What's New in Colon Cancer Screening & How to Do High Quality Colonoscopy?

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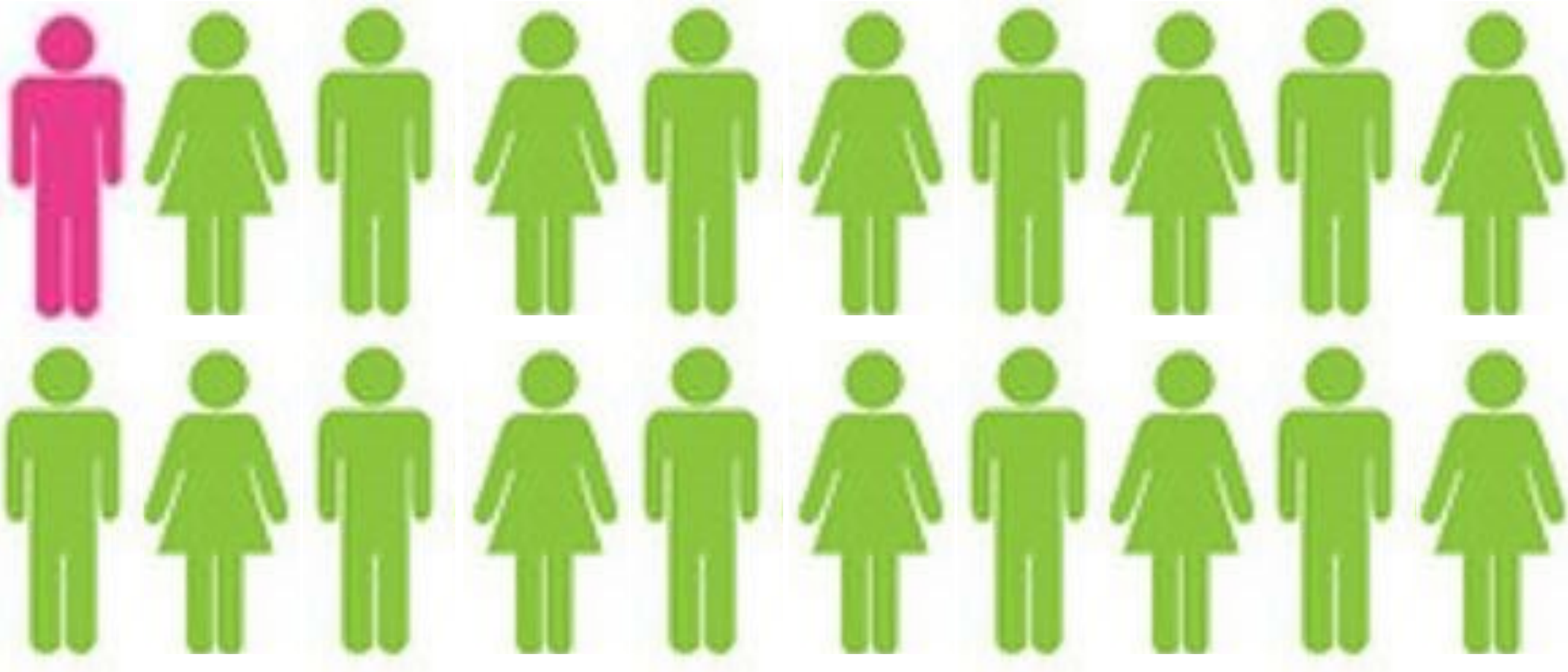
In the US, 1 in 20 People will be Diagnosed with Colorectal Cancer



Gastroenterology 2017;153:307–323

CONSENSUS GUIDELINE

Colorectal Cancer Screening: Recommendations for Physicians and Patients From the U.S. Multi-Society Task Force on Colorectal Cancer

Douglas K. Rex,[1] C. Richard Boland,[2] Jason A. Dominitz,[3] Francis M. Giardiello,[4] David A. Johnson,[5] Tonya Kaltenbach,[6] Theodore R. Levin,[7] David Lieberman,[8] and Douglas J. Robertson[9]

[1]Indiana University School of Medicine, Indianapolis, Indiana; [2]University of California San Diego, San Diego, California; [3]VA Puget Sound Health Care System, University of Washington, Seattle, Washington; [4]Johns Hopkins University School of Medicine, Baltimore, Maryland; [5]Eastern Virginia Medical School, Norfolk, Virginia; [6]San Francisco Veterans Affairs Medical Center, San Francisco, California; [7]Kaiser Permanente Medical Center, Walnut Creek, California; [8]Oregon Health and Science University, Portland, Oregon; [9]VA Medical Center, White River Junction, Vermont, and Geisel School of Medicine at Dartmouth, Hanover, New Hampshire

This document updates the colorectal cancer (CRC) screening recommendations of the U.S. Multi-Society Task Force of Colorectal Cancer (MSTF), which represents the American College of Gastroenterology, the American Gastroenterological Association, and The American Society for Gastrointestinal Endoscopy. CRC screening tests are ranked in 3 tiers based on performance features, costs, and practical considerations. The first-tier tests are colonoscopy every 10 years and annual fecal immunochemical test (FIT). Colonoscopy and FIT are recommended as the cornerstones of screening regardless of how screening is offered. Thus, in a sequential approach based on colonoscopy offered first, FIT should be offered to patients who decline colonoscopy. Colonoscopy and FIT are recommended as tests of choice when multiple options are presented as alternatives. A risk-stratified approach is also appropriate, with FIT screening in populations with an estimated low prevalence of advanced neoplasia and colonoscopy screening in high prevalence populations. The second-tier tests include CT colonography every 5 years, the FIT–fecal DNA test every 3 years, and flexible sigmoidoscopy every 5 to 10 years. These tests are appropriate screening tests, but each has disadvantages relative to the tier 1 tests. Because of limited evidence and current obstacles to use, capsule colonoscopy every 5 years is a third-tier test. We suggest that the Septin9 serum assay (Epigenomics, Seattle, Wash) not be used for screening. Screening should begin at age 50 years in average-risk persons, except in African Americans in whom limited evidence supports screening at 45 years. CRC incidence is rising in persons under age 50, and thorough diagnostic evaluation of young persons with suspected colorectal bleeding is recommended. Discontinuation of screening should be considered when persons up to date with screening, who have prior negative screening (particularly colonoscopy), reach age 75 or have <10 years of life expectancy. Persons without prior screening should be considered for screening up to age 85, depending on age and comorbidities. Persons with a family history of CRC or a documented advanced adenoma in a first-degree relative age <60 years or 2 first-degree relatives with these findings at any age are recommended to undergo screening by colonoscopy every 5 years, beginning 10 years before the age at diagnosis of the youngest affected relative or age 40, whichever is earlier. Persons with a single first-degree relative diagnosed at ≥60 years with CRC or an advanced adenoma can be offered average-risk screening options beginning at age 40 years.

Colorectal cancer (CRC) screening is the process of detecting early-stage CRCs and precancerous lesions in asymptomatic people with no prior history of cancer or precancerous lesions. The U.S. Multi-Society Task Force of Colorectal Cancer (MSTF) is a panel of expert gastroenterologists representing the American College of Gastroenterology, the American Gastroenterological Association, and the American Society for Gastrointestinal Endoscopy. The MSTF, like others, has long endorsed systematic offers of CRC screening to average-risk persons (persons without a high-risk family history of colorectal neoplasia) beginning at age 50 years, with general evidence supporting screening reviewed in previous publications.[1] This publication updates the screening recommendations of the MSTF for screening in average-risk persons.[1]

Screening differs from surveillance. Surveillance refers to the interval use of colonoscopy in patients with previously detected CRC or precancerous lesions and interval colonoscopy in patients performed to detect dysplasia in persons with inflammatory bowel disease affecting the colon. Surveillance recommendations from the MSTF on surveillance after cancer[2] and removal of precancerous lesions[3] are available in other documents. Screening is also distinct

Abbreviations used in this paper: CRC, colorectal cancer; FIT, fecal immunochemical test; MSTF, U.S. Multi-Society Task Force on Colorectal Cancer; SSP, sessile serrated polyp.

Most current article

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Table 4. Multi-Society Task Force Ranking of Current Colorectal Cancer Screening Tests

Tier 1
Colonoscopy every 10 years
Annual fecal immunochemical test
Tier 2
CT colonography every 5 years
FIT–fecal DNA every 3 years
Flexible sigmoidoscopy every 10 years (or every 5 years)
Tier 3
Capsule colonoscopy every 5 years
Available tests not currently recommended
Septin 9

Colorectal Cancer Screening for Average-Risk Adults: 2018 Guideline Update From the American Cancer Society

Andrew M. D. Wolf, MD[1]; Elizabeth T. H. Fontham, MPH, DrPH[2]; Timothy R. Church, PhD[3]; Christopher R. Flowers, MD, MS[4]; Carmen E. Guerra, MD[5]; Samuel J. LaMonte, MD[6]; Ruth Etzioni, PhD[7]; Matthew T. McKenna, MD[8]; Kevin C. Oeffinger, MD[9]; Ya-Chen Tina Shih, PhD[10]; Louise C. Walter, MD[11]; Kimberly S. Andrews, BA[12]; Otis W. Brawley, MD[13]; Durado Brooks, MD, MPH[14]; Stacey A. Fedewa, PhD, MPH[15]; Deana Manassaram-Baptiste, PhD, MPH[16]; Rebecca L. Siegel, MPH[17]; Richard C. Wender, MD[18]; Robert A. Smith, PhD[19]

TABLE 1. American Cancer Society Guideline for CRC Screening, 2018

Recommendations[a]
The ACS recommends that adults aged 45 y and older with an average risk[b] of CRC undergo regular screening with either a high-sensitivity stool-based test or a structural (visual) examination, depending on patient preference and test availability. As a part of the screening process, all positive results on noncolonoscopy screening tests should be followed up with timely colonoscopy.
The recommendation to begin screening at age 45 y is a *qualified recommendation.*
The recommendation for regular screening in adults aged 50 y and older is a *strong recommendation.*
The ACS recommends that average-risk adults in good health with a life expectancy of greater than 10 y continue CRC screening through the age of 75 y *(qualified recommendation).*
The ACS recommends that clinicians individualize CRC screening decisions for individuals aged 76 through 85 y based on patient preferences, life expectancy, health status, and prior screening history *(qualified recommendation).*
The ACS recommends that clinicians discourage individuals over age 85 y from continuing CRC screening *(qualified recommendation).*

OPEN ACCESS

ORIGINAL ARTICLE

Effectiveness of screening colonoscopy in reducing the risk of death from right and left colon cancer: a large community-based study

Chyke A Doubeni,[1] Douglas A Corley,[2] Virginia P Quinn,[3] Christopher D Jensen,[2] Ann G Zauber,[4] Michael Goodman,[5] Jill R Johnson,[1] Shivan J Mehta,[6] Tracy A Becerra,[3] Wei K Zhao,[2] Joanne Schottinger,[3] V Paul Doria-Rose,[7] Theodore R Levin,[2] Noel S Weiss,[8] Robert H Fletcher[9]

Table 2 Association between receipt of screening endoscopy and colorectal adenocarcinoma death risk

Screening colonoscopy status according to colon location	Case patients, n=1747	Matched control patients, n=3460	Estimated relative risks (95% CI)	
			Bivariate model	Multivariate model*
All locations in the colon/rectum				
No screening endoscopy	1358	2310	1.00	1.00
Screening colonoscopy	24	120	0.33 (0.21 to 0.52)	0.33 (0.21 to 0.52)
Screening sigmoidoscopy	365	1030	0.60 (0.52 to 0.69)	0.64 (0.56 to 0.75)
Right colon				
No screening endoscopy	649	1151	1.00	1.00
Screening colonoscopy	13	61	0.37 (0.20 to 0.68)	0.35 (0.18 to 0.65)
Screening sigmoidoscopy	218	535	0.72 (0.59 to 0.87)	0.75 (0.62 to 0.92)
Left colon/rectum				
No screening endoscopy	669	1092	1.00	1.00
Screening colonoscopy	9	56	0.25 (0.12 to 0.50)	0.25 (0.12 to 0.53)
Screening sigmoidoscopy	138	468	0.48 (0.38 to 0.59)	0.52 (0.41 to 0.66)

*The multivariate model adjusted for race/ethnicity, family history, percentage of people 25+ years in the census tract with at least a high-school diploma, Charlson comorbidity score and number of primary care visits, as well as an indicator faecal occult blood testing. The estimates were obtained from conditional regression models.

Doubeni C et al. Gut 2018

Potentially Modifiable Failures in the Screening Process to Prevent Death from Colorectal Cancer

Douglas A. Corley, MD, PhD
(for Chyke Doubeni, MD)

Penn Medicine

Methods

- **Study Design:**
  - Retrospective cohort study

- **Setting:**
  - Kaiser Permanente Northern and Southern California

- **Population:**
  - Patients were aged 55-90 who died from CRC in 2006-2012 and had ≥5 years of health plan enrollment prior to diagnosis.
  - Matched cancer-free controls.

- **Data:**
  - Receipt, results, indications, and follow-up of CRC testing in the 10-year period prior to diagnosis were obtained from electronic databases and chart audits.

Results – overview

- **Among 1,750 patients who died from CRC:**
  - 65.9% (n=1,153) were not up-to-date with screening:
    - Failure to ever screen (33.8%, n=591)
    - Failure to screen at appropriate intervals (31.1%, n=545)
    - Failure to receive recommended surveillance (1.0%, n=17)
  - 9.7% (n=170) failed to follow-up for a positive test
  - 24.4% (n=427) died despite being screening up-to-date (failure of the screening test)

- **62.5% (n=267) patients with a failure of the screening test had right colon cancers.**

- **Fewer visits with a PCP was strongly associated with failure to screen or screen adequately..**

Conclusions

- In two healthcare systems with high screening rates:
- Most people dying from CRC were not up to date with screening or did not receive follow up after a positive screening result
- Failure to screen was strongly correlated with PCP contacts
- For all test types, failures of the screening tests were disproportionately right-sided cancers
- Failure of surveillance follow-up was an uncommon cause of death
- Although, we cannot eliminate all failures of CRC screening, these findings point to potential opportunities to further decrease deaths from CRC

2018: High Rates of Interval Colorectal Cancer Persist

Number of Patients who will Develop Interval Colorectal Cancer in an Endoscopist's Career?	
Colonoscopy Volume	**Median ADR (24-28%)**
Very Low (115/year)	1
Moderate (316/year)	3
Very High (789/year)	9

Ertem et al. Gastrointest Endosc 2018 May 24

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Recommendations

1. We recommend colonoscopy every 10 years or annual FIT as first-tier options for screening the average-risk persons for colorectal neoplasia (strong recommendation; moderate-quality evidence).
2. We recommend that physicians performing screening colonoscopy measure quality, including the adenoma detection rate (strong recommendation, high-quality evidence).
3. We recommend that physicians performing FIT monitor quality (strong recommendation, low-quality evidence). The recommended quality measurements for FIT programs are detailed in a prior publication.[86]
4. We recommend CT colonography every 5 years or FIT–fecal DNA every 3 years (strong recommendation, low-quality evidence) or flexible sigmoidoscopy every 5 to 10 years (strong recommendation, high-quality evidence) in patients who refuse colonoscopy and FIT.
5. We suggest that capsule colonoscopy (if available) is an appropriate screening test when patients decline colonoscopy, FIT, FIT–fecal DNA, CT colonography, and flexible sigmoidoscopy (weak recommendation, low-quality evidence).
6. We suggest against Septin9 for CRC screening (weak recommendation, low-quality evidence).

Quality Indicators For Colonoscopy

Proposed Thresholds
≥ 85 %
≥ 95 %
Men: ≥ 30% Women: ≥ 20%
≥ 90%
100%
<1%

Rex DK et al. Quality indicators for colonoscopy
Gastrointest Endosc. 2015 Jan;81(1):31-53.

Clean: **Bowel Preparation**

↓

Scope insertion: **Cecal Intubation Rate**

↓

Inspection: **Adenoma Detection Rate**

↓

Lesion Characterization

↓

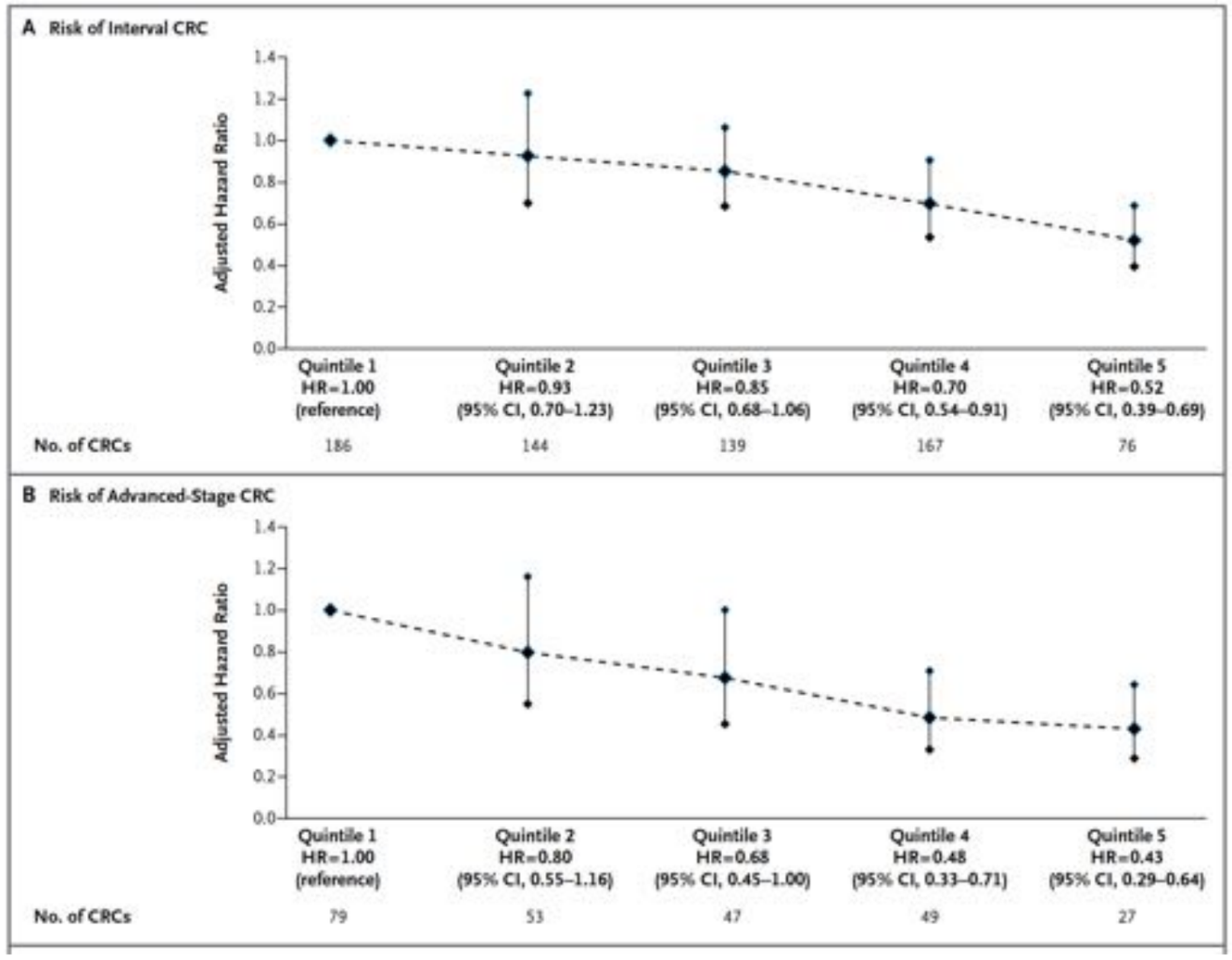
Polypectomy: **Complete**

✕

Cancer

ADR is Correlated with Interval Cancer

- 314,872 colonoscopies performed by 136 gastroenterologists at 17 medical centers with 3.3 million members
- ADR range: 7.3 - 52.5%
- Linear relationship across 5 quintiles of ADR from lowest to highest



Corley DA, Jensen C, Marks A, et al. N Engl J Med 2014;370:1298-306.

