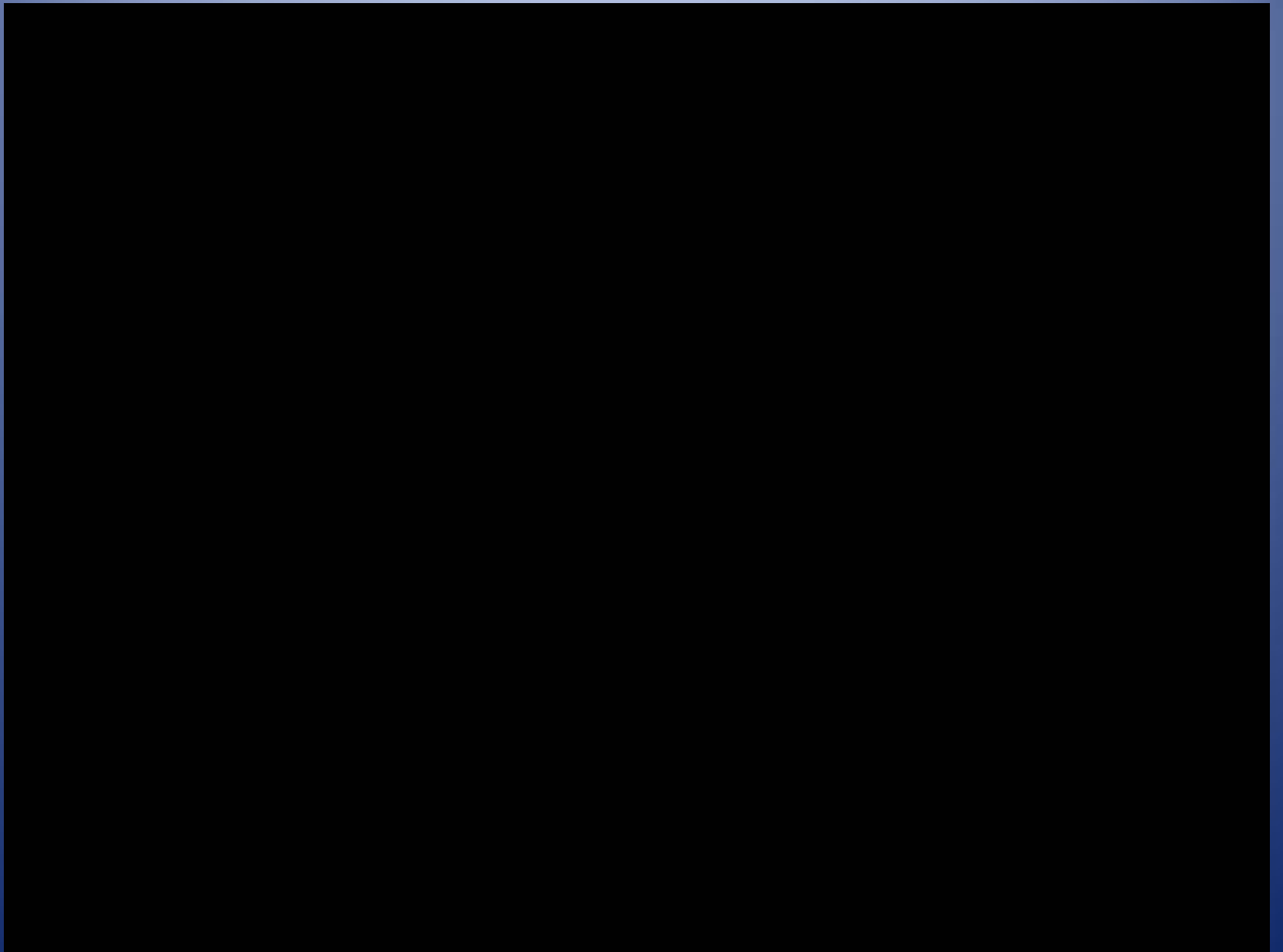
Case 1

- 57 year old female
- Crohn's disease s/p ileal resection
- Admitted with hematochezia; EGD and colonoscopy unrevealing
- VCE performed; retained at small bowel stricture
- Patient started on prednisone
- KUB: capsule present at 4 weeks



