Improving ADR

Richard Sultanian and Rachid Mohamed

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Bowel preparation

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Bowel preparation

- High quality
  - High/intermediate quality vs. poor quality – OR for adenoma detection 1.41 (1.21-1.64)
  - Utilize BBPS – scores 0-3 likely warrant early repeat colonoscopy
- Split-dose now standard of care
  - ½ prep day of procedure (including am procedures)
  - OR for cleanliness 2.51(1.86-3.39)
  - OR for ADR 1.52 (0.69-3.32)
  - Patient tolerance is *improved* with split dosing

Brand EC and Wallace MB. Curr Treat Opt Gastroenterol 2017

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Bowel preparation

- Reporting is critical
  - Utilize validated scoring system vs. adequate/inadequate
  - Grading of cleanliness is *after* washing/suctioning performed
  - Patient education/engagement is important

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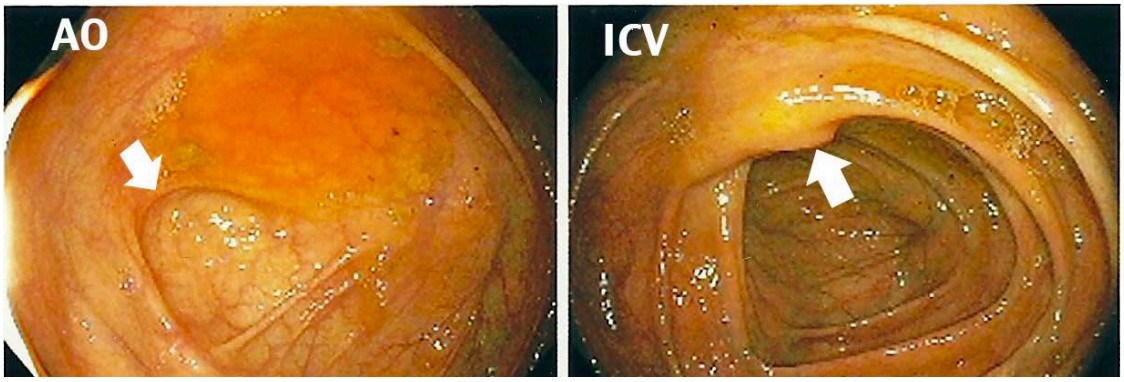

Quality colonoscopy

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Quality colonoscopy

- Cecal intubation
  - Incomplete procedures associated with lower detection of proximal adenomas and subsequent interval cancer
  - ASGE minimum benchmark of 90%
  - It is ok not to complete every colonoscopy!!!
- Withdrawal time
  - Should be monitored, measured and reported
  - Linear relationship with ADR and inverse with interval cancer
  - Minimum benchmark of 6 min
  - Surrogate for good technique

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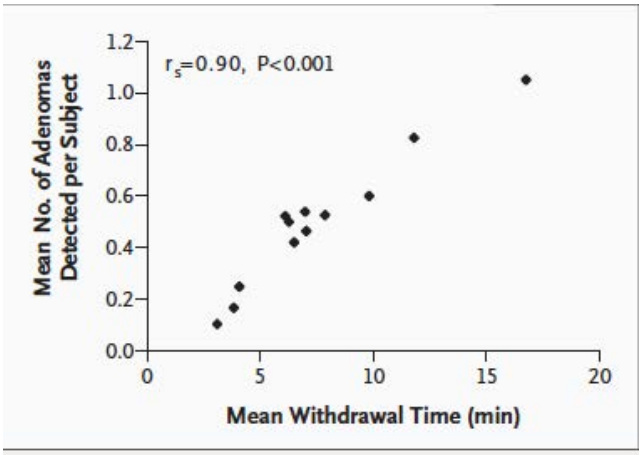

Figure 2. Mean Rates of Detection of Adenomas According to Mean Colonoscopic Withdrawal Times for 12 Endoscopists.