ADR is Correlated with Interval Cancer

Table 2. Adenoma Detection Rate and Risk of an Interval Colorectal Cancer among All Patients.

Adenoma Detection Rate	Interval Cancer	Hazard Ratio (95% CI)*	Unadjusted Risk
	no. of cases		*no. of cases/ 10,000 person-yr*
Continuous rate	712	0.97 (0.96–0.98)	7.7
Rate quintile			
Quintile 1: 7.35–19.05%	186	1.00 (reference)	9.8
Quintile 2: 19.06–23.85%	144	0.93 (0.70–1.23)	8.6
Quintile 3: 23.86–28.40%	139	0.85 (0.68–1.06)	8.0
Quintile 4: 28.41–33.50%	167	0.70 (0.54–0.91)	7.0
Quintile 5: 33.51–52.51%	76	0.52 (0.39–0.69)	4.8

- Each 1% increase in ADR associated with:

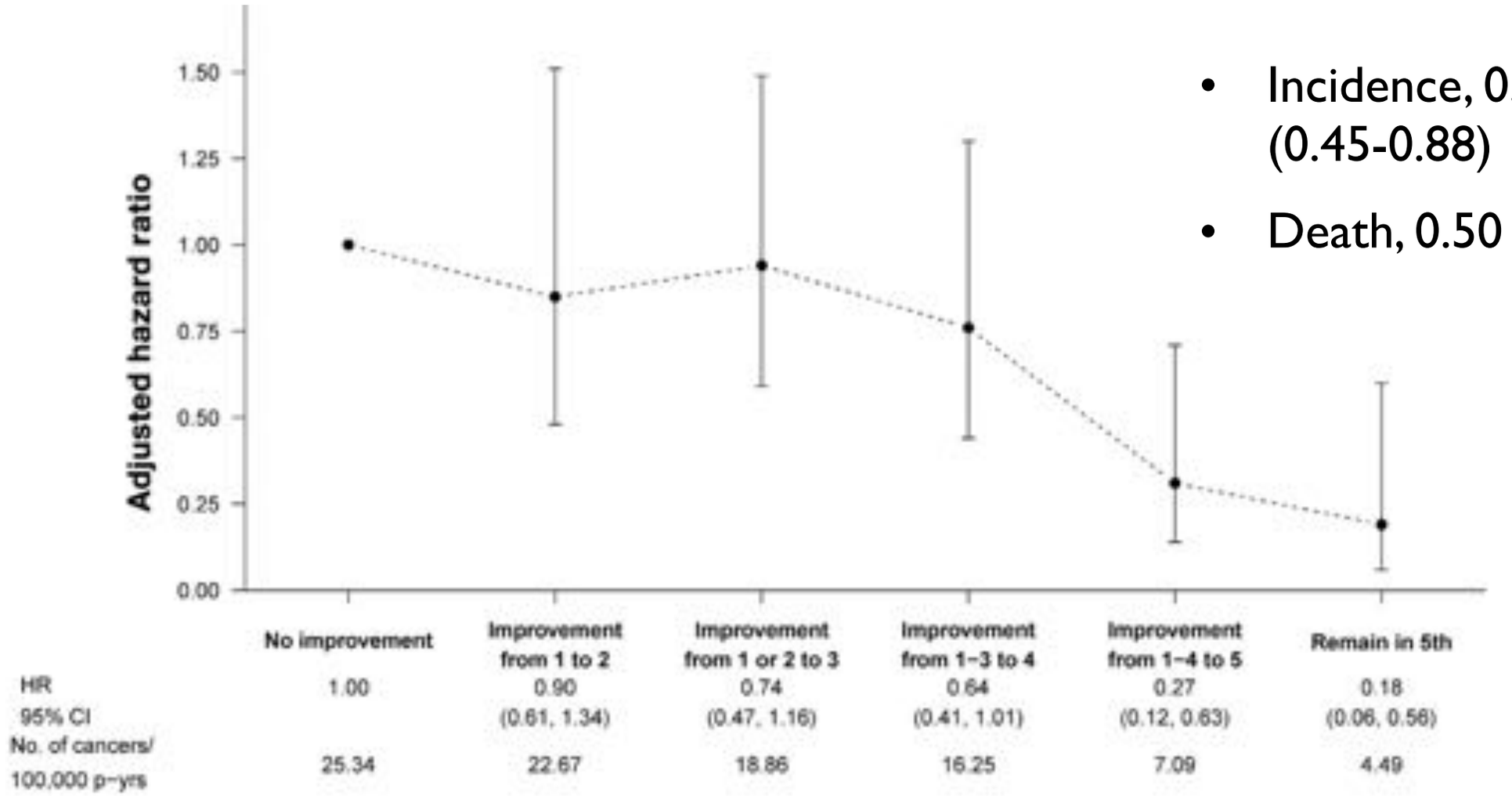
  3% decrease in interval CRC risk (HR, 0.97, 95%CI: 0.96-0.98)

  5% decrease in CRC death risk

- No threshold effect above which increases in ADR were without benefit

Corley DA, Jensen C, Marks A, et al. N Engl J Med 2014;370:1298-306.

Increases in ADRs from Individual Endoscopists Reduces Interval Cancer



- Incidence, 0.63 (0.45-0.88)
- Death, 0.50 (0.27-0.95)

Kaminski MF, Wieszczy P, Rupinski M et al. Gastroenterology 2017

Quality indicators for colonoscopy

Colonoscopy is widely used for the diagnosis and treatment of colon disorders. Properly performed, colonoscopy is generally safe, accurate, and well-tolerated. Visualization of the mucosa of the entire large intestine and distal terminal ileum usually is possible during colonoscopy. Polyps can be removed during colonoscopy, thereby reducing the risk of colon cancer. Colonoscopy is the preferred method to evaluate the colon in most adult patients with large-bowel symptoms, iron deficiency anemia, abnormal results on radiographic studies of the colon, positive results on colorectal cancer (CRC) screening tests, post-polypectomy and post-cancer resection surveillance, and diagnosis and surveillance in inflammatory bowel disease. In addition, colonoscopy is the most commonly used CRC screening test in the United States.[1] Based on 2010 data, over 3.3 million outpatient colonoscopies are performed annually in the United States, with screening and polyp surveillance accounting for half of indications.[2]

Optimal effectiveness of colonoscopy depends on patient acceptance of the procedure, which depends mostly on acceptance of the bowel preparation.[3] Preparation quality affects the completeness of examination, procedure duration, and the need to cancel or repeat procedures at earlier dates than would otherwise be needed.[4,5] Ineffective preparation is a major contributor to costs.[6] Meticulous inspection[7,8] and longer withdrawal times[9-14] are associated with higher adenoma detection rates (ADR). A high ADR is essential to rendering recommended intervals[15] between screening and surveillance examinations safe.[16,17] Optimal technique is needed to ensure a high probability of detecting dysplasia when present in inflammatory bowel disease.[17-21] Finally, technical expertise and experience will help prevent adverse events that might offset the benefits of removing neoplastic lesions.[22]

Recent studies report that colonoscopy is less effective in preventing proximal colon cancer and cancer deaths (ie, colon cancer proximal to the splenic flexure) compared with distal cancer (ie, colon cancer at or distal to the splenic flexure).[23-28] Decreased protection against right-sided CRC is likely due to multiple factors. These include missed adenomas or incompletely resected adenomas; suboptimal bowel preparation; precancerous lesions that are endoscopically subtle or difficult to remove, such as sessile serrated polyps and flat and/or depressed adenomas, and differences in tumorigenesis between right-sided and left-sided cancers. Improving prevention of right-sided colon cancer is a major goal of colonoscopy quality programs.

Five studies have established that gastroenterologists are more effective than surgeons or primary care physicians at preventing CRC by colonoscopy.[27,29-32] This most likely reflects higher rates of complete examinations (ie, cecal intubation)[33] and higher rates of adenoma detection among gastroenterologists.[33,34] All endoscopists performing colonoscopy should measure the quality of their colonoscopy. Institutions where endoscopists from multiple specialties are practicing should reasonably expect all endoscopists to participate in the program and achieve recommended quality benchmarks.

The quality of health care can be measured by comparing the performance of an individual or a group of individuals with an ideal or benchmark.[35] The particular parameter that is being used for comparison is termed a quality indicator. A quality indicator often is reported as a ratio between the incidence of correct performance and the opportunity for correct performance[4] or as the proportion of interventions that achieve a predefined goal.[35] Quality indicators can be divided into 3 categories: (1) structural measures—these assess characteristics of the entire health care environment (eg, participation by a physician or other clinician in systematic clinical database registry that includes consensus endorsed quality measures), (2) process measures—these assess performance during the delivery of care (eg, ADR and adequate biopsy sampling during colonoscopy for chronic ulcerative colitis), (3) outcome measures—these assess the results of the care that was provided (eg, the prevention of cancer by colonoscopy and reduction in the incidence of colonoscopic perforation).

METHODOLOGY

In 2006, the American Society for Gastrointestinal Endoscopy (ASGE)/American College of Gastroenterology (ACG) Task Force on Quality in Endoscopy published their first version of quality indicators for colonoscopy.[36] The present update integrates new data pertaining to previously proposed quality indicators and new quality indicators for performing colonoscopy.[36] Indicators that had wide-ranging clinical application, were associated with

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http://dx.doi.org/10.1016/j.gie.2014.07.058

2015 Updated ADR Thresholds

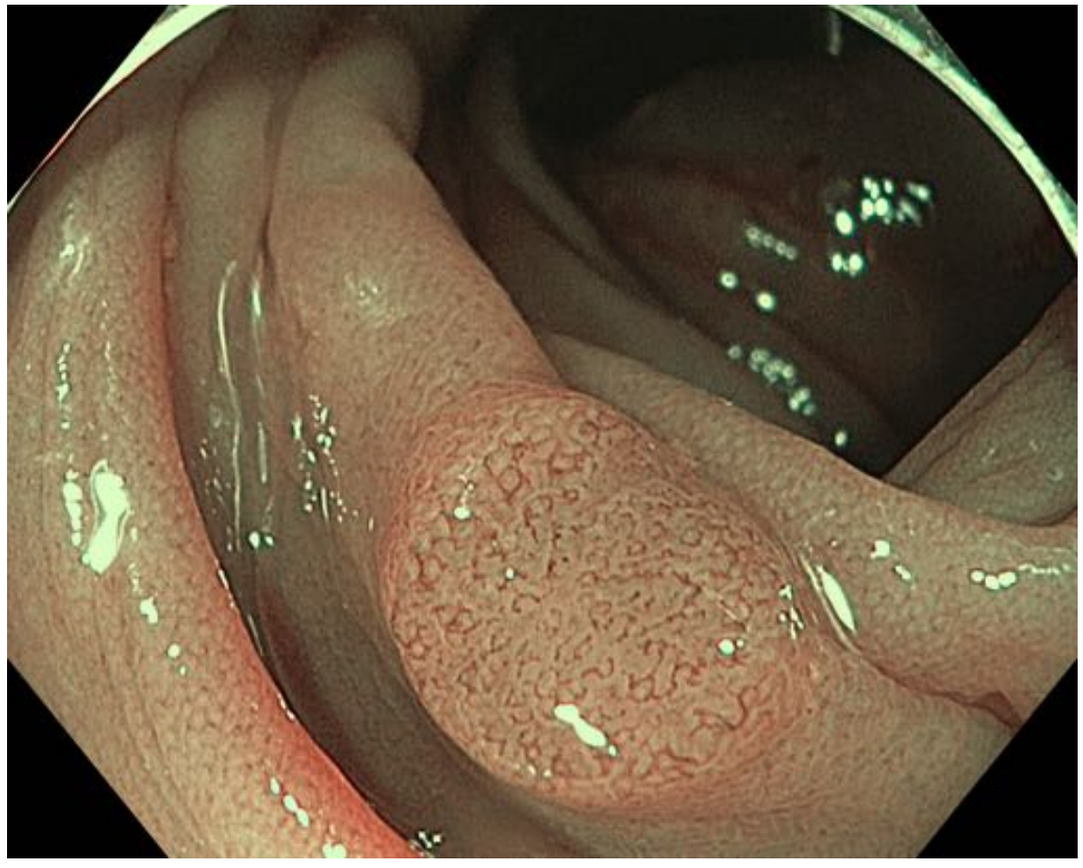
TABLE 4. Summary of proposed quality indicators

Quality indicator	Performance target (%)
8. Frequency with which adenomas are detected in asymptomatic average-risk individuals (screening) (priority indicator)	
Adenoma detection rate for male/female population	≥ 25
Adenoma detection rate for male patients	≥ 30
Adenoma detection rate for female patients	≥ 20

Adenoma Detection Rate (ADR)

ADR is the number of <u>screening</u> <u>patients</u> with at least one adenoma divided by total number of consecutive patients aged 50 years or older screened with colonoscopy.

*If incomplete due to inadequate prep, patient discomfort, etc, or indication is surveillance or diagnostic, then procedure is not included in the calculation.



Rex D, et al. Gastrointest Endosc 2006

Screening ADR in a FIT cohort

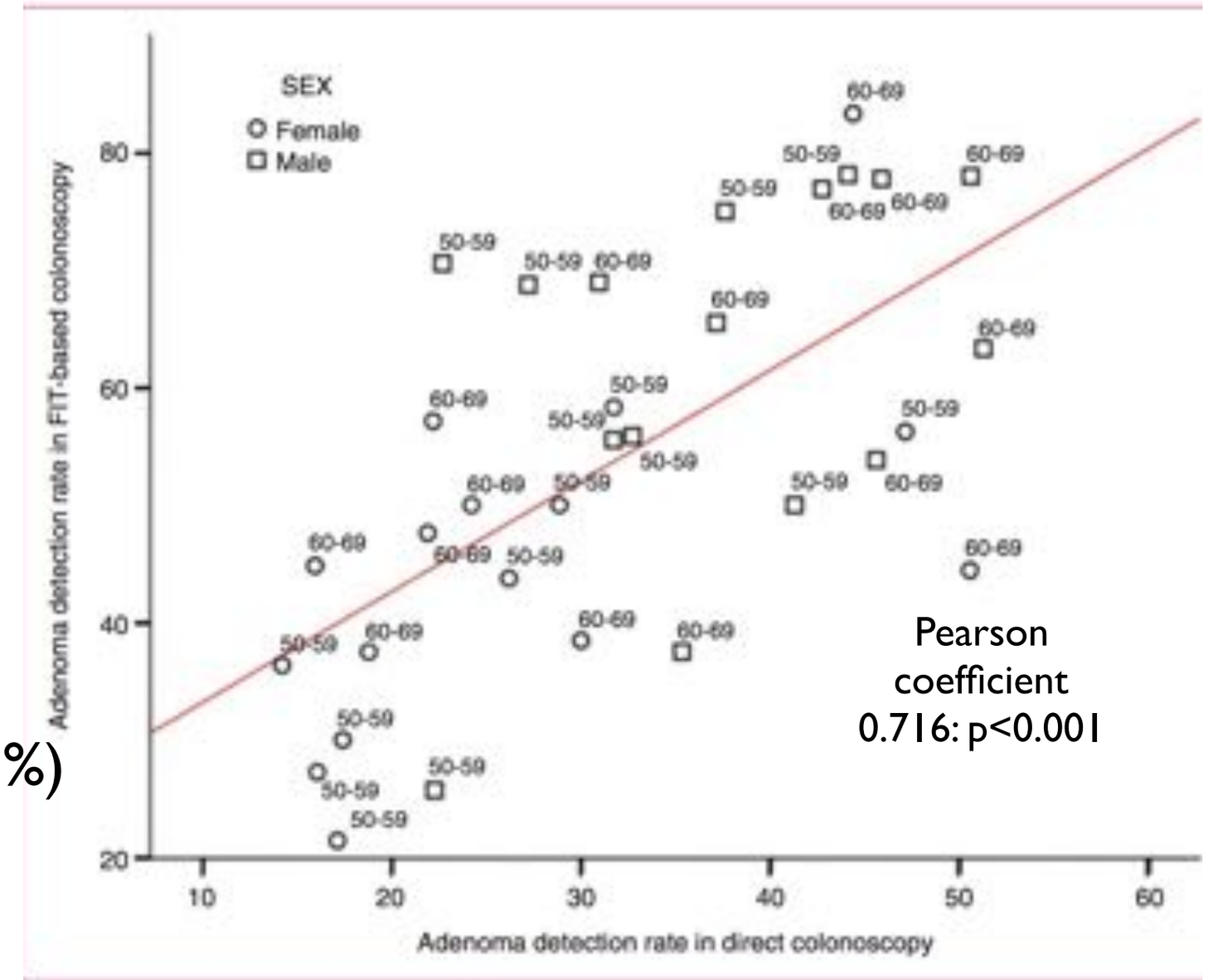
- Predictive model using COLONPREV study dataset

- Colonoscopy in 5722 individuals: 5059 as primary strategy and 663 after FIT+

ADR Colonoscopy 31%

ADR FIT 55%

- Median ADR
  - Colonoscopy: 31% (14%–51%)
  - FIT: 55% (21%–83%)

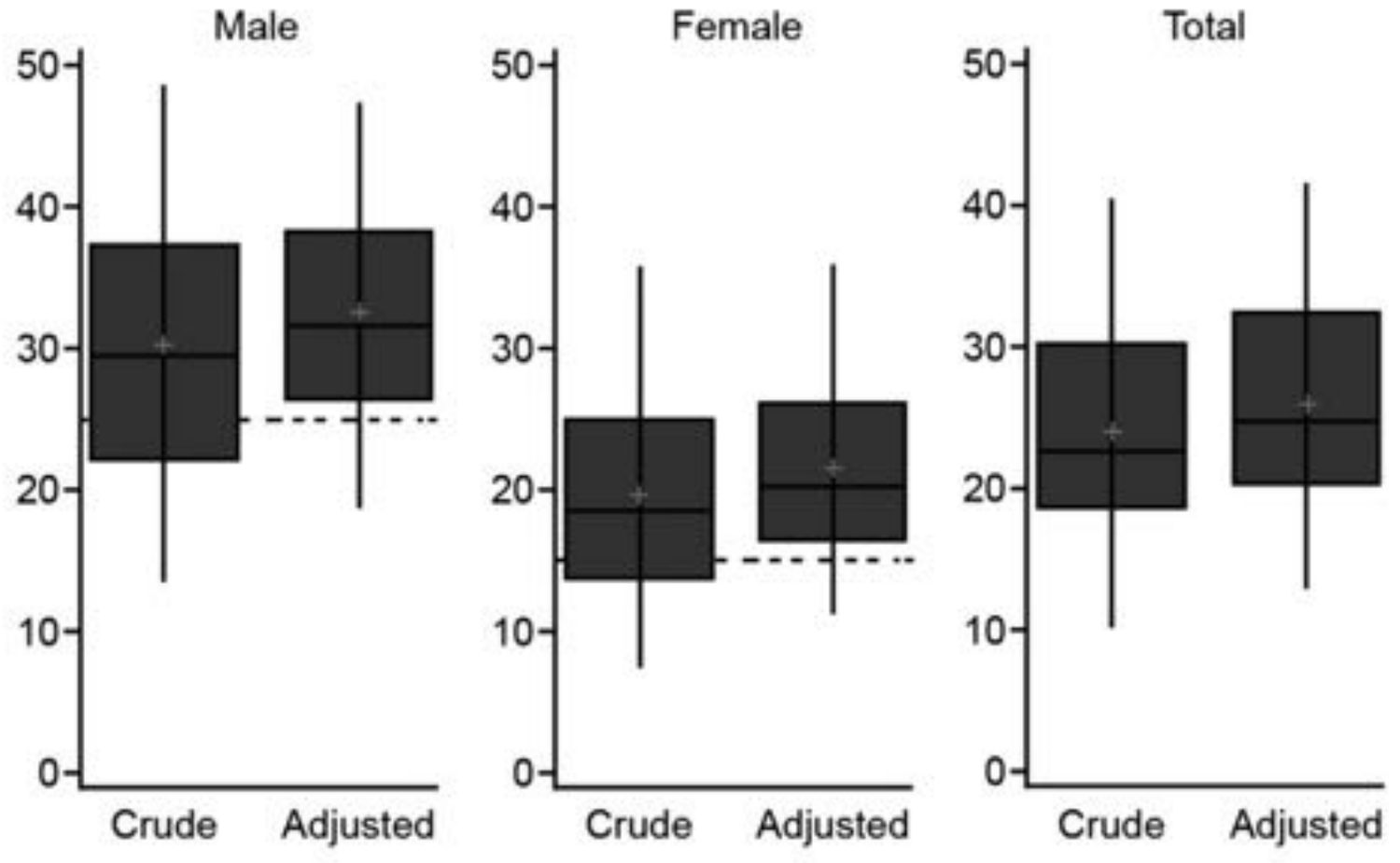


Cubiella United European Gastroenterol J 2016

Adjustments in Risk Factors DO NOT Matter for ADR

Risk factors:

- age
- race/ ethnicity
- family history



Jensen C Clin Gastroenterol Hepatol 2015

Serrated polyp detection rates?