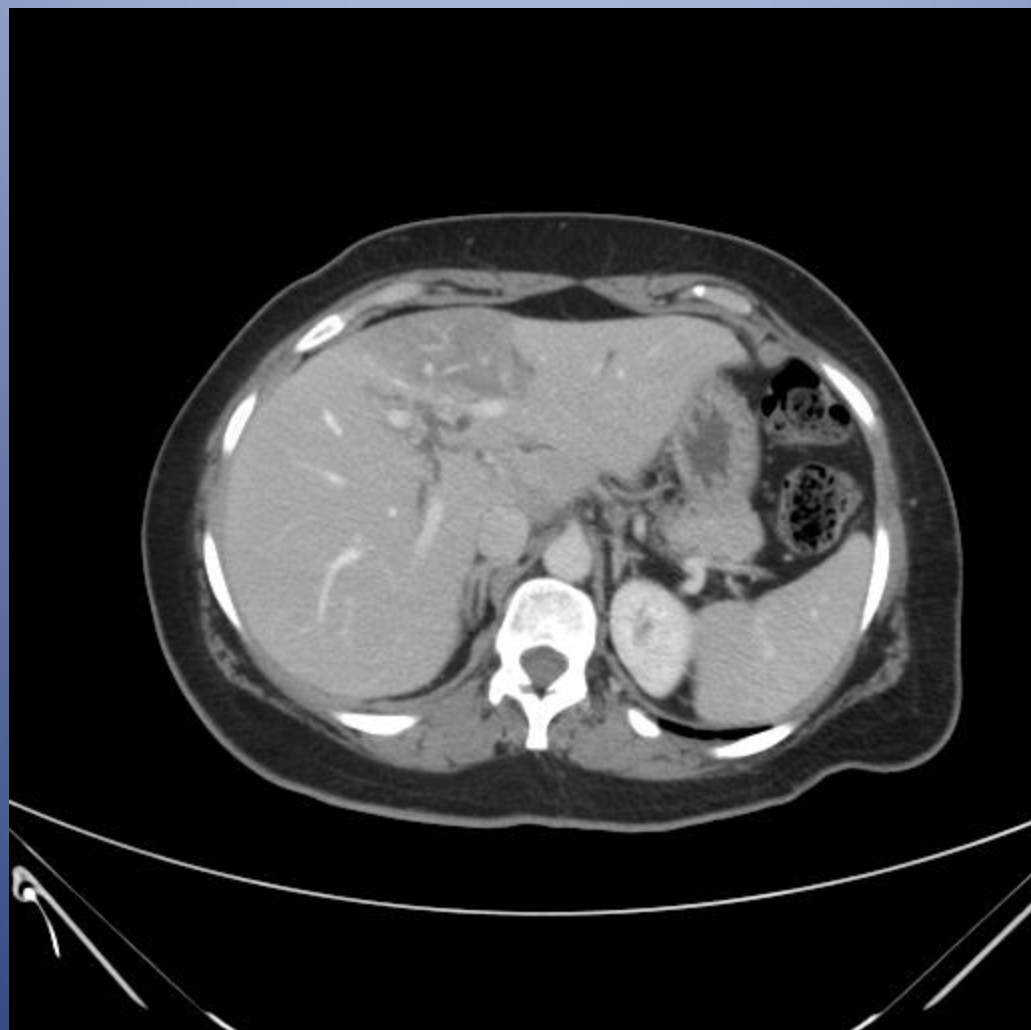
Case 2

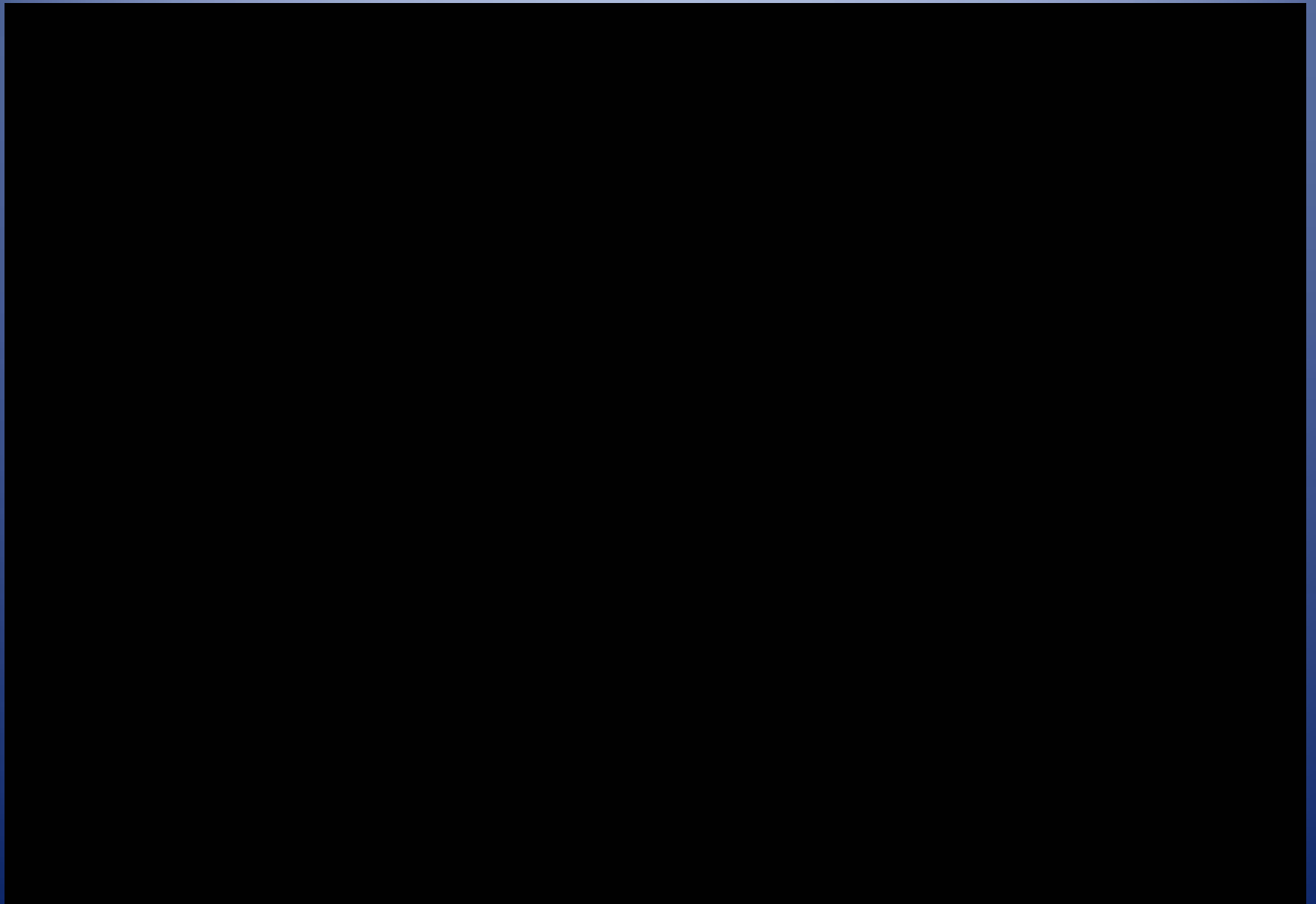
- 48 year old woman with PJS
- Previous hx bowel resection
- Recurrence of abdominal pain
- VCE: multiple large polyps in the mid- small bowel