Barclay RL et al. NEJM 2006

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Magnetic imaging assistive technology

- SCOPE Guide
  - Olympus product
  - Uses magnetic field sensors within the scope to provide a real-time 3D representation of the scopes position in the body
  - Available in both adult and pediatric models
- SCOPE Pilot
  - Pentax product
  - Also uses magnetic field sensors within the scope to provide real time 3D representation of the scopes position in the body
  - Available only in adult models
- Does not directly enhance ADR, but if you complete deep cecal intubation more often, you will find more polyps

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Gas Insufflation

- Essential to distend the colonic lumen and optimize mucosal visualization
- Entry
  - Excessive amounts can be detrimental
    - Increases colonic angulation, patient discomfort, air trapping
    - Delays discharge from recovery room
    - Unnecessary investigations to rule out perforation
- Withdrawal
  - Critical to find the polyps!
  - Under insufflation prevents direct observation of the majority of mucosal surface, especially flexures and proximal aspects of folds
  - Segmentally inflate and decompress on withdrawal

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Anti-spasmotics

- Can be used on withdrawal to increase mucosal surface visualization, especially if vigorous peristalsis present
  - NOTE: No RCT evidence supports enhanced ADR with these agents
- **Buscopan** (Hyoscine Bromide)
  - Reduces smooth muscle contraction and spasms
  - Pros
    - More tubular view, backs of folds seen, quicker examination, vasovagal protection
  - Cons
    - Side effects (tachycardia)

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Dynamic position change

- Highly effective technique in achieving successful deep cecal intubation
- Challenging with patients under GA, morbid obesity
  - Lightly sedated patients can help move themselves!

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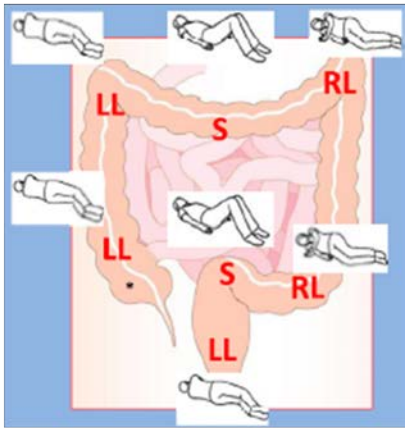
Dynamic position change

Optimal Position on Insertion
Rectum = LL
Sigmoid = LL – S – RL
Descending = RL
Splenic = RL
Transverse = S
Hepatic = LL
Ascending = LL
Cecum = LL – S – RL – Prone
Medial cecum = RL



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Dynamic position change

- Does it enhance ADR?
- Unclear as some studies demonstrate a significant increase in PDR/ADR, while other studies did not find a significant benefit, especially if the endoscopists ADR is already above average
- Systematic review 2016 (Zhao et al. J Dig Dis 2016)
  - Eight studies were included, of which seven were randomized controlled trials (RCTs).
  - A non-randomized controlled trial and all four cross-over RCTs reported significant improvement in PDR, ADR and bowel distention with position change during colonoscopic withdrawal,
  - Three parallel-group RCTs did not confirm its effectiveness

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Repeat assessment of the right colon

- Does repeat endoscopic evaluation of the right colon enhance ADR?
- Forward viewing, repeat endoscopic evaluation
  - Laine et al (Gastrointest Endosc 2016) did relook endoscopy in the right colon in 280 patients
  - 15.4% increased adenoma detection with a second look evaluation of the right colon
  - 3.2% overall increased ADR
  - 3.6% of patient had a change in their surveillance interval to a shorter time frame after relook endoscopy
- Systematic review and meta-analysis of this (Ai et al. Eur J Gastroenterol Hepatol 2018) assessed 5 separate studies
  - Repeat examination lead to a modest improvement in the detection of lesions in the proximal colon

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Cecal retroflexion

- Chandran et al. (GIE 2015) looked at the benefit of retroflexion in 1351 consecutive patients
  - 95.9% successful in performing cecal retroflexion
  - Increased ADR from 24.6% → 26.4%
  - No reported complications in this study
- Limitation
  - Typically performed with pediatric colonoscope
  - Perforations reported and increased patient discomfort also problematic
  - Considering the limited yield and potential danger to the patients, this is not routinely recommended

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Performance reporting

- Historical evaluations methods
  - Experience
  - Word of mouth
- Established targets for measurable outcomes in screening populations
  - Cecal intubation
  - Polyp / adenoma detection rates
- Important outcomes
  - High completion and ADR associated with lower interval CRC rate

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Calgary model

- Colon Cancer Screening Center quality improvement program
- Single indication (screening)
- Anonymous
- Comparative
- Iterative process

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CCSC Physician Quality Improvement Report

Sedation Practices				
No Sedation	9%	9%	9%	
Mean Midazolam (mg)[2]	2.8	2.8	3	
Mean Fentanyl (µg)[2]	50	48	53	
Reversal Agent	0%	0%	.01%	≤1%
Cecal Intubation Rate	100%	100%	99%	≥95%
Patient Comfort				
Total Napcoms	139	0		
Avg Score	1.8	NR	2.5	
% >4	7%	NR	18%	
FIT+	**Graph ID: 19**			
Procedures	105	104		
PDR	74%	83%	76%	
ADR[4]	57%	66%	58%[5]	≥55%**/≥58%* *
APC	1.82	1.58	NR	
SADR	8%	15%	12%	
SRLDR	61%	69%	63%	
Withdrawal Time[3]	7.8	7.9	8.6	≥ 6 min