TABLE 2. Endoscopist SDR by ADR group and indication for examination

	Screening colonoscopies		Surveillance colonoscopies	
	CSSDR	PSDR	CSSDR	PSDR
ADR	Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)
<15%	1.3 (0.9-3.1)	2.5 (1.1-3.1)	0.0 (0.0-3.4)	5.2 (0.6-6.4)
15% to <25%	3.5 (2.5-4.8)	6.0 (5.0-8.4)	1.3 (0.0-3.4)	4.3 (2.6-5.7)
25% to <35%	6.3 (3.0-7.2)	9.3 (8.2-12.1)	4.9 (3.2-6.7)	8.1 (4.7-12.2)
≥35%	10.0 (8.5-13.1)	16.2 (15.9-23.6)	8.5 (6.4-10.2)	14.7 (10.8-19.4)

SDR, Serrated polyp detection rate; *ADR*, adenoma detection rate; *CSSDR*, clinically significant serrated polyp detection rate; *PSDR*, proximal serrated polyp detection rate; *IQR*, interquartile range.

Potential SDR benchmarks:

CSSDR = 7% & PSDR = 11%

Anderson J. Gastrointest Endosc 2017

Serrated Polyp Detection is Highly Variable

Table 1. Screening Colonoscopies and Detection Rates

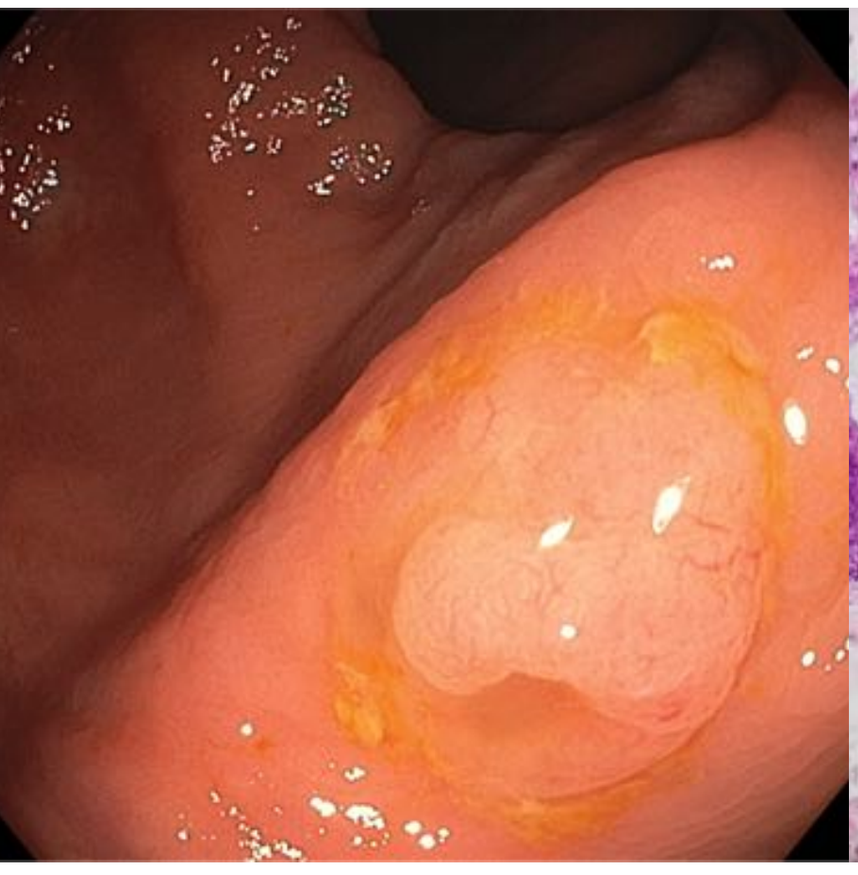
Endoscopist	Number of colonoscopies	Patient age[a]	Male	≥1 Adenoma	≥1 Proximal serrated polyp	Adenoma detection rate per colonoscopy[a]	Proximal serrated polyp detection rate per colonoscopy[a]
1	3189	59.8 ± 8.0	52%	47%	18%	1.06 ± 1.79	0.26 ± 0.68
2	154	57.8 ± 8.0	45%	31%	10%	0.76 ± 1.59	0.14 ± 0.46
3	532	57.4 ± 7.3	45%	33%	6%	0.73 ± 1.57	0.08 ± 0.35
4	109	58.2 ± 7.0	46%	39%	11%	0.86 ± 1.46	0.18 ± 0.55
5	331	57.4 ± 6.9	48%	40%	13%	0.77 ± 1.36	0.18 ± 0.53
6	124	58.4 ± 6.9	44%	33%	8%	0.77 ± 1.66	0.11 ± 0.41
7	528	58.9 ± 7.7	41%	31%	11%	0.69 ± 1.47	0.16 ± 0.48
8	56	59.2 ± 7.6	50%	46%	13%	1.20 ± 1.86	0.14 ± 0.40
9	348	57.7 ± 7.5	37%	36%	12%	0.74 ± 1.48	0.17 ± 0.52
10	359	57.7 ± 7.3	53%	25%	3%	0.45 ± 1.05	0.04 ± 0.20
11	90	57.7 ± 6.7	52%	17%	1%	0.22 ± 0.56	0.01 ± 0.11
12	83	59.1 ± 8.3	52%	27%	2%	0.46 ± 0.98	0.02 ± 0.15
13	327	58.1 ± 7.8	60%	29%	11%	0.50 ± 0.95	0.15 ± 0.49
14	297	59.5 ± 8.2	50%	21%	4%	0.38 ± 1.07	0.06 ± 0.37
15	154	57.8 ± 8.0	45%	31%	10%	0.76 ± 1.59	0.14 ± 0.46
Combined	6681	58.9 ± 7.8	49%	38%	13%	0.84 ± 1.60	0.19 ± 0.57

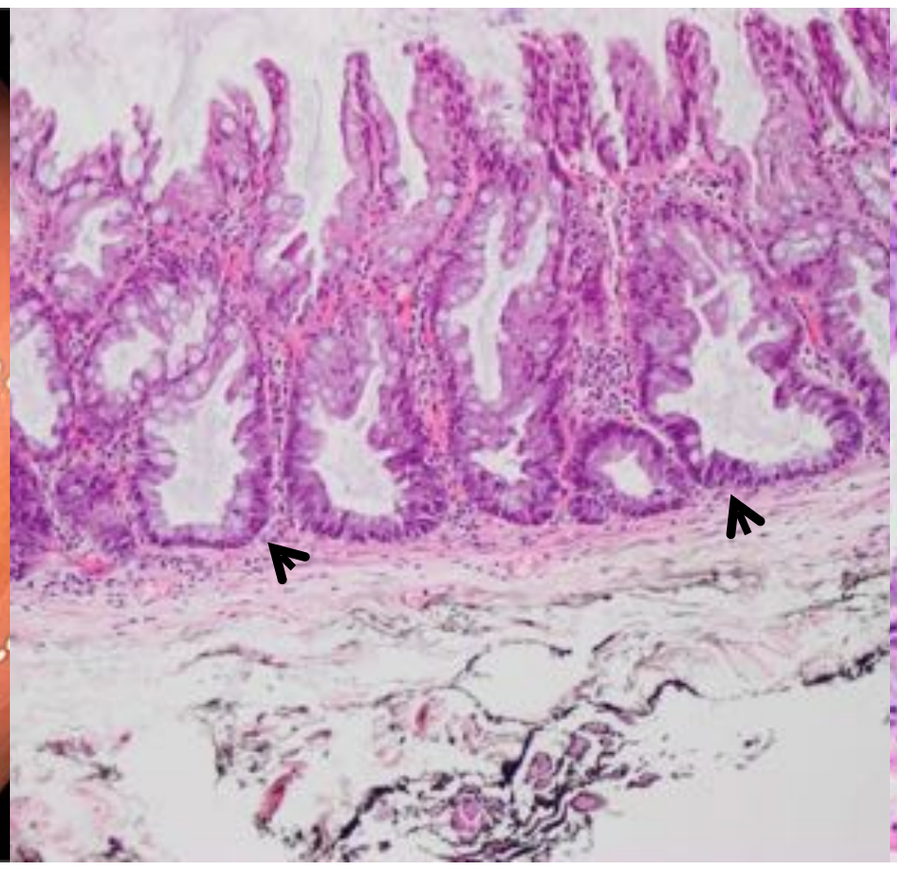
[a]Mean ± SD.

- Proximal serrated polyp detection rate: 13% (1%–18%).
- Endoscopist (P<.0001), but not patient age (P=.76) or gender (P=.95), was associated with proximal serrated polyp detection.

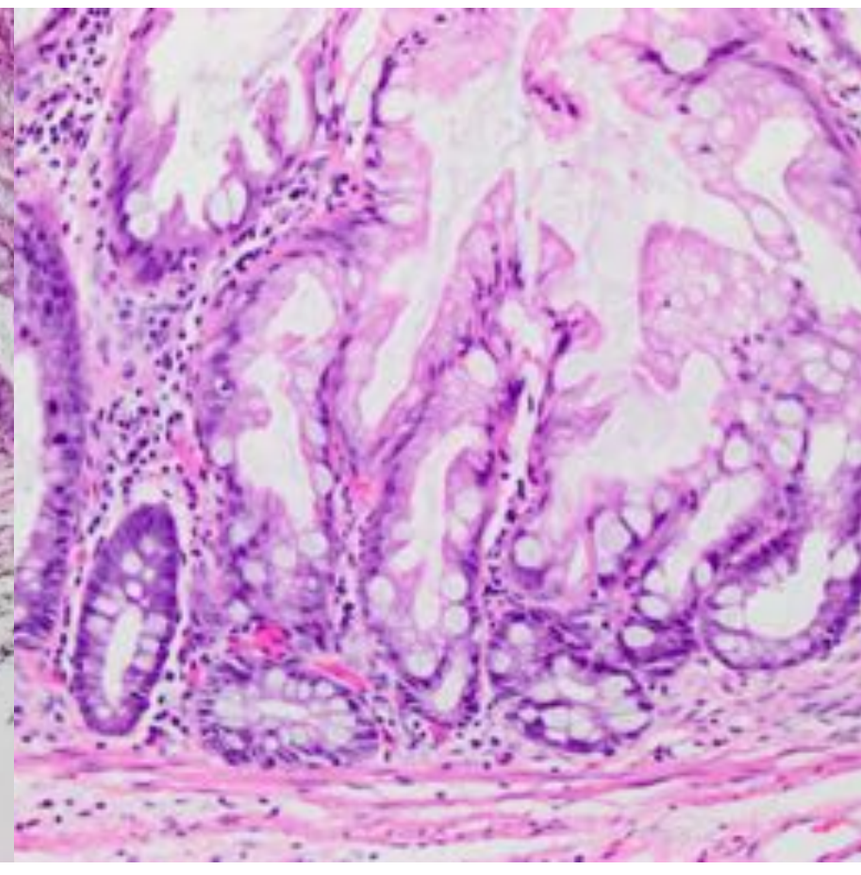
Kahi et al. Clin Gastro Hepatol 2011

Serrated polyp detection rates?





Dilated, boot-shaped crypts with serrations extend throughout crypt, including base



Mature Goblet Cells at Crypt Bases

Poor Pathology Agreement in the Diagnosis Of Serrated Polyps

Assess observer agreement in the diagnosis of colorectal serrated polyps. 4 GI pathologists, 60 cases

5 categories: SA, HP, adenoma, admixed, other w/ serration

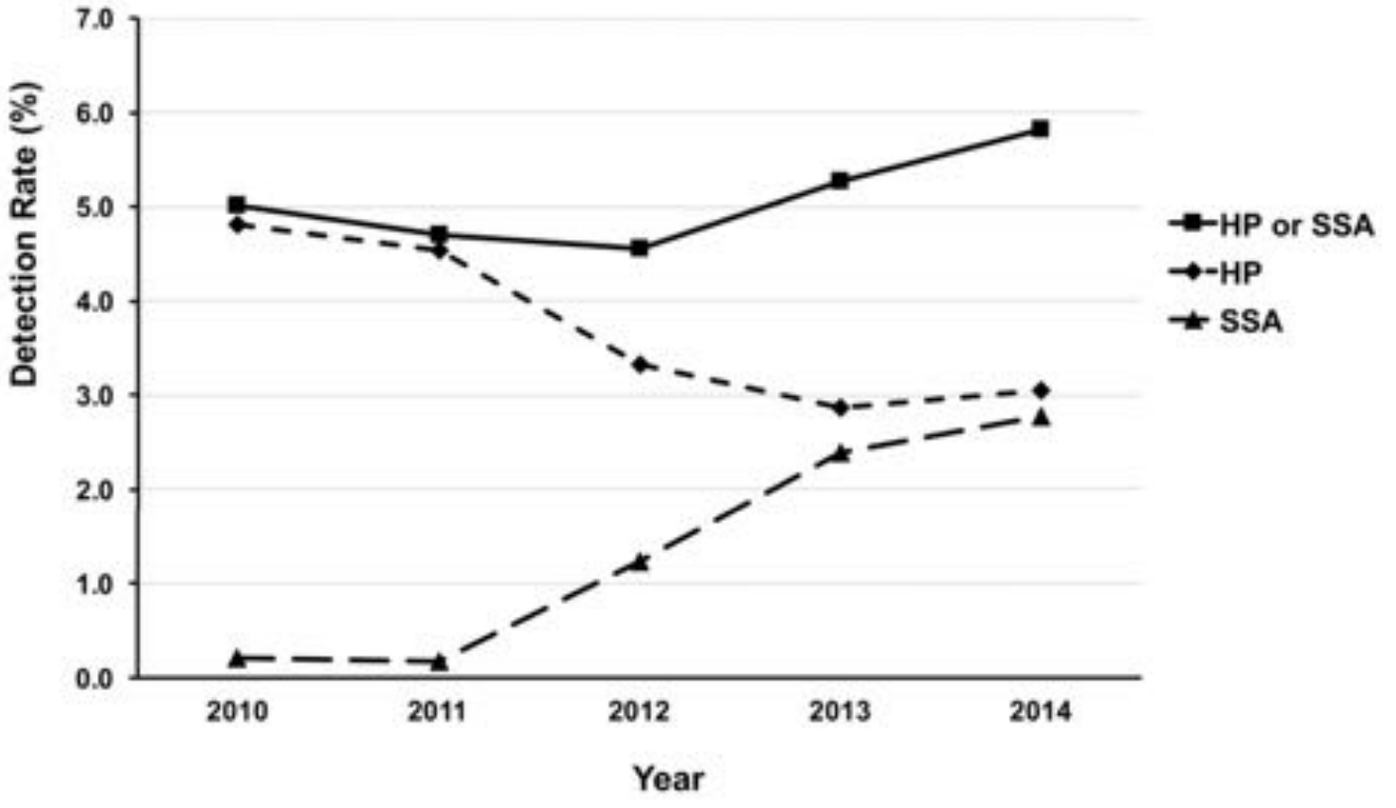
Findings:

	K
Diagnosing between all 5	0.49
Serrated vs. Others	0.38

Wong N A C S, Hunt L P, Warren B F. Histopathology 2009

Awareness is a First Step

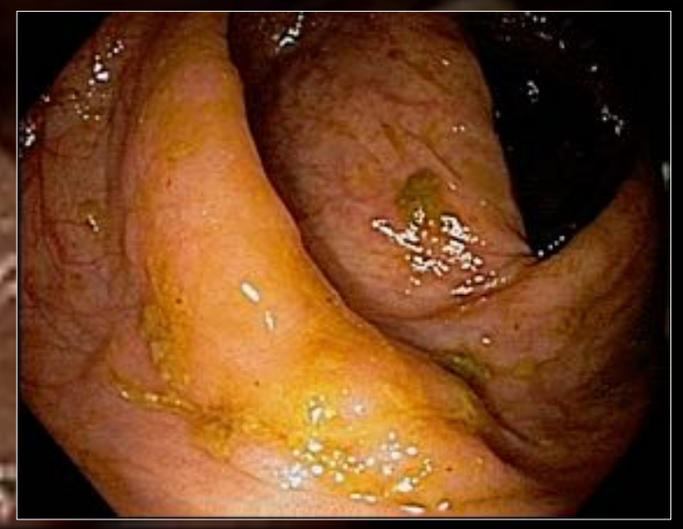
- Colonoscopy and pathology data from 3 medical centers at Kaiser Permanente Northern California. 2010-2014.
- Gastroenterologists and pathologists from 3 medical centers at Kaiser attended a one hour training session on sessile serrated polyp diagnosis in 2012
- Mean sessile serrated polyp detection rates increased from 0.6% in 2010 to 2012 to 3.7% in 2013 to 2014.
- SDRs varied widely among experienced gastroenterologists, even after training (1.1% to 8.1%).