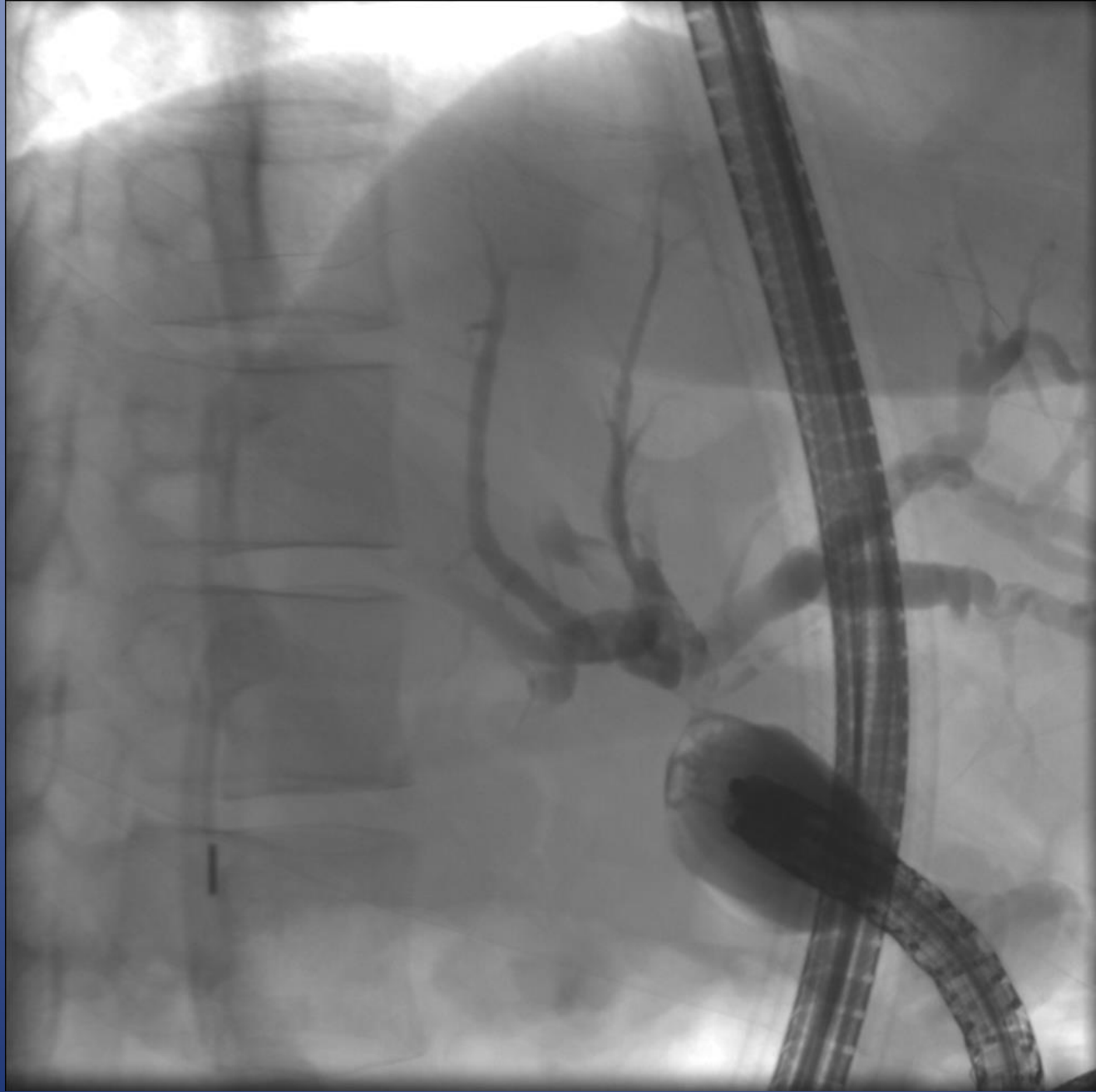


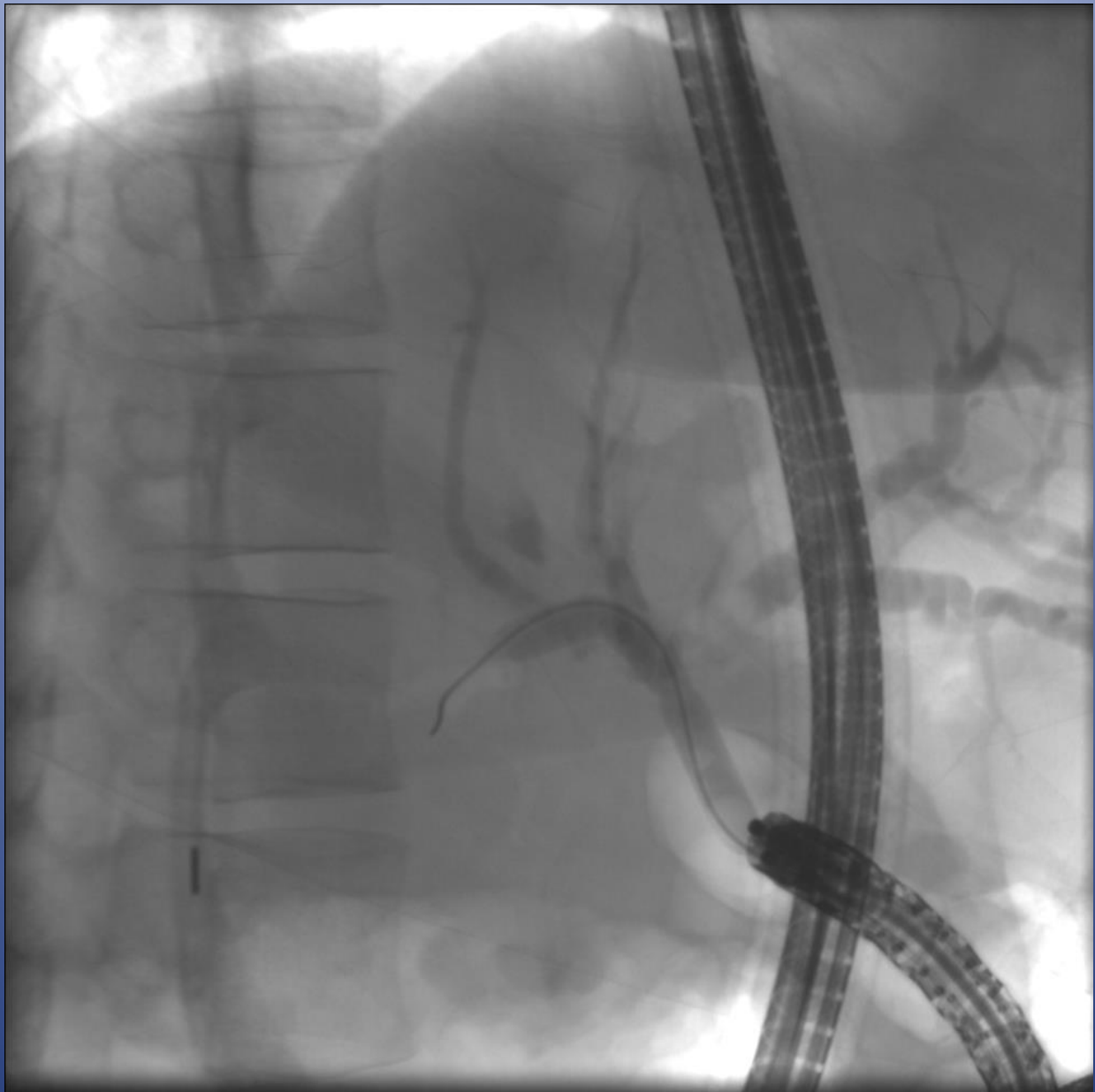
Case 3

- 44 year old Female
- Previous cholecystectomy, complicated by biliary stricture; underwent Roux-en-Y:hepaticojejunostomy
- Presents with RUQ pain, nausea
- TB 5.3, AP 556, AST 81, ALT 53
- CT shown
- Attempt to reach the anastomosis using “push” technique and pediatric colonoscope unsuccessful