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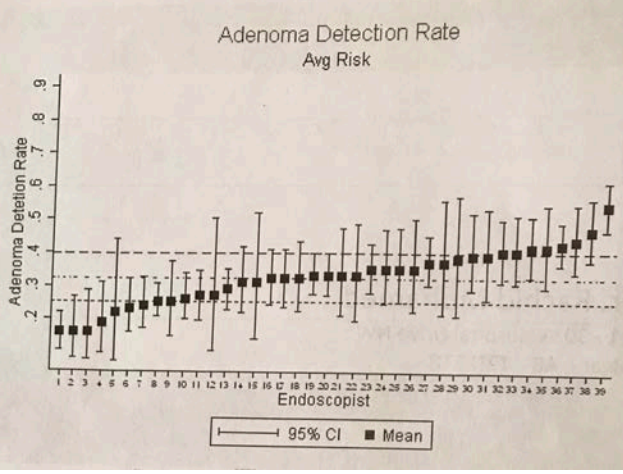
Adenoma Detection Rate

Average Risk

Your ADR: 32%

Graph ID: 17



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Impact of a quarterly report card on colonoscopy quality measures

Charles J. Kahi, MD, MSCR,[1,2] Darren Ballard, MD,[1] Anand S. Shah, MD,[3] Raenita Mears, MSN, ACNS-BC, RN,[2] Cynthia S. Johnson, MA[4]

- Outcome measures determined before and after intervention of quarterly report cards

TABLE 2. Adjusted rates and means by intervention phase

Variable, rate, % (95% CI, %)	Before intervention	Intervention	*P* value
Adenoma detection	44.7 (39.1-50.4)	53.9 (49.7-58.1)	.013
Proximal adenoma detection	29.3 (24.4-34.8)	39.8 (35.7-44.0)	.003
Distal adenoma detection	28.4 (23.6-33.7)	27.8 (24.2-31.7)	.840
Advanced neoplasm detection	11.5 (8.4-15.5)	13.3 (10.8-16.4)	.441
Serrated polyp detection	33.8 (28.5-39.5)	32.7 (28.7-36.9)	.741
Cecal intubation	95.6 (92.5-97.5)	98.1 (96.7-99.0)	.027
No. of adenomas per colonoscopy, mean (95% CI)	1.1 (0.7-1.4)	1.2 (0.9-1.5)	.364
Adenoma size per colonoscopy, mean (95% CI), mm	5.6 (4.0-7.1)	5.5 (4.0-7.0)	.956

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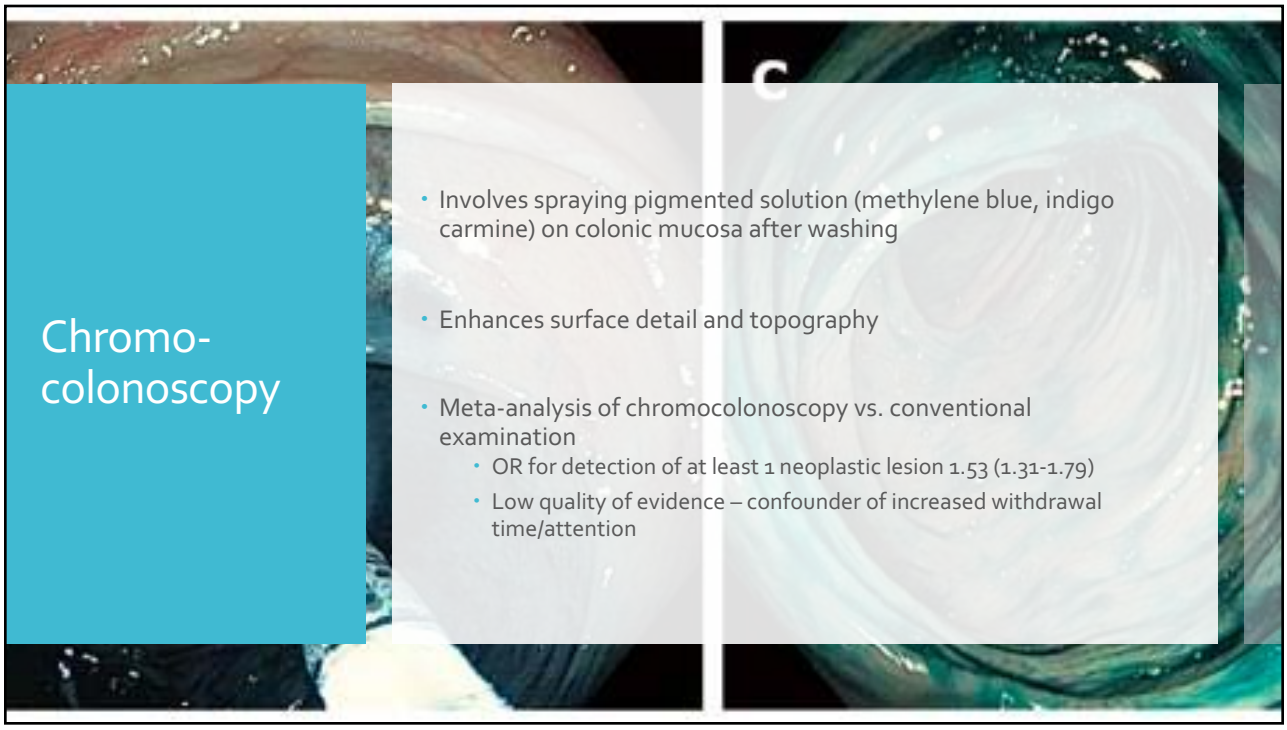