Li D et al Gastrointest Endosc 2017

How to Improve ADR?

Split Dose is a Must
for Right Colon!



Fellows

Position Change

Bowel Prep

Hycosamine

Withdrawal Time

Repeat Exam

High Definition

Drugs

Volume

Enhanced Imaging

iScan

EndoRings

Narrow Band Imaging

Inspect Way In & Out

Blue Light

Third-Eye Retroscope

Chromoendoscopy

Water

Retroflexion

FICE

Full-Spectrum Endoscopy

Wide Angle

Time of Day

Endocuff

Late Schedule

Nurses

Cap

Fellows

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Narrow Band Imaging

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Water

Retroflexion

FICE

Full-Spectrum Endoscopy

Wide Angle

Time of Day

Endocuff

Late Schedule

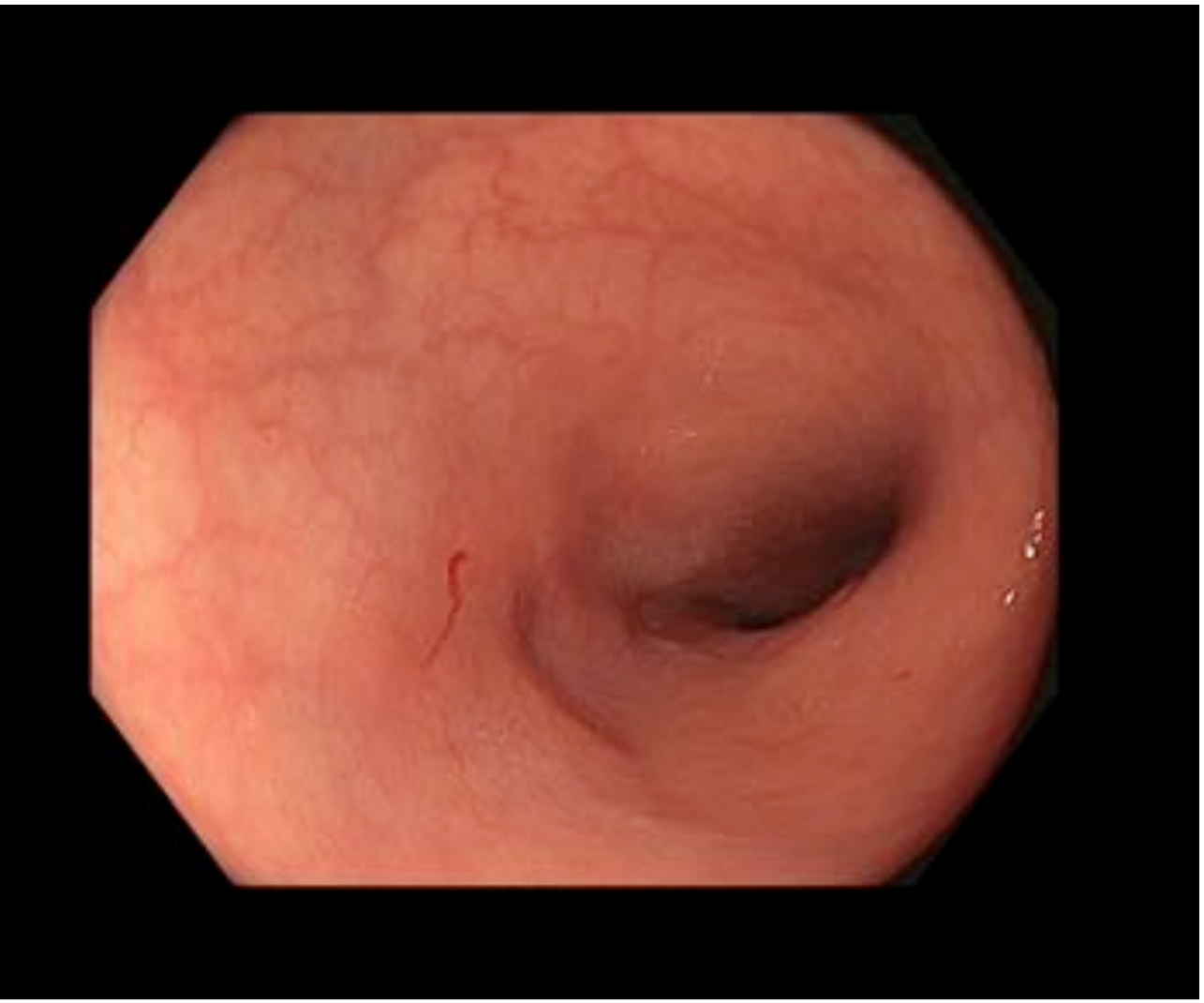
Nurses

Cap

Inspection Tips for Higher ADRs

Mindset	**1**	**Know the signature features of adenomas and serrated lesions**
	2	**Look for subtle lesions - think flat and depressed**
Technique	**3**	**Maintain a straight scope**
	4	**Clean the mucosa**
	5	**Look behind folds**
	6	**Expand & collapse the lumen**
	7	**Take adequate time - but be efficient with a plan**
	8	**Spend most time in the right colon - examine twice**
Tools	**9**	**Know when need adjustment- lighting, cap, chromoendoscopy**
	10	**Engage in quality assurance program**

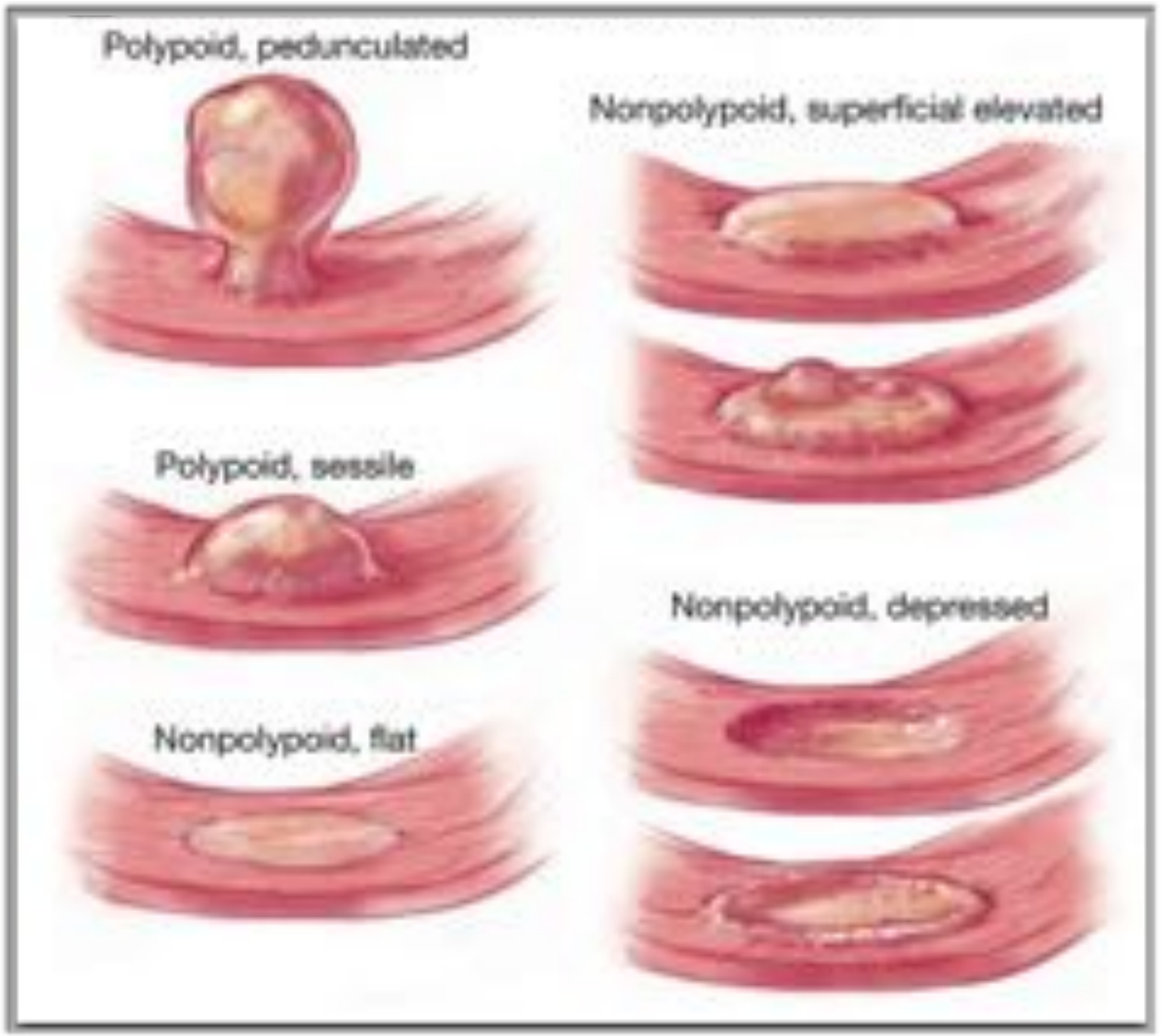
Practicalities of Detection



Kaltenbach & Soetikno, Detection, Diagnosis & Management of Non-Polypoid Colorectal Neoplasm, 2nd ed. ASGE Learning Library.

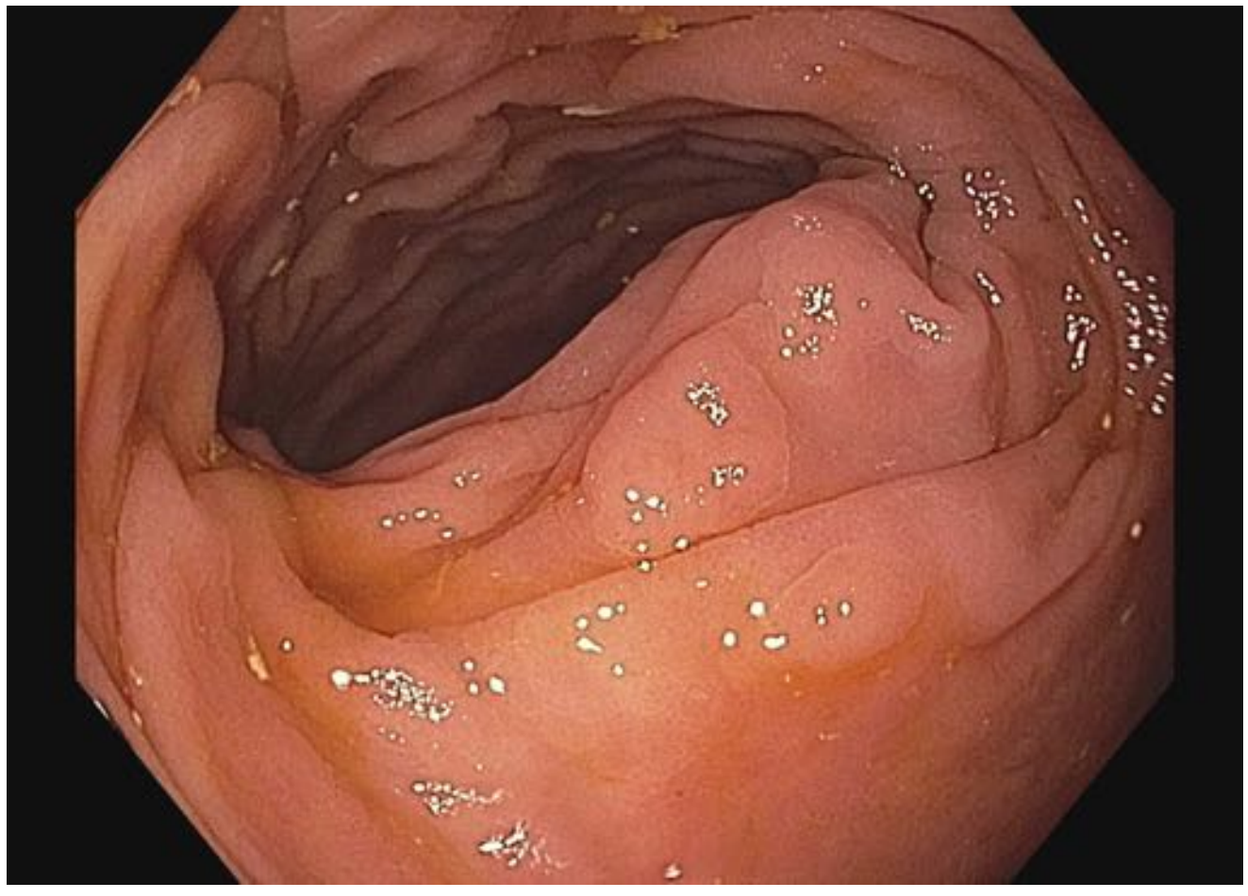
Look for subtle lesions

- Requires pattern recognition
- Requires clean mucosa
- Requires good lighting & high definition
- Requires good insertion & inspection technique (fold examination, distention, cleansing)
- May require enhanced tools with chromoendsocopy or cap



Soetikno, Kaltenbach, Rouse et al. JAMA 2008

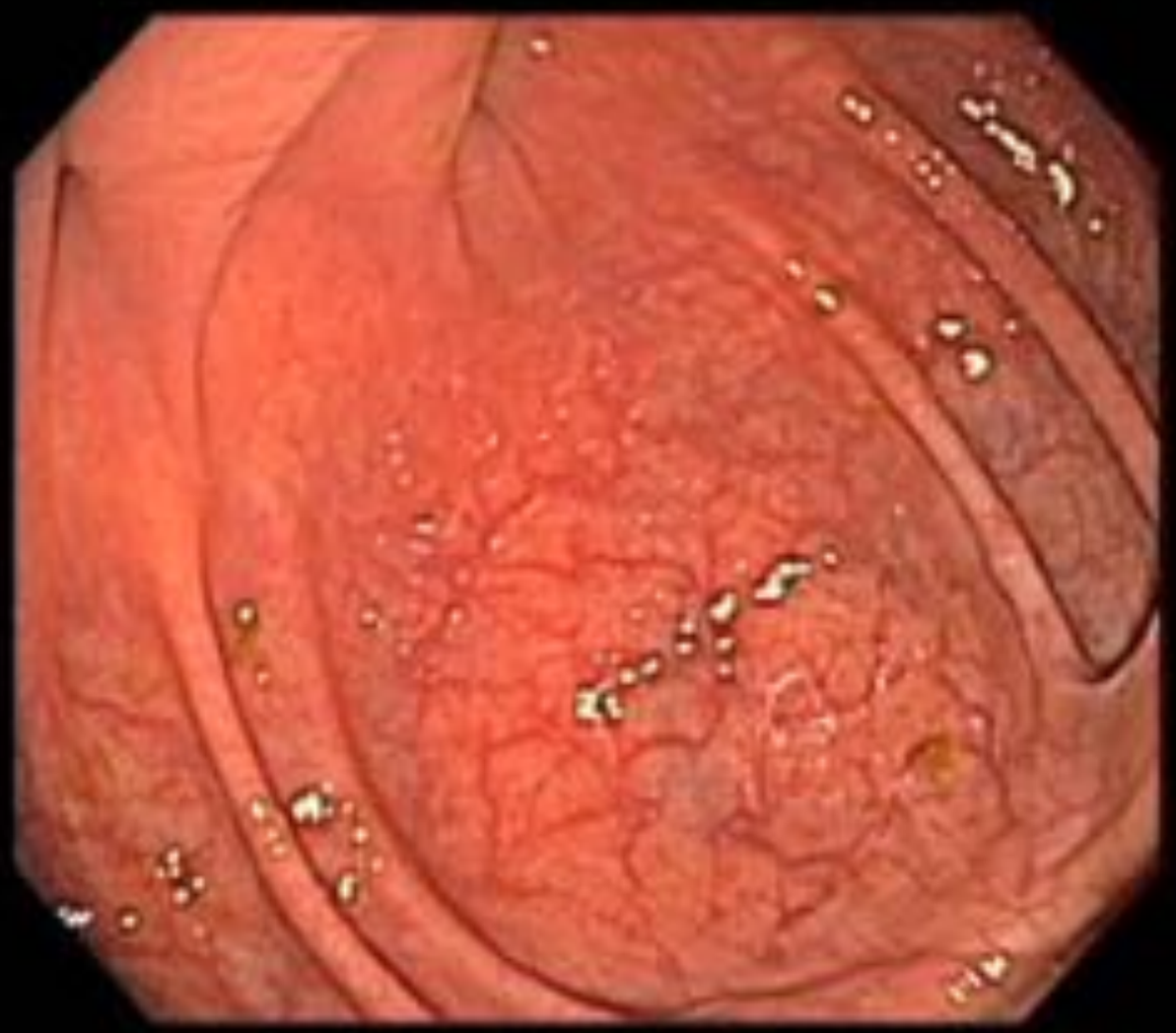
Know the Signatures of Adenoma



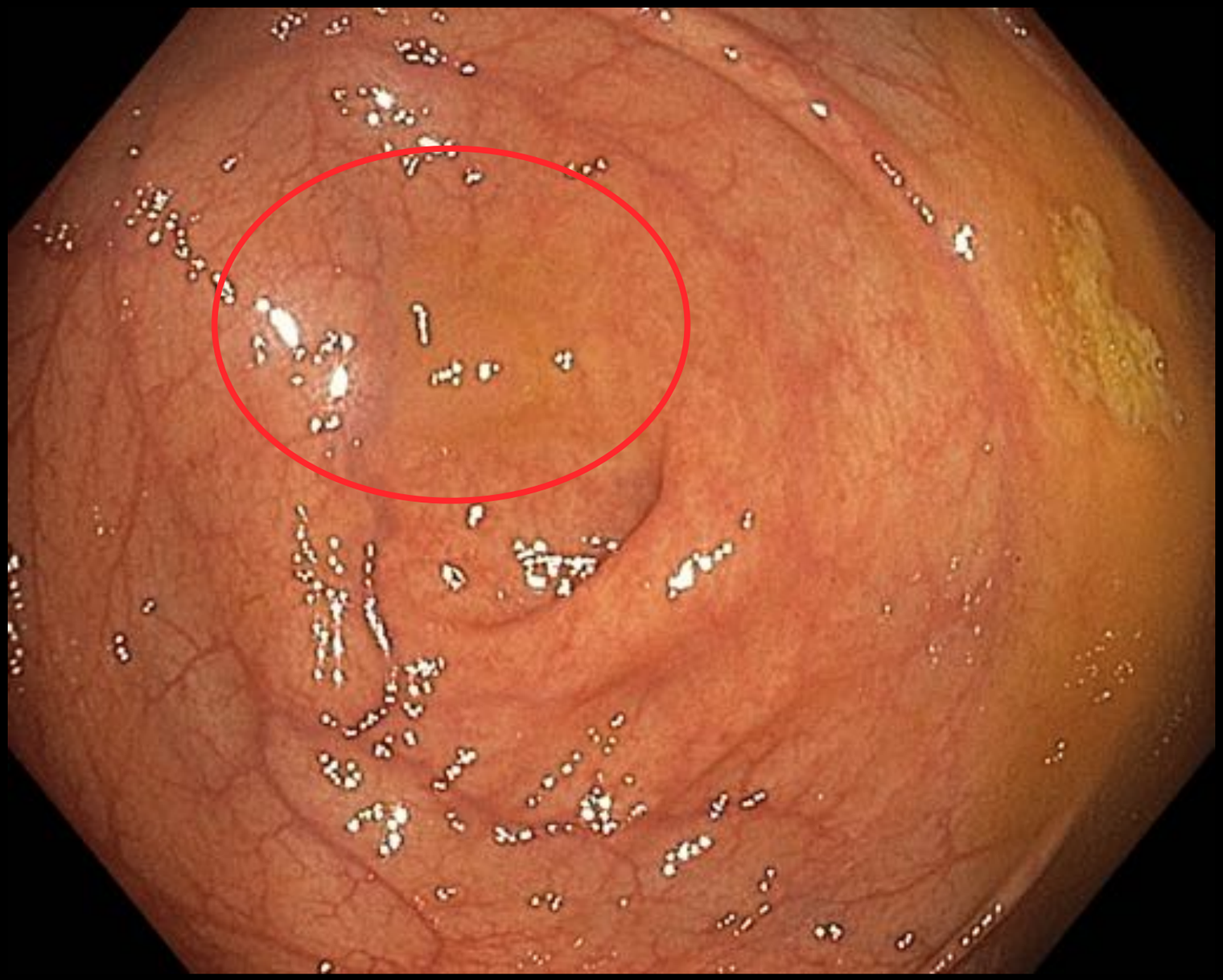
- Subtle color differential (more red)
- Irregular vascular network
- Absence of innominate grooves
- Slight friability
- Deformity of the wall

Kaltenbach & Soetikno, Detection, Diagnosis & Management of Non-Polypoid Colorectal Neoplasm, 2nd ed. ASGE Learning Library.