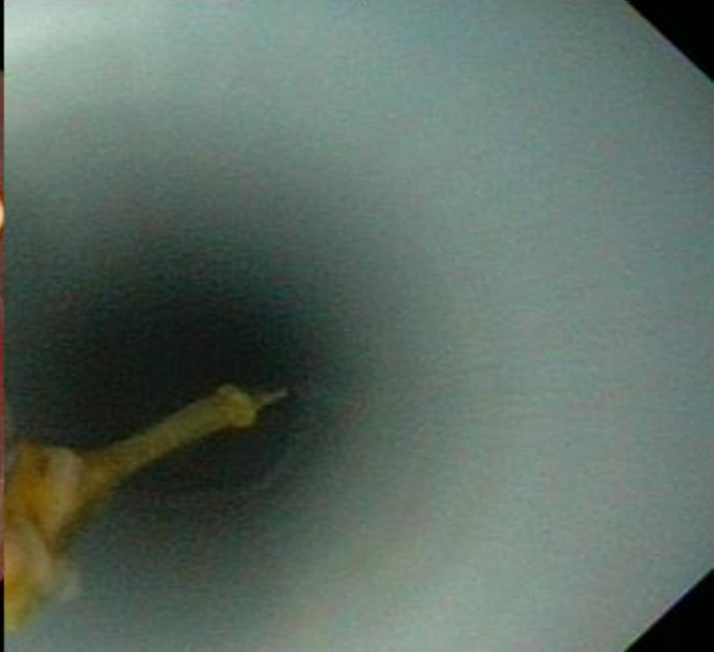
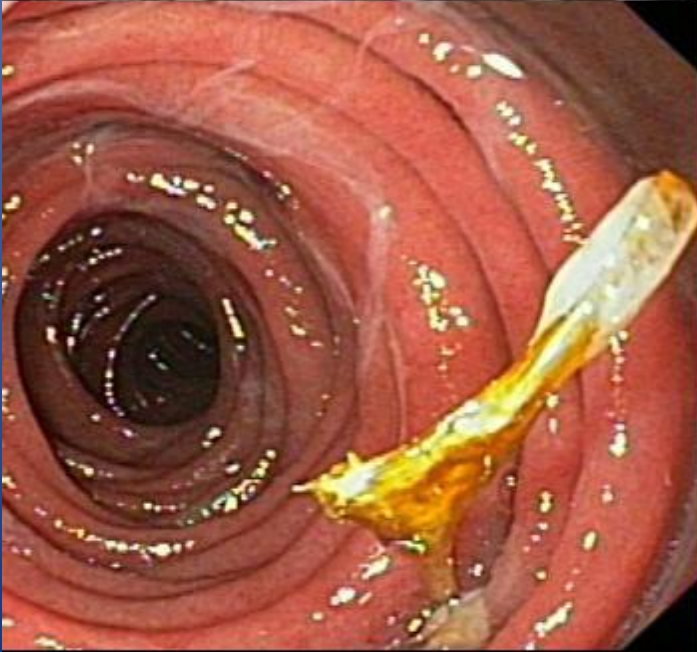
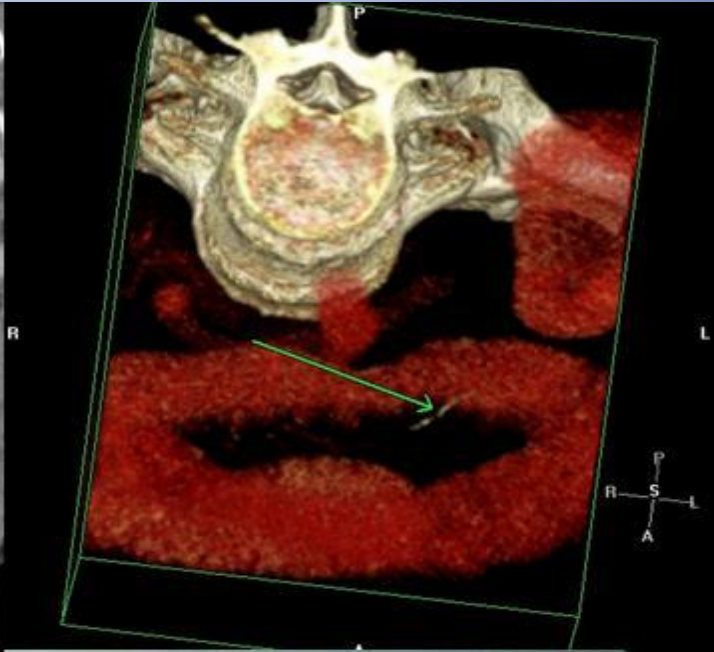
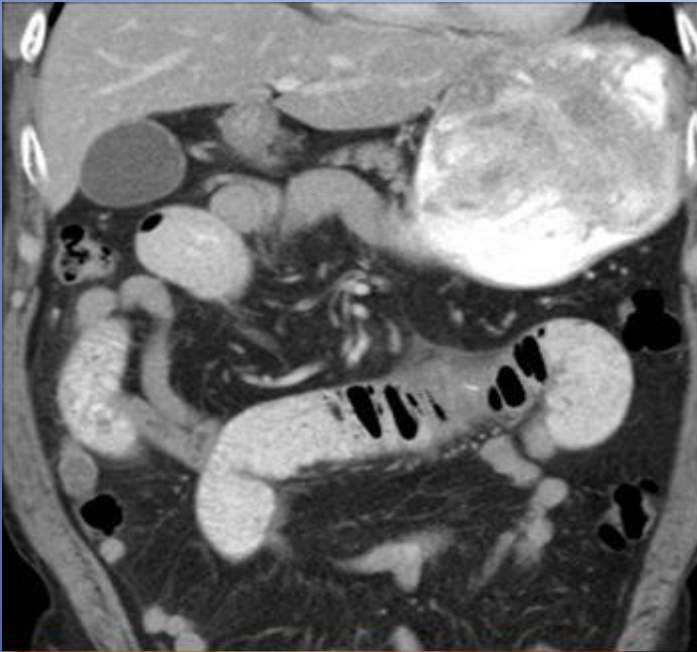