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Virtual chromo-colonoscopy

- Olympus – narrow band imaging (NBI)
  - Real-time blue/green light filters
  - Meta-analyses and RCTs – no increased ADR with NBI vs. HDWL
    - However, can be a tool for characterization of surface and vascular features of detected lesions
- Pentax – i-scan
  - Post processor surface, tone, contrast enhancement
  - RCT 2018 – i-scan 1 mode vs. HDWL for ADR in screening population
    - ADR higher with I-scan 1 – 47.2% vs. 37.7%
    - Proximal lesions - 34.4%vs. 25.6%
    - Flat lesions – 14.4% vs. 6.2%

Kidambi TD et al. Clin Gastro Hep 2018

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Virtual chromo-colonoscopy

- Fujinon – FICE (Fujinon intelligent colour enhancement)
  - Construction of virtual images to enhance pit and vascular patterns
  - Overall, no detected difference in ADR with FICE and HDWL

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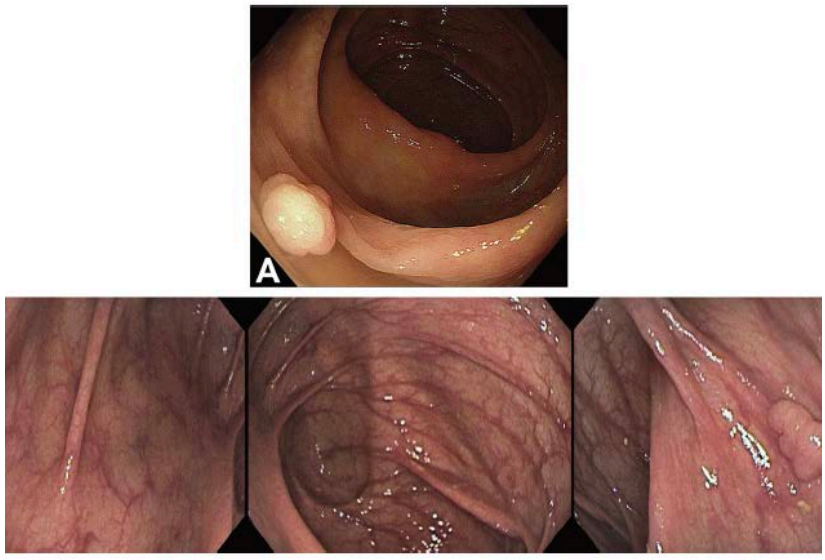
Novel technologies

FUSE – Full Spectrum Endoscopy

- 3 imagers – forward; two sides – creating 330-degree angle of view
- Multicenter, RCT (>5000 colonoscopies) – no increase in ADR



Kudo T et al. GIE 2018

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Endocuff

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Endocuff

- Effective adenoma detection includes adequate exposure of mucosa behind folds
- Disposable, distal attachment on colonoscope
  - Multiple sizes to fit all colonoscopes

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Endocuff data

- Meta-analysis in average risk screening population (Chin M et al. 2016)
  - Comparator arm – HDWL
- N – 5624 patients