Look for Pattern of Mucosa

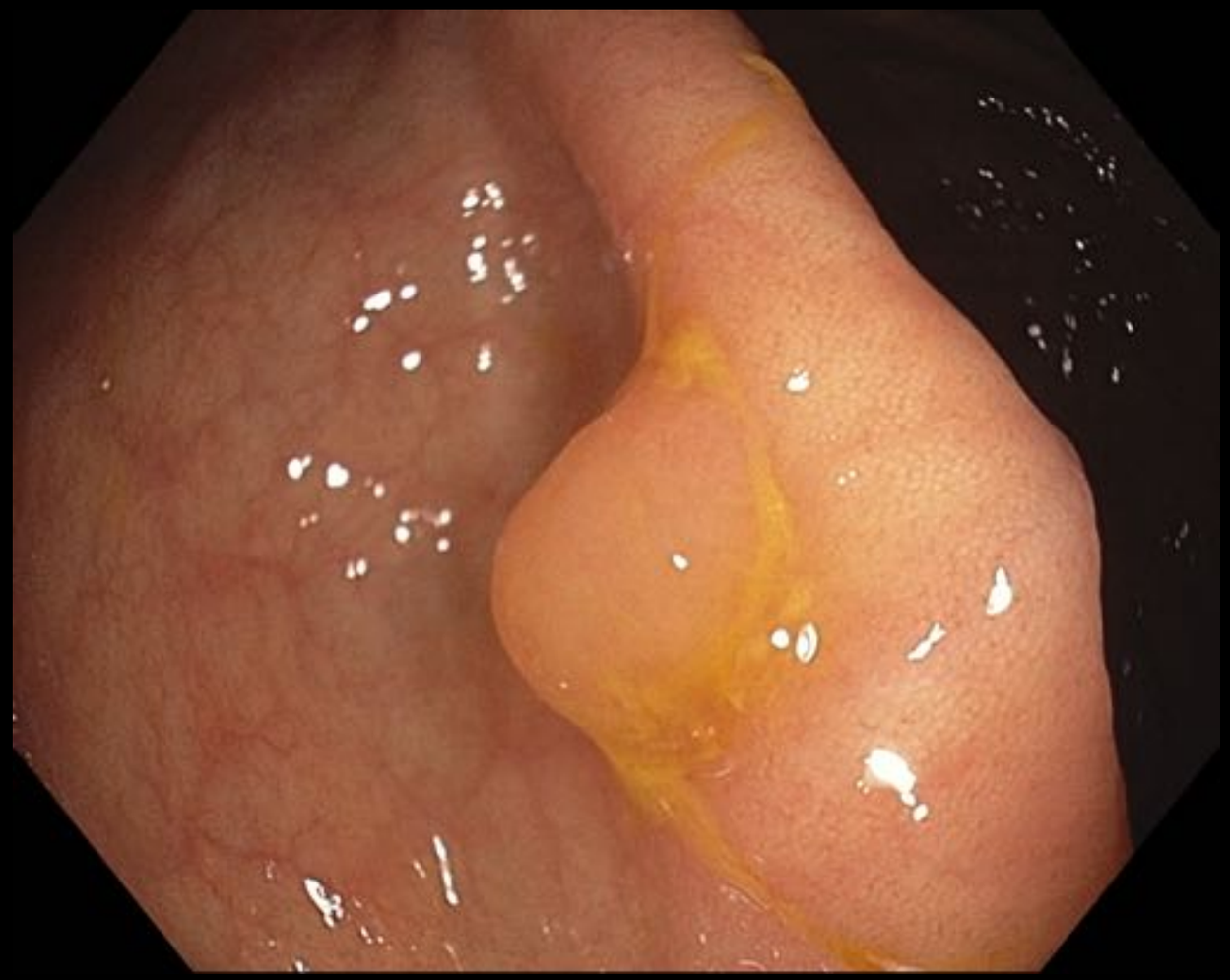


Know the Signatures of Serrated Lesions



Features of Serrated Lesions

- Mucus Cap
- Indistinct borders
- Cloud-like Surface
- Irregular Shape
- Dark Pits



Hazewinkel Y et al Gastrointest Endosc 2013 Jun;77(6):916-24
IJspeert J et al. Gut 2015;0:108

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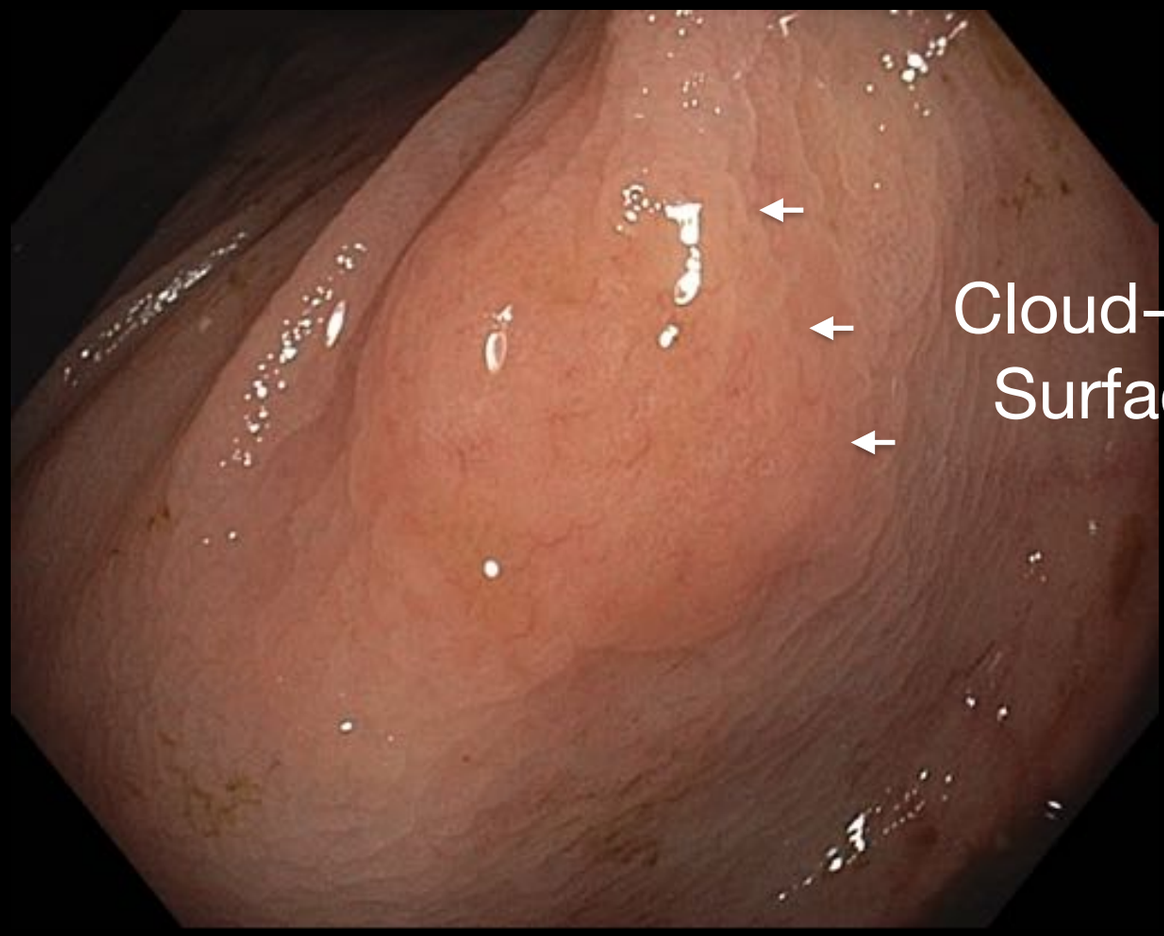

Hazewinkel Y et al Gastrointest Endosc 2013 Jun;77(6):916-24
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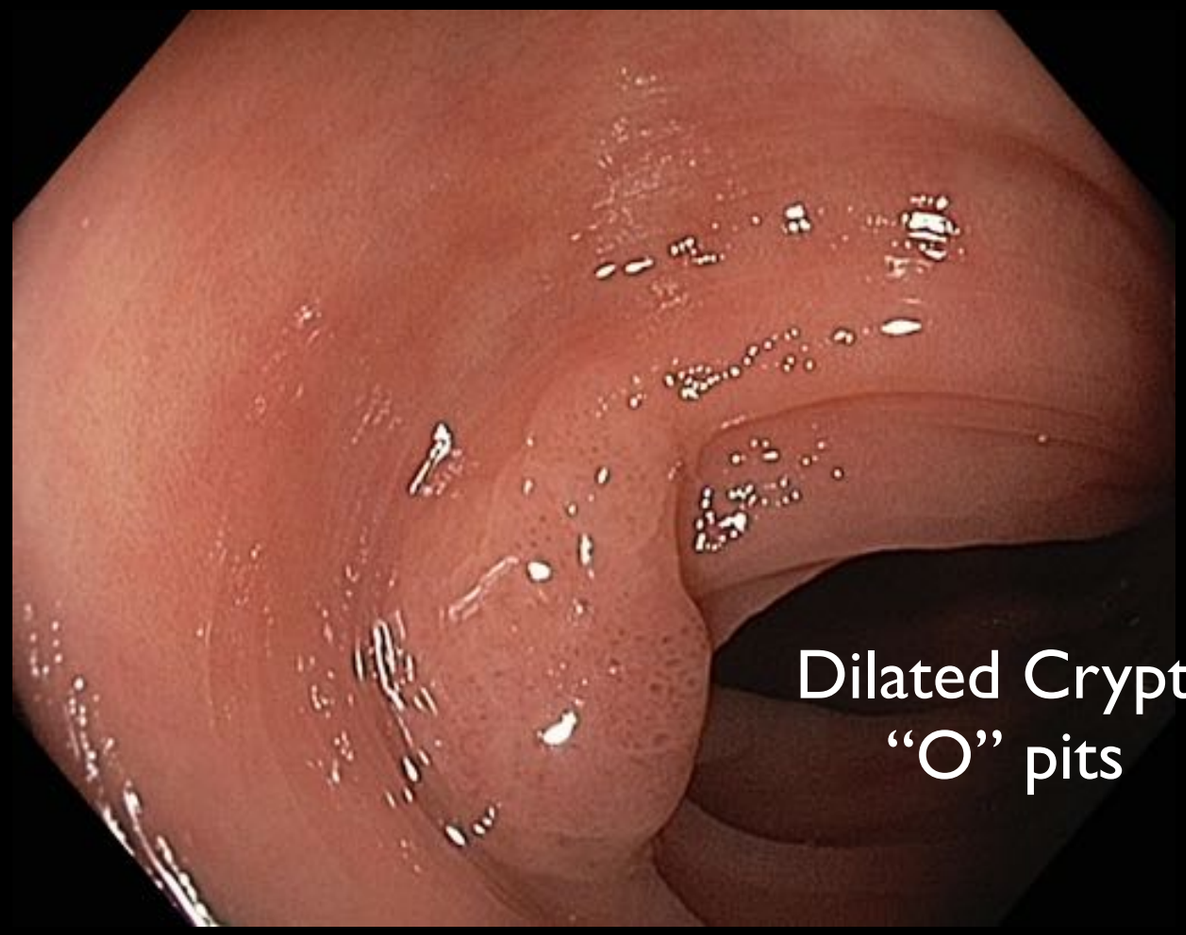
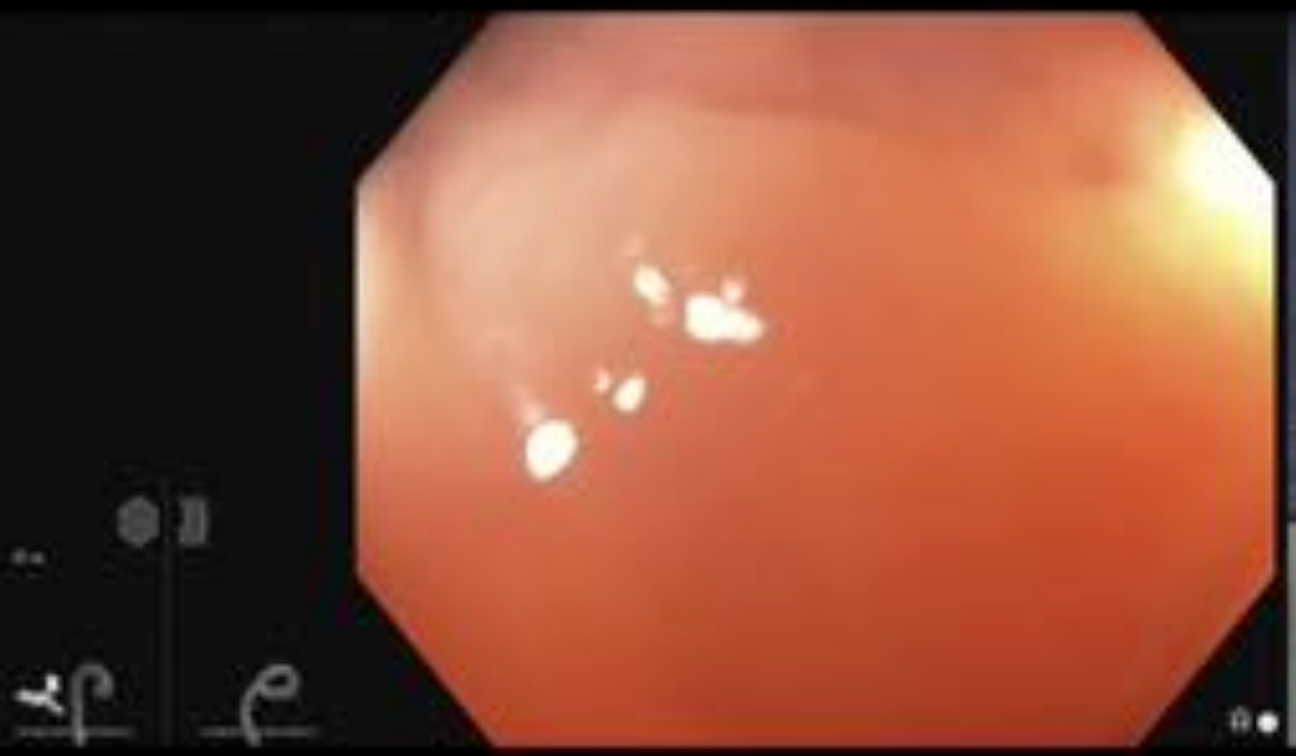
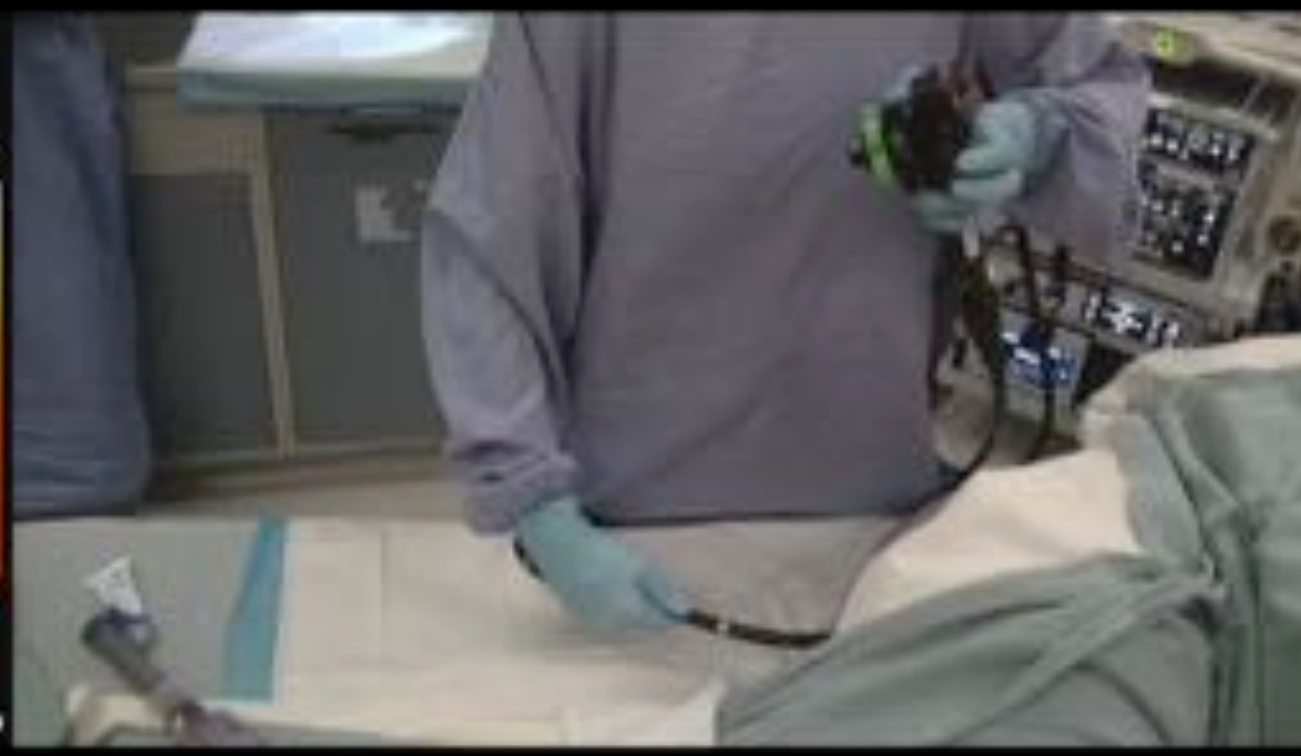