Case 4:

- 70 year old man presents to UMass ER
- 3 days of worsening abdominal pain
- Upper abdominal tenderness
- No fever, WBC normal
- CT-scan
- Surgical consult



Case 5:

- 72 year old lady with renal impairment and GI bleeding
- 10 units transfused
- EGD and colonoscopy-negative
- VCE- active mid-jejunal bleeding

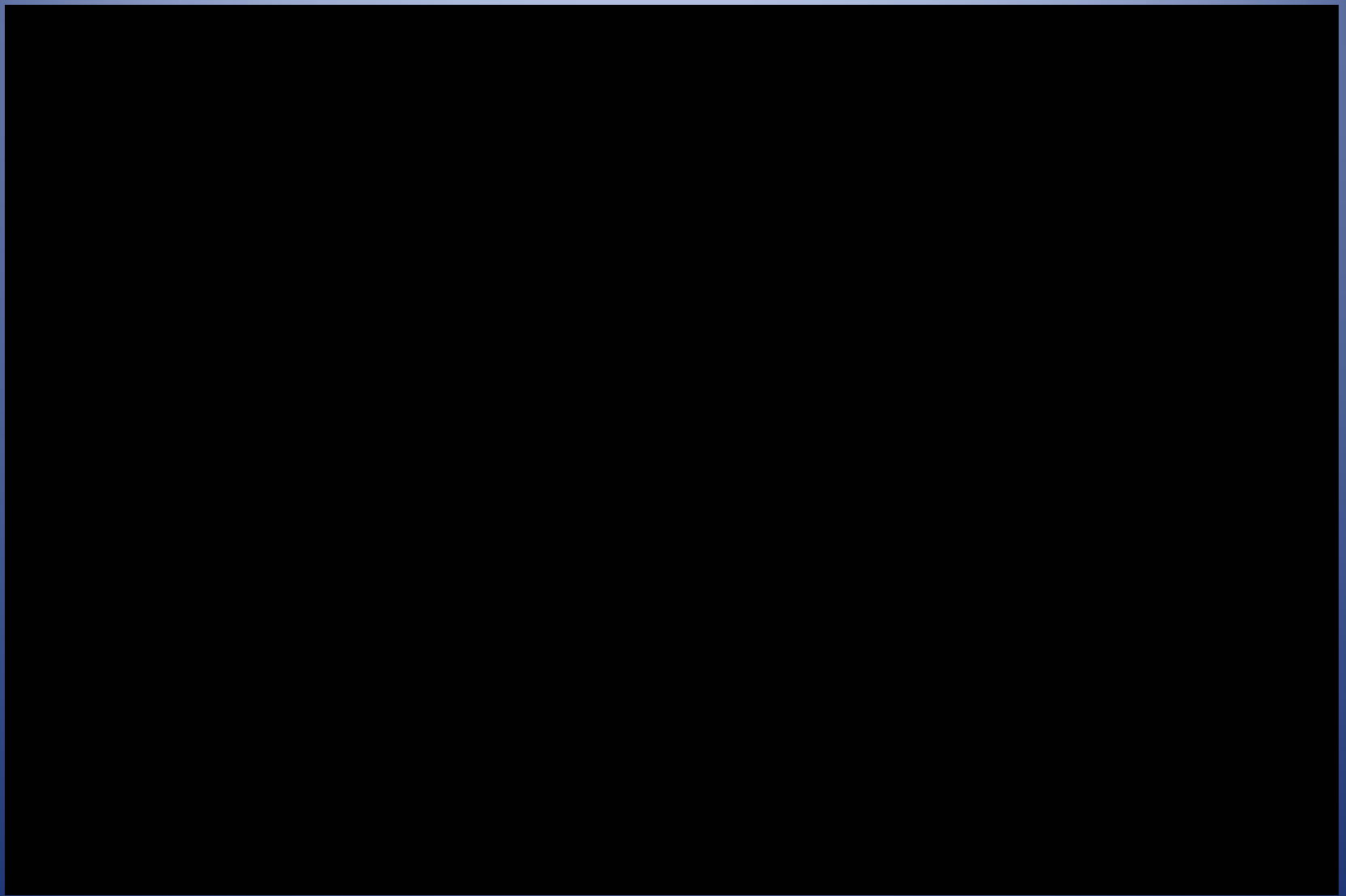


Endoscopic Visualization of the Entire Small Intestine in 27 Consecutive Patients Using Novel Motorized Spiral Endoscope