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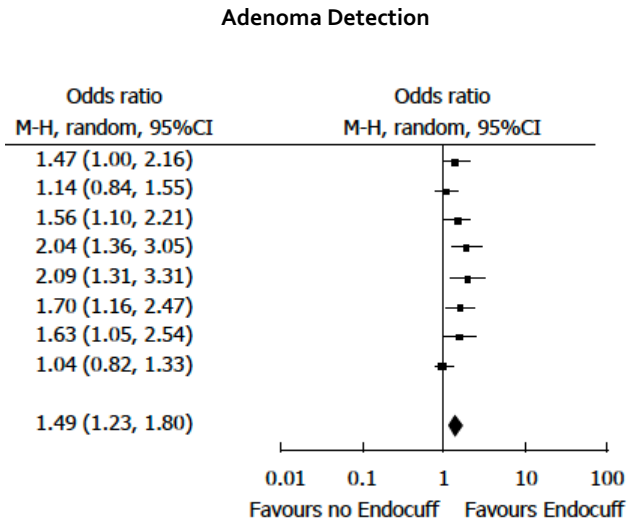
Endocuff data



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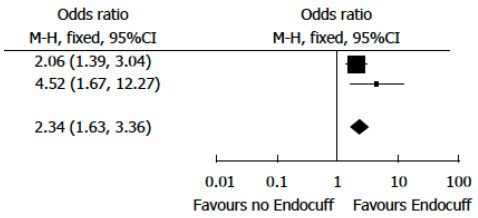
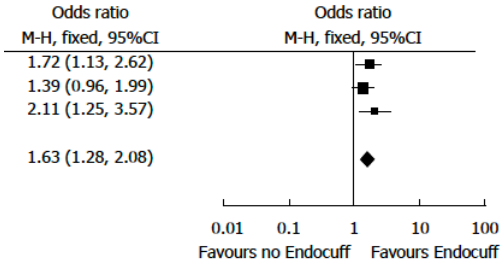
Right sided lesions



Serrated lesions



Endocuff data

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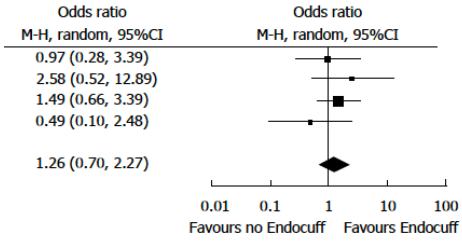
Endocuff - safety

Cecal intubation rate



In meta-analysis, 2% abortion rate
- aborted due to patient discomfort
- all subsequently completed without cuff

Increase in superficial mucosal injury without increased risk of perforation

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Endocuff – Calgary experience

- Clinical trial of all screening patients at CCSC May 2019
- Adenoma detection rate, mean sedation and abortion rate (amongst other things) followed

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Endocuff – Calgary Experience

	May – August 2019					
	FIT+			Non FIT+		
	ADR	APC	SADR	ADR	APC	SADR
Endocuff	67%	2.3	17%	49%	1.3	19%
No Endocuff	59%	1.7	17%	43%	1.0	18%

- Overall use in 82% of colonoscopy procedures
  - Endoscopist preference
  - Special case indications
- Abortion rate 4%
- Mean sedation unchanged with use of Endocuff

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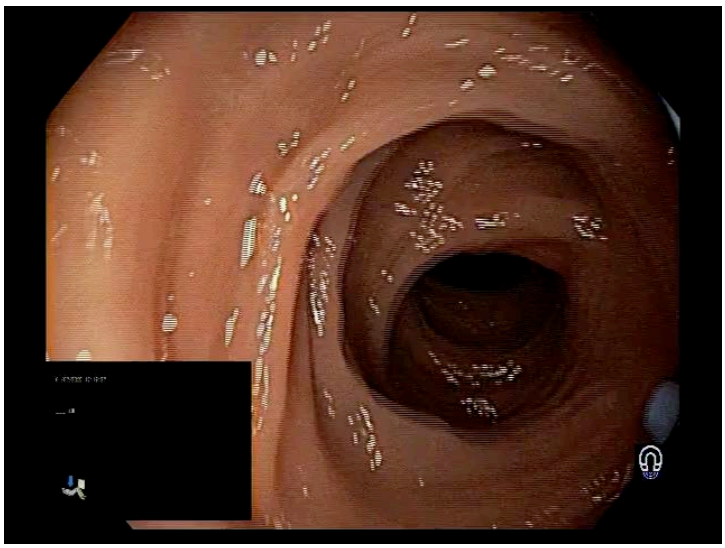
Endocuff Demonstration



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Endocuff Demonstration

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