Dilated Crypts
"O" pits

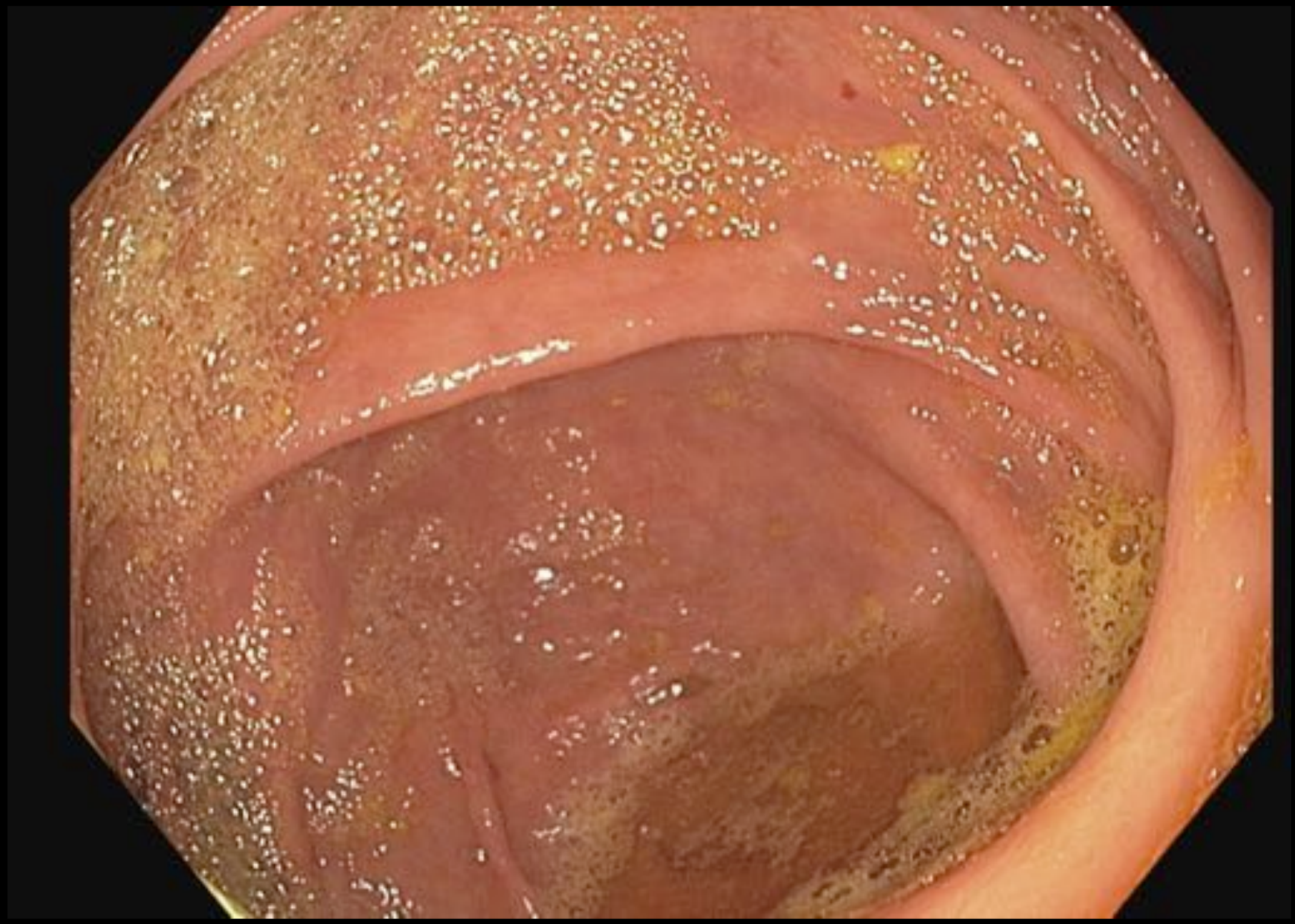
Hazewinkel Y et al Gastrointest Endosc 2013 Jun;77(6):916-24
IJspeert J et al. Gut 2015;0:108

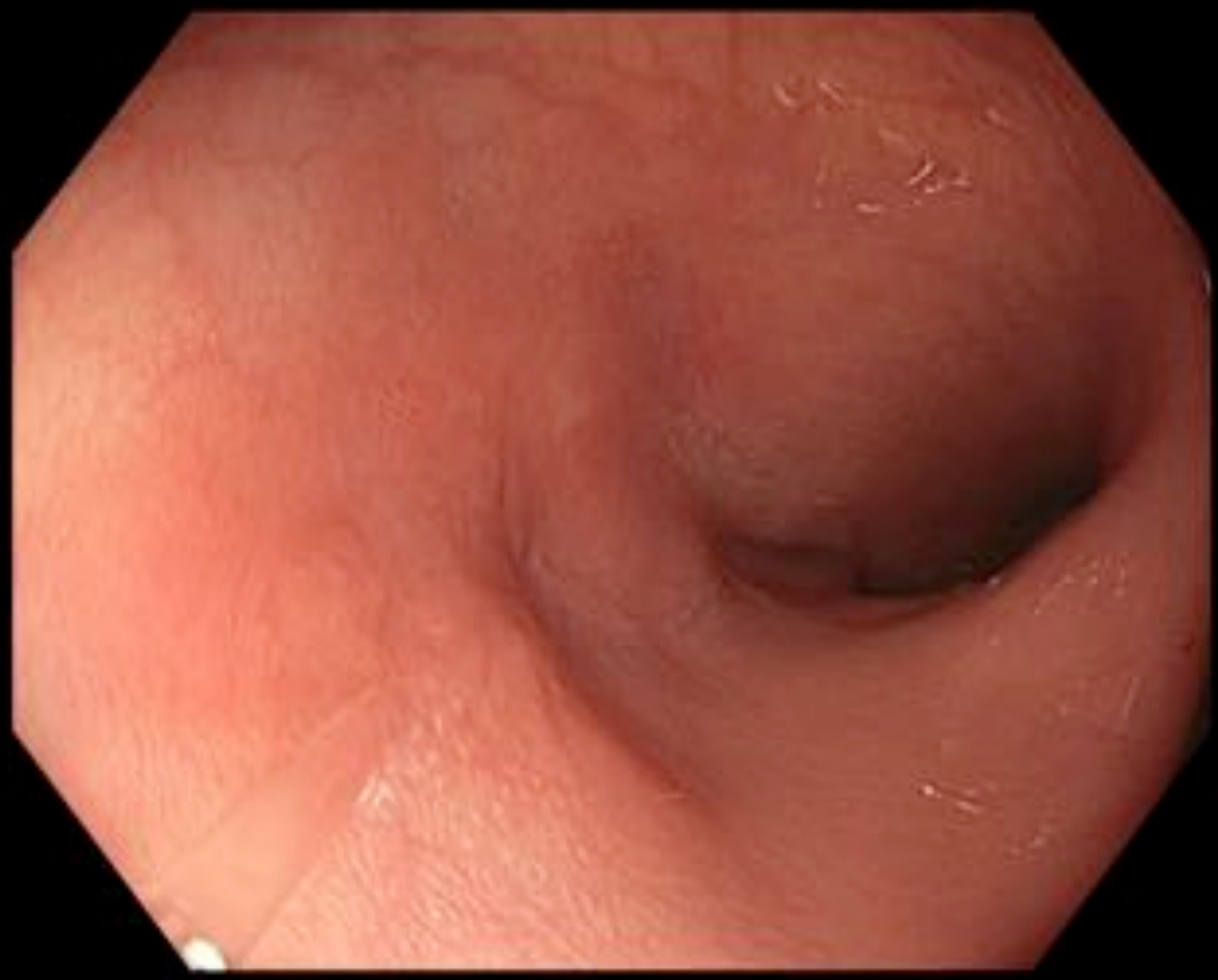
Straight Endoscope for Controlled & Efficient Inspection





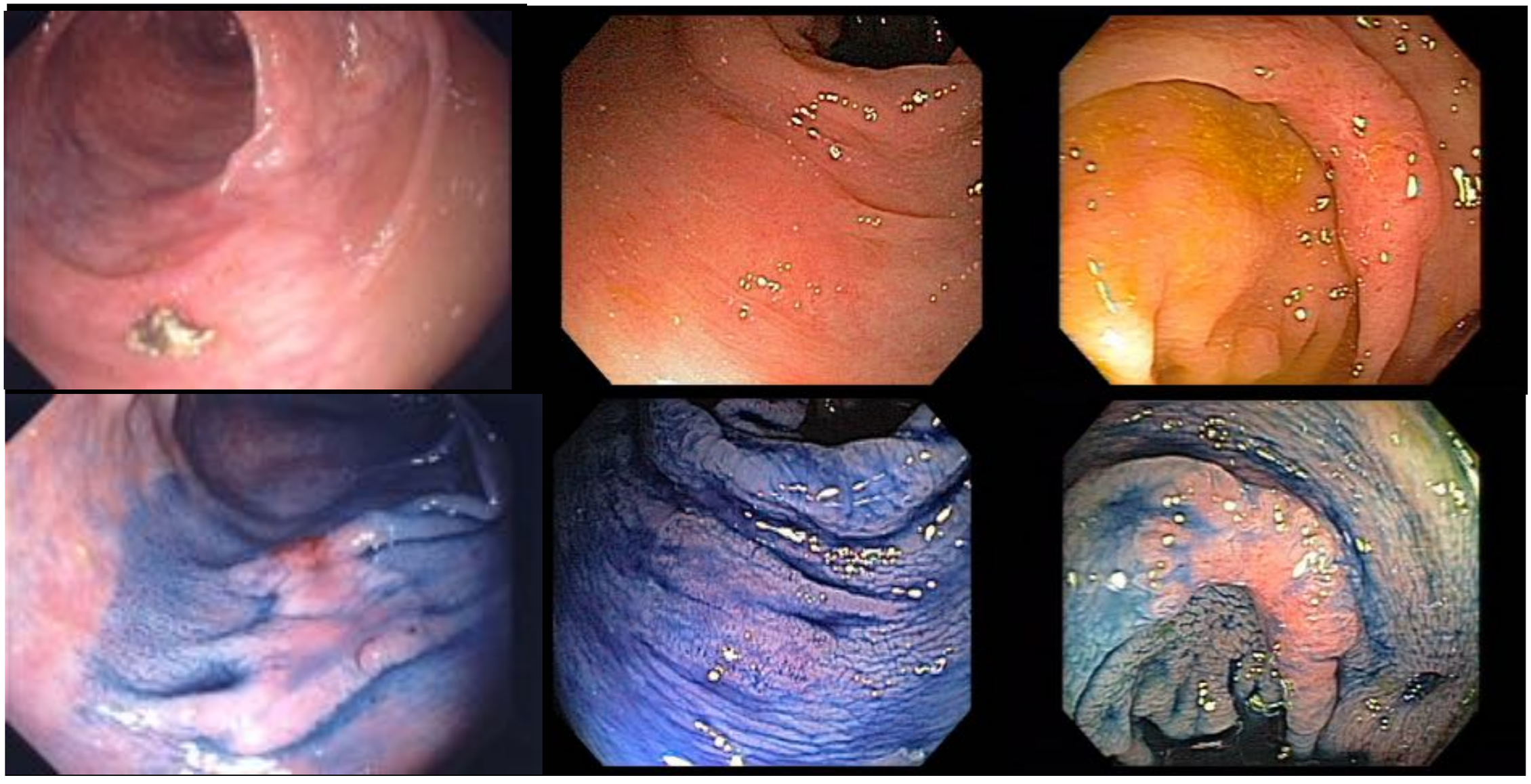
Inspection Technique



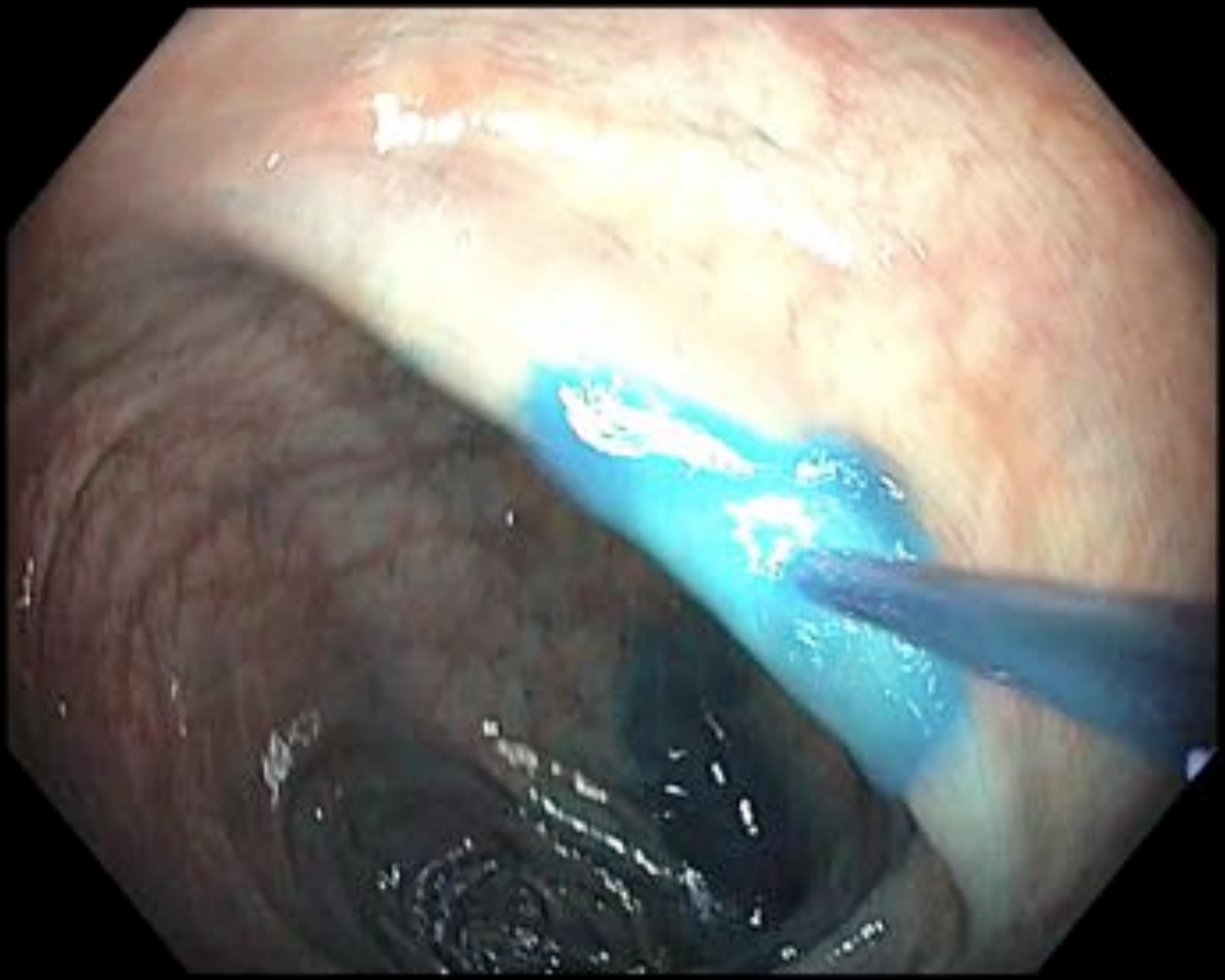


Kaltenbach & Soetikno, Detection, Diagnosis & Management of Non-Polypoid Colorectal Neoplasm, 2nd ed. ASGE Learning Library.