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- 27 cases done
- Complete enteroscopy in all cases
- All under one hour
- Last 3 cases complete antegrade unidirectional enteroscopy , mouth to cecum at 18, 22 and 20 minutes



MOTORIZED SPIRAL ENTEROSCOPY: A NEW TECHNIQUE FOR ONE-STAGE COMPLETE ENTEROSCOPY

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Peter V. Draganov, MD; Daniel C. DeMarco, MD

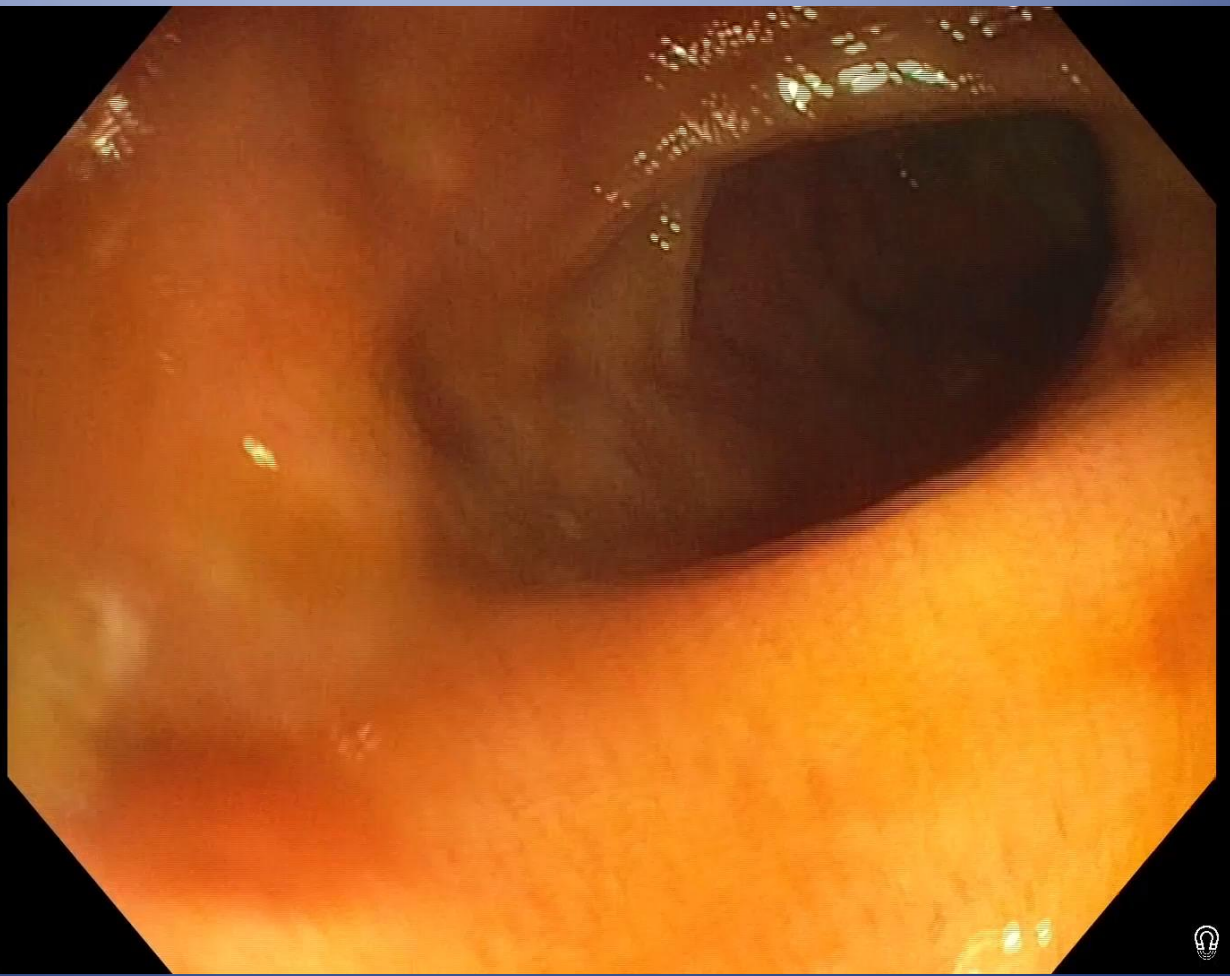


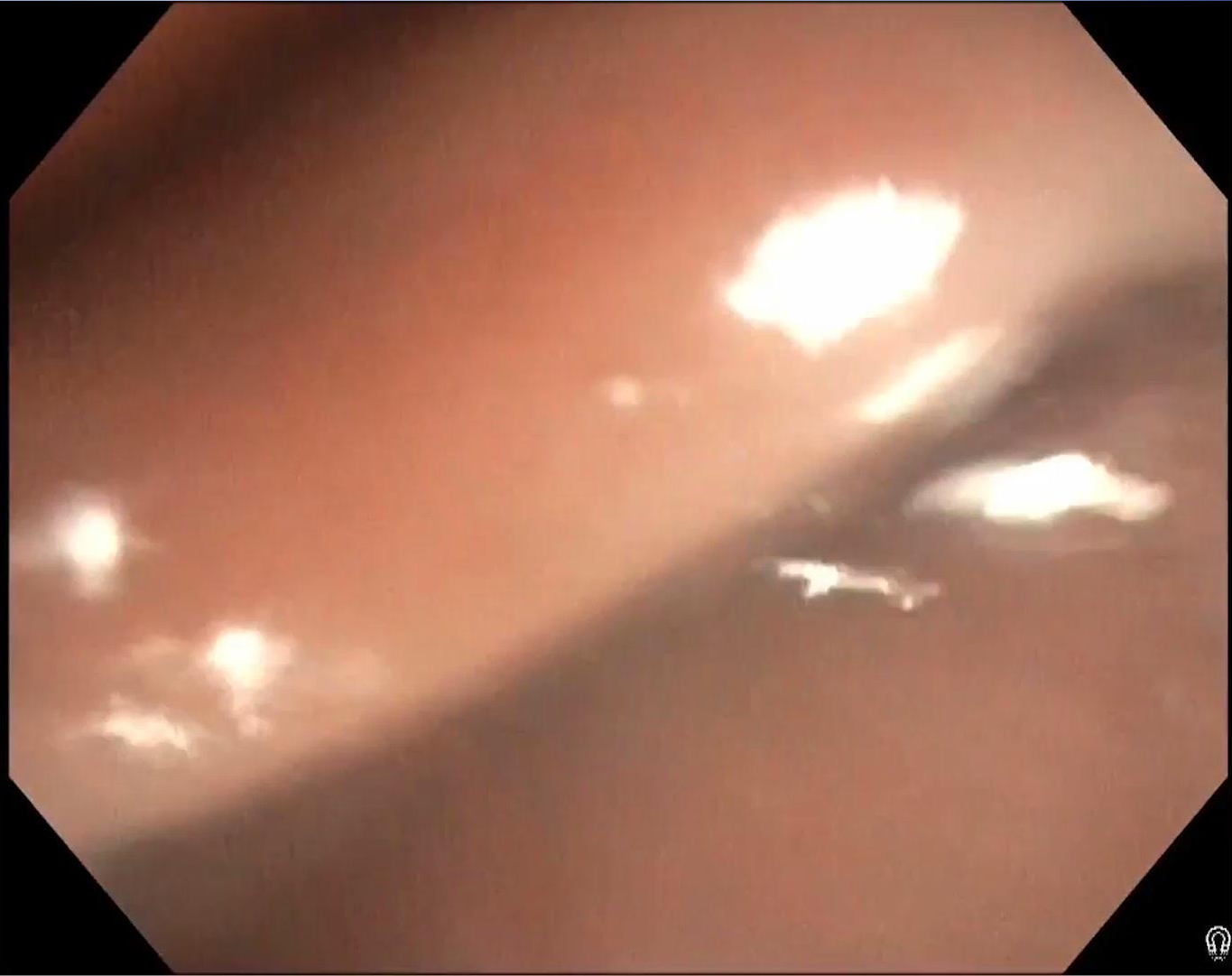
Motorized Spiral Enteroscope



Results

Subject #	Age	Sex	Indication(s)	BMI	ASA	Insertion Time (min)	Total Procedure Time (min)	Point of Deepest Insertion	Complications	Final Diagnosis
1	24	M	Abdominal Pain; VCE: ulcerated mucosa	40	III	33	41	Distal Jejunum	None	None
2	22	M	CT scan finding of intussusception	21	II	32	43	Cecum	None	None
3	61	F	GI Bleeding; VCE: AVM	27	III	61	94	Cecum	None	None
4	58	F	Iron Deficiency Anemia; VCE finding of AVM	23	II	47	70	Distal Ileum	None	None
5	67	F	Iron Deficiency Anemia	23	II	48	66	Cecum	None	None
6	33	M	GI Bleeding	28	III	59	78	Cecum	Bleeding	Meckel's diverticulum
7	29	M	Suspected Crohn's; VCE: bleeding AVM and small polyp	28	II	49	72	Cecum	None	Crohn's, Inflammatory polyp





European Novel Motorized Spiral Enteroscopy Trial:

- Enrolled: N = 58 (of 132)
- Female 21, Male 37, mean age 62 (20-92)
- Unidirectional pan-enteroscopy 6
- Diagnostic yield 86% (50/58)
- Adverse events 12% (7/58)- mucosal lesion, hypotension, bradycardia, epigastric pain, parotitis.

Take home points:

- Complete enteroscopy
- Have I got to where I needed to be?
- Tattoo- raise bleb with saline and then tattoo
- Did I solve the problem?
- Use CO₂
- Deep sedation or general anesthesia