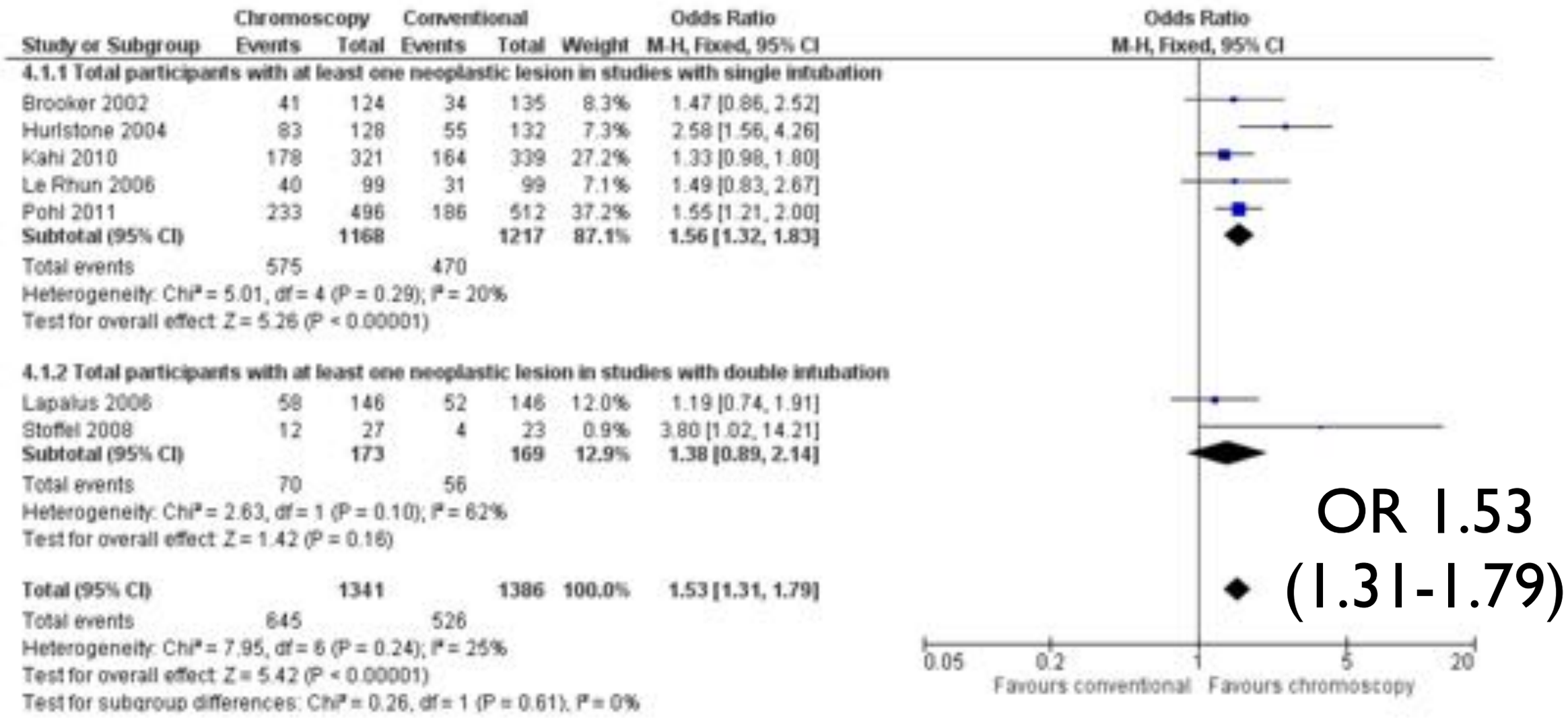
Dye Accentuates Subtle Lesions



Superficial elevated **Flat** **Depressed**



Higher ADR with Chromoendoscopy



Brown et al. Cochrane Database of Systematic Reviews 2016

Messy

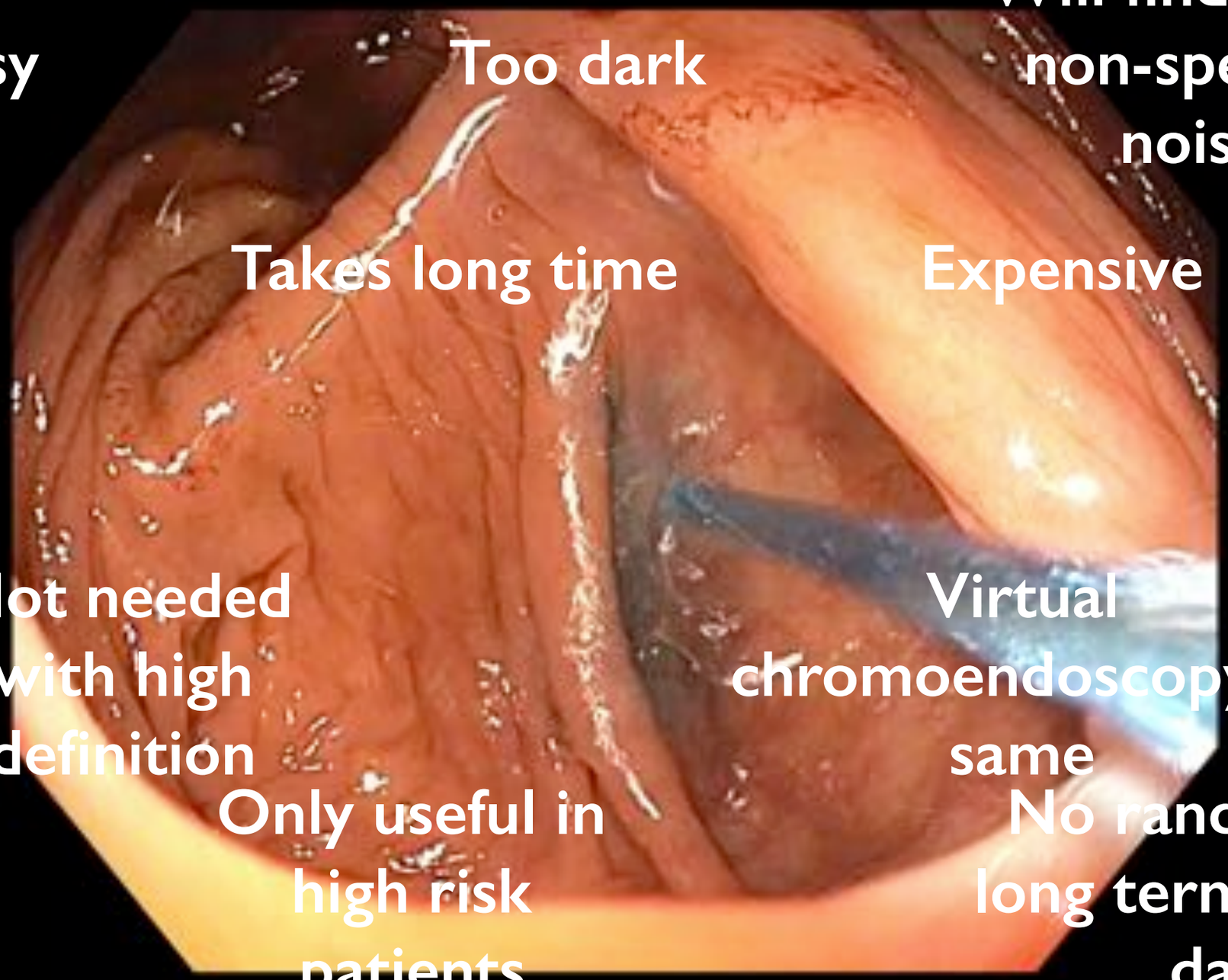
Too dark

Will find more non-specific noise

It pools

Takes long time

Expensive

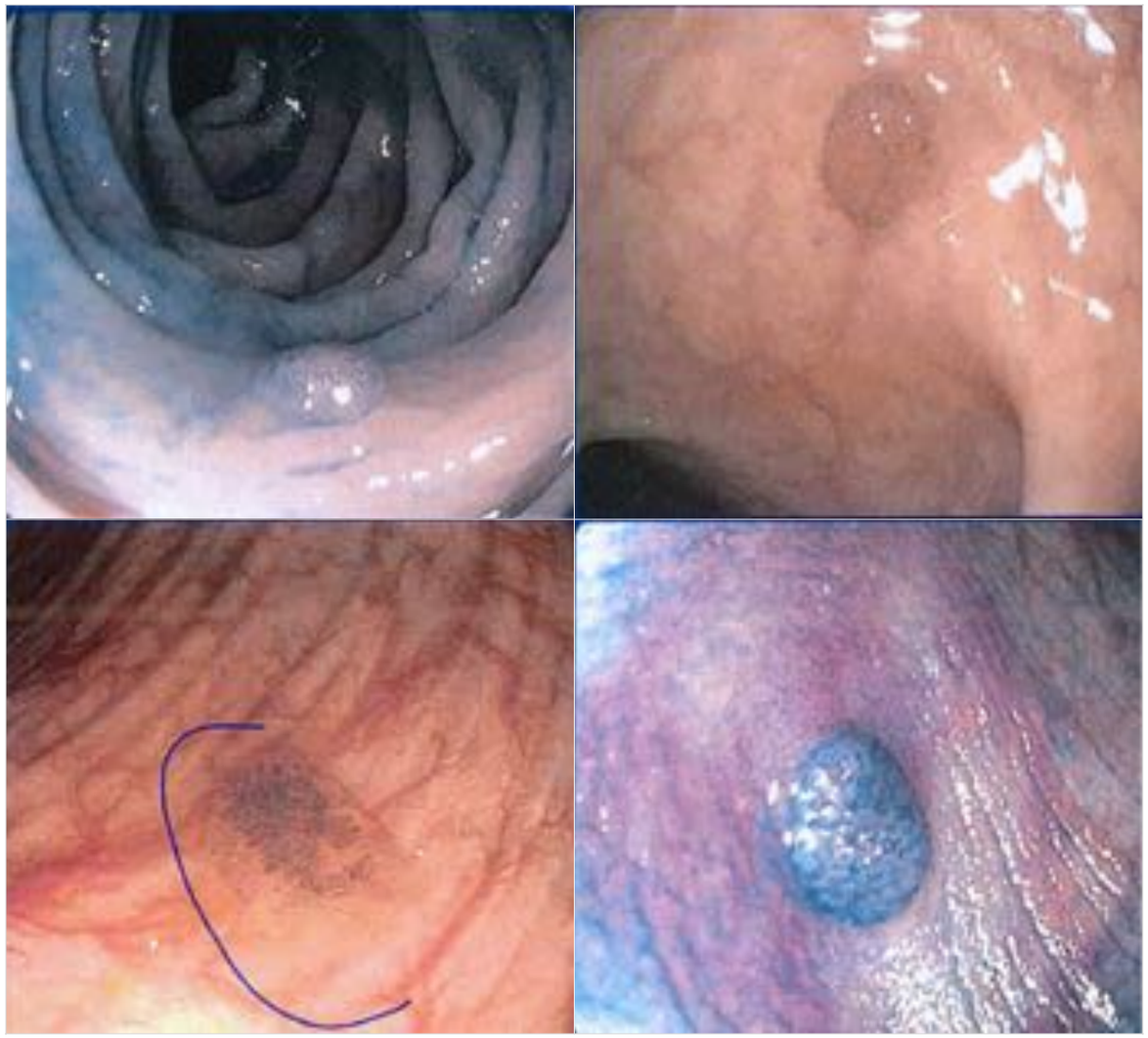


Not needed with high definition

Virtual chromoendoscopy is same

Only useful in high risk patients

No randomized long term survival data



Repici A, Di Stefano AF, Radicioni MM, Jas V, Moro L, Danese S. Contemp Clin Trials. 2012 Mar;33(2):260-7

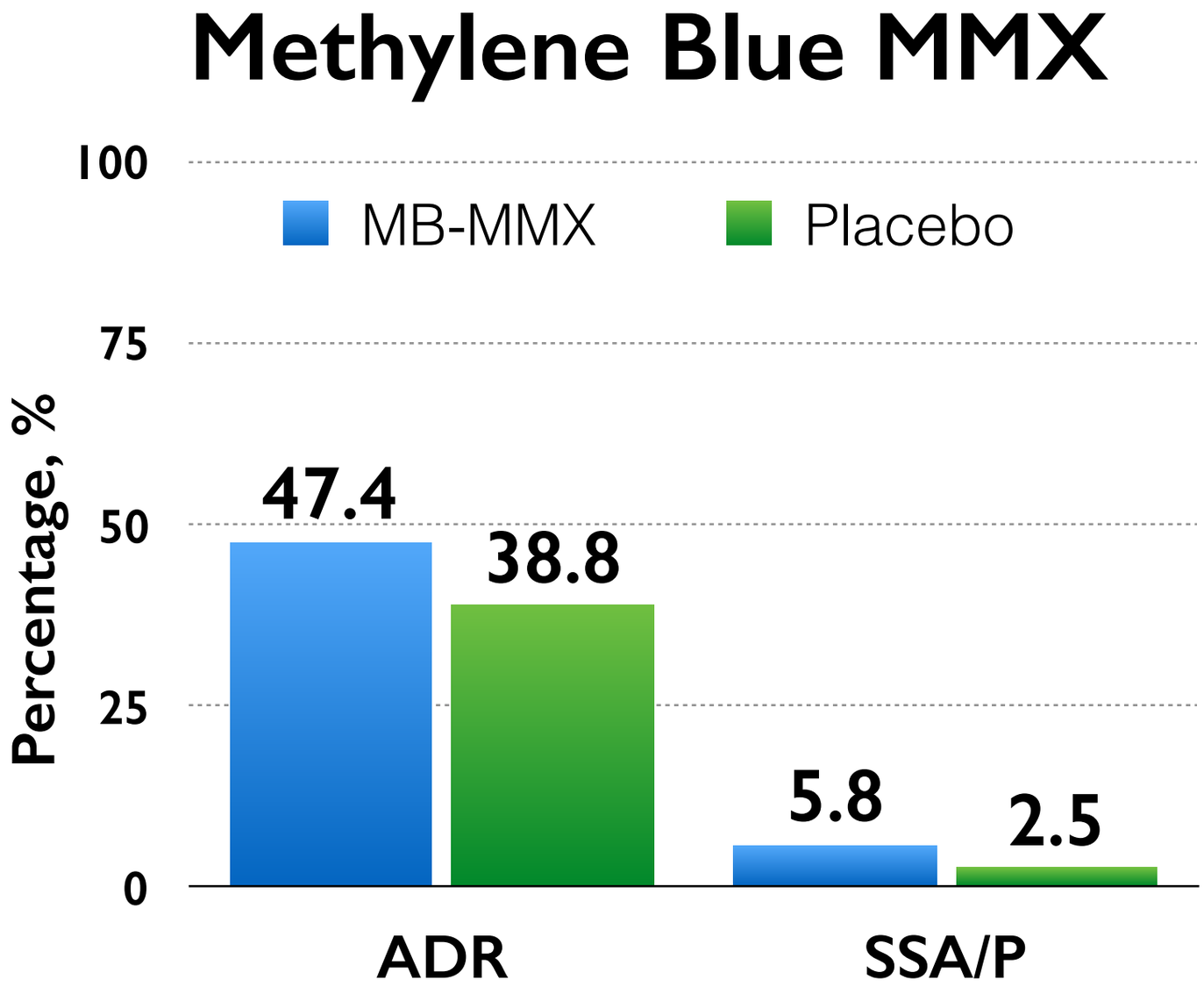
395

METHYLENE BLUE MMX® INCREASES ADENOMA DETECTION RATE IN SCREENING AND SURVEILLANCE COLONOSCOPY- A MULTI-CENTRE, MULTINATIONAL, PLACEBO CONTROLLED, RANDOMISED, DOUBLE-BLIND AT RANDOMISATION, PARALLEL-GROUP, PHASE III STUDY

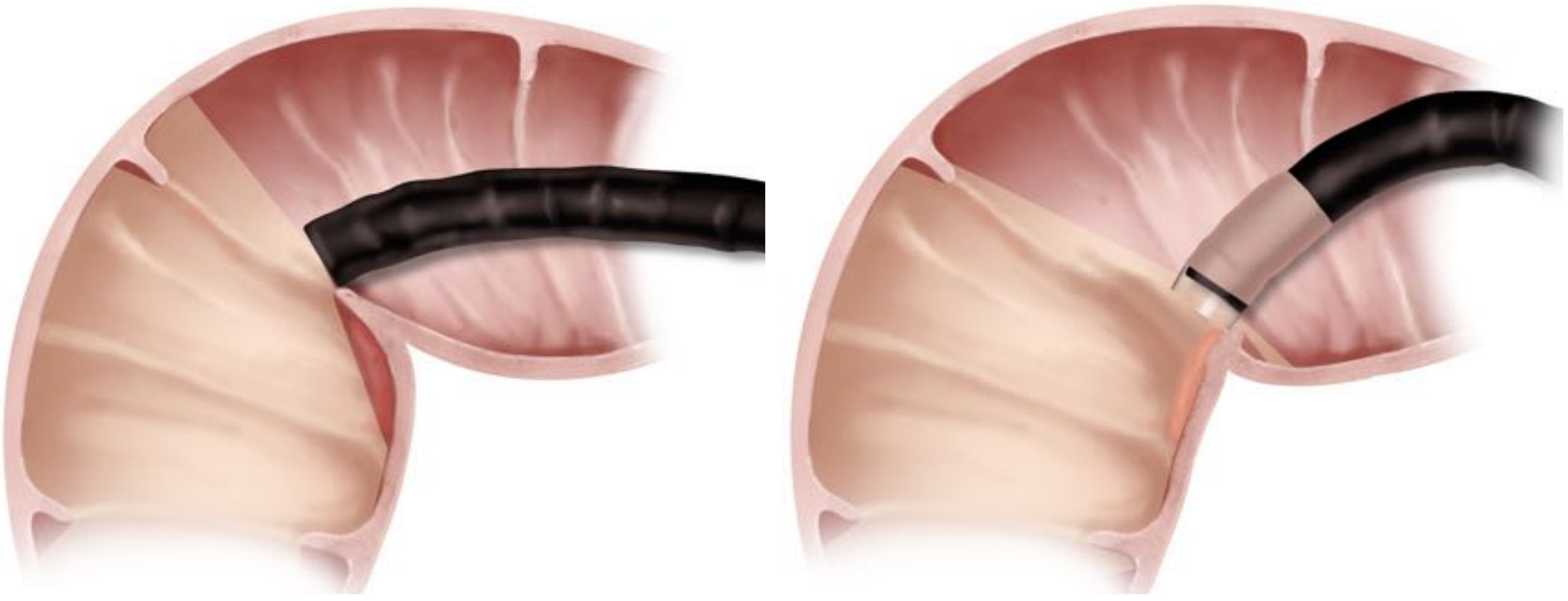
Alessandro Repici*[1], Michael B. Wallace[2], James East[3], Prateek Sharma[4], Raf Bisschops[5], Francisco C. Ramirez[6], David H. Bruining[7], Michele A. Young[8], David Gatof[9], Marcia I. Canto[10], Norman E. Marcon[11], Renato Cannizzaro[12], Ralf Kiesslich[13], Matt Rutter[14], Evelien Dekker[15], Peter D. Siersema[16], Manon Spaander[17], Limas Kupcinskas[18], Franco Radaelli[19], Pradeep Bhandari[20], Michael Vieth[21], Cesare Hassan[22]

[1]Digestive Endoscopy Unit, Istituto Clinico Humanitas, Rozzano (MI), Milano, Italy; [2]Mayo Clinic, Jacksonville, FL; [3]Translational Gastroenterology Unit, John Radcliffe Hospital, Oxford, United Kingdom; [4]Kansas City Veterans Affairs Hospital, Kansas City, MO; [5]Leuven University Hospital, Leuven, Belgium; [6]Mayo Clinic, Scottsdale, AZ; [7]Mayo Clinic, Rochester, MN; [8]VA Medical Center, Phoenix, AZ; [9]Clinical Research of the Rockies, Lafayette, CO; [10]Johns Hopkins Hospital, Baltimore, MD; [11]St. Michael's Hospital, Toronto, ON, Canada; [12]Centro di Riferimento Oncologico, Aviano, Italy; [13]Horst Schmidt Kliniken GmbH, Wiesbaden, Germany; [14]University Hospital of North Tees, Stockton-on-Tees, United Kingdom; [15]Amsterdam Medical Centre, Amsterdam, Netherlands; [16]University Medical Centre, Utrecht, Netherlands; [17]Erasmus Medical Centre, Rotterdam, Netherlands; [18]Kaunas University of Medicine, Kaunas, Lithuania; [19]Valduce Hospital, Como, Italy; [20]Queen Alexandra Hospital, Cosham, Portsmouth, United Kingdom; [21]Institut für Pathologie Klinikum Bayreuth GmbH, Bayreuth, Germany; [22]Nuovo Regina Margherita Hospital, Rome, Italy

Introduction: Widespread application of blue dye to the mucosal surface of the colon (pan-colonic chromoendoscopy) has been shown to increase the detection of colorectal neoplasia in patients at average or increased risk of CRC. A new formulation of methylene blue powder incorporated in a MMX tablet for target release of the dye at colonic level has been developed and tested in phase I and II studies. We conducted this international multi-center, placebo controlled, randomized, double-blind (at randomization), parallel-group Phase III FDA registration study to assess the efficacy and safety of MB-MMX® for CRC screening and surveillance. Methods: In 20 centers, 50-75 years old subjects scheduled for CRC screening or surveillance high-definition white-light colonoscopy were randomized between 200 mg MB-MMX®, placebo, or 100 mg MB-MMX® in a ratio of 2:2:1. The 100 mg MB-MMX® arm was only for masking purposes at the request of the FDA, and it was excluded in the statistical analysis. MB-MMX® and placebo tablets were administered with a day-before regimen of 4 liters of polyethylene glycol-based bowel preparation. Centralized reading of endoscopic videos and pathological samples were adopted to minimize operator-related bias. The primary endpoint was the proportion of patients with at least one histologically proven adenoma or carcinoma (ADR), while the false positive rate (i.e. rate of resections for non-neoplastic polyps), additional *per-*



Use of Cap



Sanchez-Yague A, Kaltenbach T, Soetikno R. Gastrointest Endosc. 2012 Jul;76(1):169-78.

OPEN ACCESS

ORIGINAL ARTICLE

Improved adenoma detection with Endocuff Vision: the ADENOMA randomised controlled trial

Wee Sing Ngu,[1] Roisin Bevan,[2] Zacharias P Tsiamoulos,[3] Paul Bassett,[4] Zoë Hoare,[5] Matthew D Rutter,[2] Gayle Clifford,[1] Nicola Totton,[5] Thomas J Lee,[6] Arvind Ramadas,[7] John G Silcock,[8] John Painter,[9] Laura J Neilson,[1] Brian P Saunders,[3] Colin J Rees[1,10]

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[2]Department of Gastroenterology, North Tees and Hartlepool NHS Foundation Trust, Stockton, UK
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[4]Statsconsultancy Ltd, Bucks, UK
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[8]Department of Gastroenterology, County Durham and Darlington NHS Foundation Trust, Durham, UK
[9]Department of Gastroenterology, City Hospitals Sunderland NHS Foundation Trust, Sunderland, UK
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ABSTRACT

Objective Low adenoma detection rates (ADR) are linked to increased postcolonoscopy colorectal cancer rates and reduced cancer survival. Devices to enhance mucosal visualisation such as Endocuff Vision (EV) may improve ADR. This multicentre randomised controlled trial compared ADR between EV-assisted colonoscopy (EAC) and standard colonoscopy (SC).

Design Patients referred because of symptoms, surveillance or following a positive faecal occult blood test (FOBt) as part of the Bowel Cancer Screening Programme were recruited from seven hospitals. ADR, mean adenomas per procedure, size and location of adenomas, sessile serrated polyps, EV removal rate, caecal intubation rate, procedural time, patient experience, effect of EV on workload and adverse events were measured.

Results 1772 patients (57% male, mean age 62 years) were recruited over 16 months with 45% recruited through screening. EAC increased ADR globally from 36.2% to 40.9% (P=0.02). The increase was driven by a 10.8% increase in FOBt-positive screening patients (50.9% SC vs 61.7% EAC, P<0.001). EV patients had higher detection of mean adenomas per procedure, sessile serrated polyps, left-sided, diminutive, small adenomas and cancers (cancer 4.1% vs 2.3%, P=0.02). EV removal rate was 4.1%. Median intubation was a minute quicker with EAC (P=0.001), with no difference in caecal intubation rate or withdrawal time. EAC was well tolerated but caused a minor increase in discomfort on anal intubation in patients undergoing colonoscopy with no or minimal sedation. There were no significant EV adverse events.

Conclusion EV significantly improved ADR in bowel cancer screening patients and should be used to improve colonoscopic detection.

Trial registration number NCT 02552017, Results; ISRCTN 11821044, Results.

Significance of this study

What is already known about this subject?

- We searched PubMed and MEDLINE for English language publications in humans up to October 2016 for randomised controlled trials (RCT), open and observational studies of Endocuff and Endocuff Vision. We identified four case series studies and four multicentre RCT using the original Endocuff. Findings from case series reported that Endocuff provided more stability during mucosectomy, improved Mean number of Adenomas detected per Procedure (MAP) and resulted in adenoma detection rates (ADR) of up to 44.7%. However, small, superficial, 'scratch-like' mucosal lesions were observed, especially in the ileocaecal region in 30% of patients. Two multicentre RCTs from Germany and one from the USA reported an ADR increase of 14%, 85% and 16.6% with Endocuff-assisted colonoscopy. However, the largest multicentre RCT was a Dutch study of 1063 procedures, which reported no significant difference in ADR but a higher MAP with Endocuff-assisted colonoscopy. A single- centre trial of Endocuff Vision has recently reported no improvement in ADR, but this was a small study. No multicentre RCTs of the second-generation Endocuff Vision, as used in this trial, have been published.

What are the new findings?

- We present findings from the first multicentre RCT comparing Endocuff Vision-assisted colonoscopy with standard colonoscopy in patients attending for symptomatic, surveillance and Bowel Cancer Screening Programme colonoscopy. Thus, this is the first study to demonstrate improved ADR with Endocuff Vision.

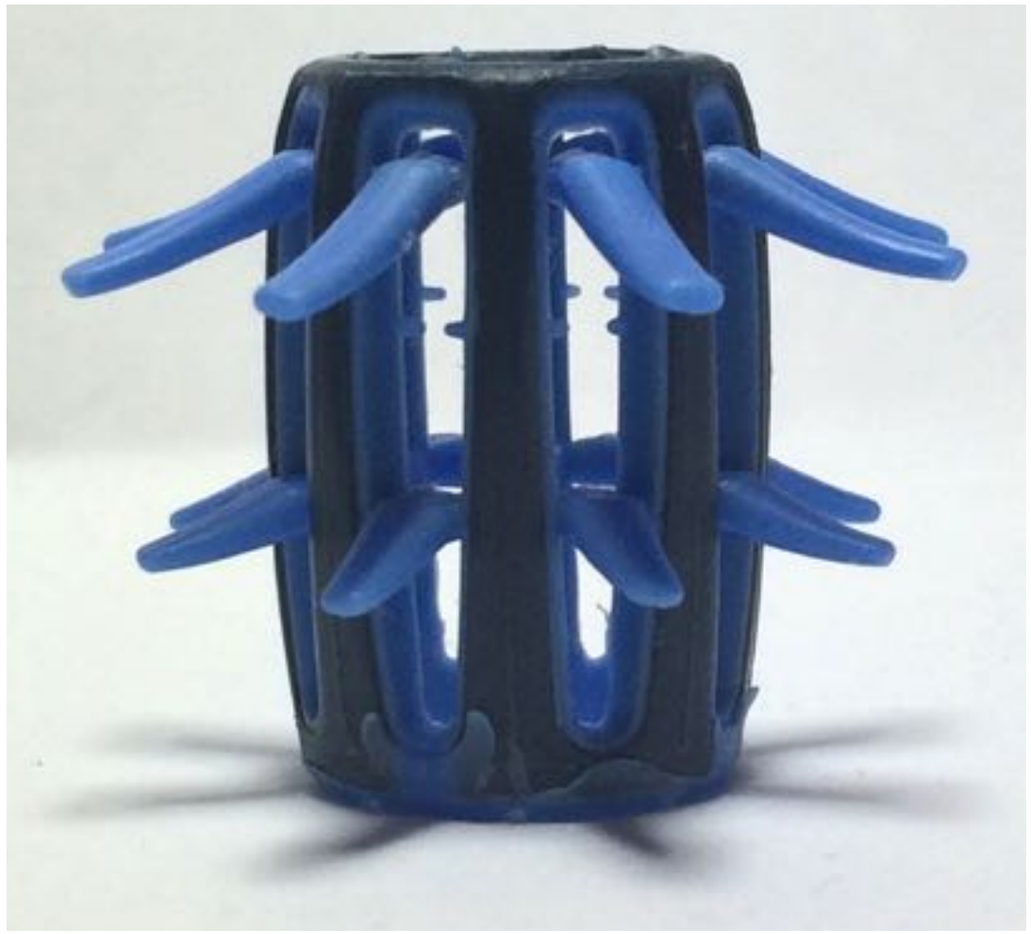
INTRODUCTION

Adenoma detection rate (ADR) is the most important marker of colonoscopy quality.[1 2] Low ADR correlates with higher postcolonoscopy colorectal cancer (PCCRC) rates and poorer outcomes.[3–7] Measures to improve ADR such as optimising bowel preparation, slower withdrawal time, use of antispasmodics, improved training, position change and new technologies to improve mucosal visualisation have been developed.[8–13]

Lesions located on the proximal side of colonic folds present a particular problem and established manoeuvres such as retroflexion may not be possible in much of the colon.[12 13] Devices that attach to the tip of the scope have been created to flatten folds but have not been demonstrated to consistently improve ADR.[14]

Endocuff Vision (EV) (figure 1) is a polypropylene device mounted onto the distal tip of a colonoscope.

Use of Endocuff Cap



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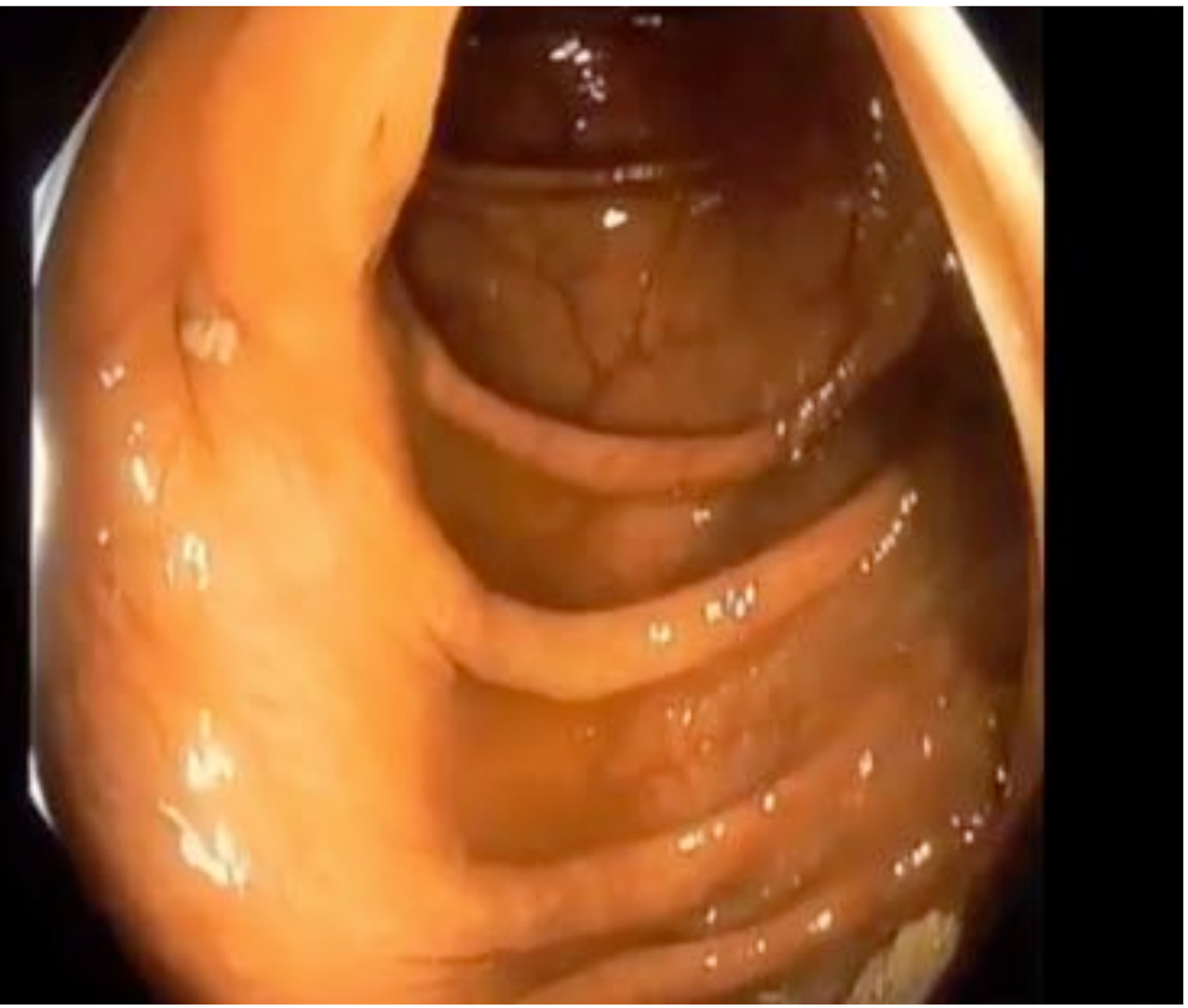


Meta-Analysis:
12 RCTs (8376 patients) comparing Endocuff assisted colonoscopy with standard colonoscopy, up to Dec 2017.

<u>ADR significantly increased</u>:
RR 1.2 (95%CI:1.06-1.36, p=0.003)
Endocuff, 41.3%,
Standard, 34.2%

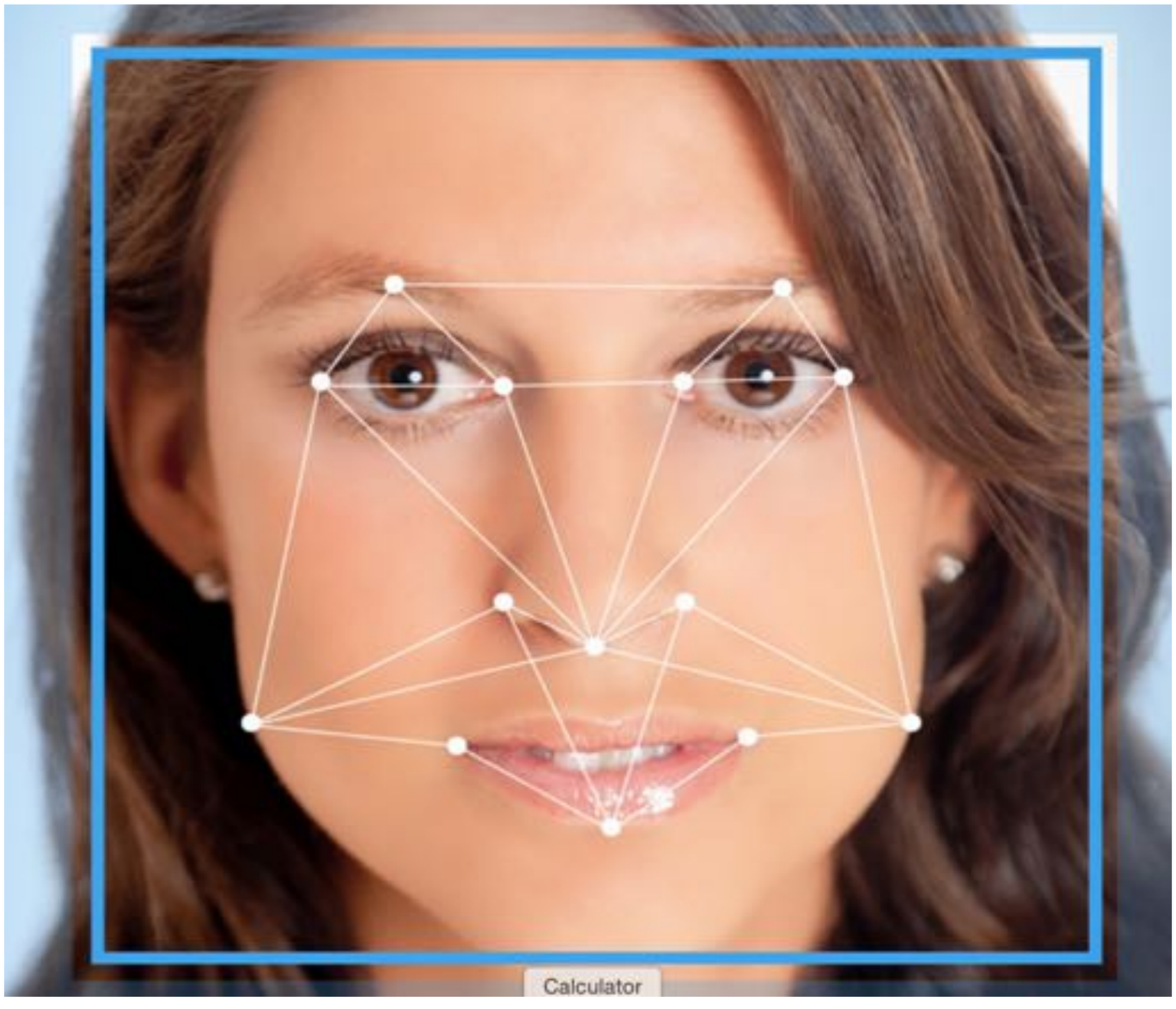
<u>Operators:</u>
Low-to-moderate ADRs (< 35 %):
RR = 1.51 (95 %CI 1.35 - 1.69; P < 0.001)

High ADRs (> 45 %):
RR = 1.01 (95 %CI 0.93 -1.09; P = 0.87)

Williet N et al.Effect of Endocuff-assisted colonoscopy on adenoma detection rate: meta-analysis of randomized controlled trials. Endoscopy. 2018

Can Computers Aid Our in Detection of Colon Polyps?

Phone Face Recognition - Why not Polyps?



a joint development from
Cadens, **Imagia**, **Satis**

Polyp detection

White light and **NBI**
unaltered footage in real time

Jacques Bergman and Patrick S. Yachimski, Section Editors

Artificial Intelligence-Assisted Polyp Detection for Colonoscopy: Initial Experience

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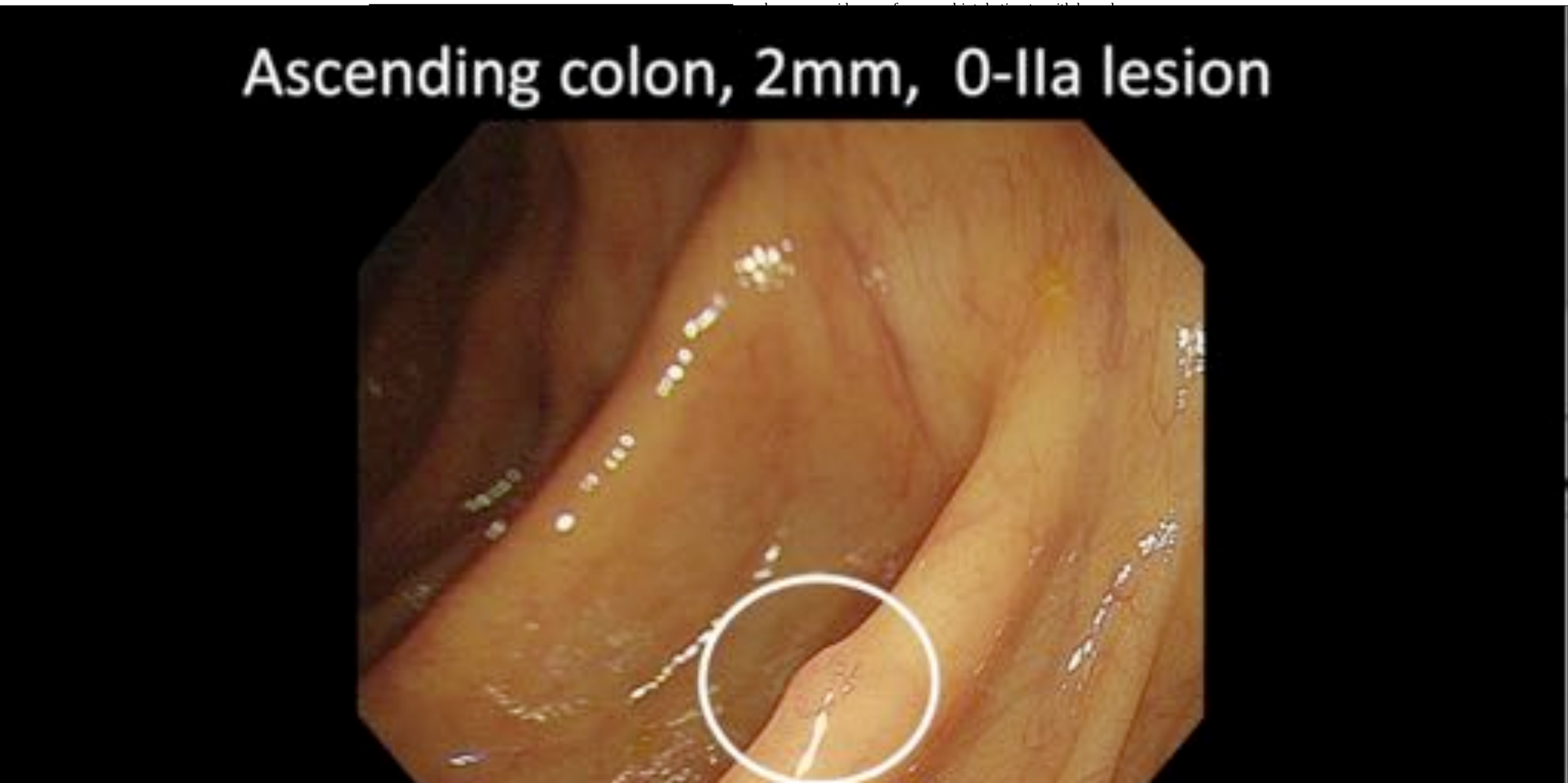
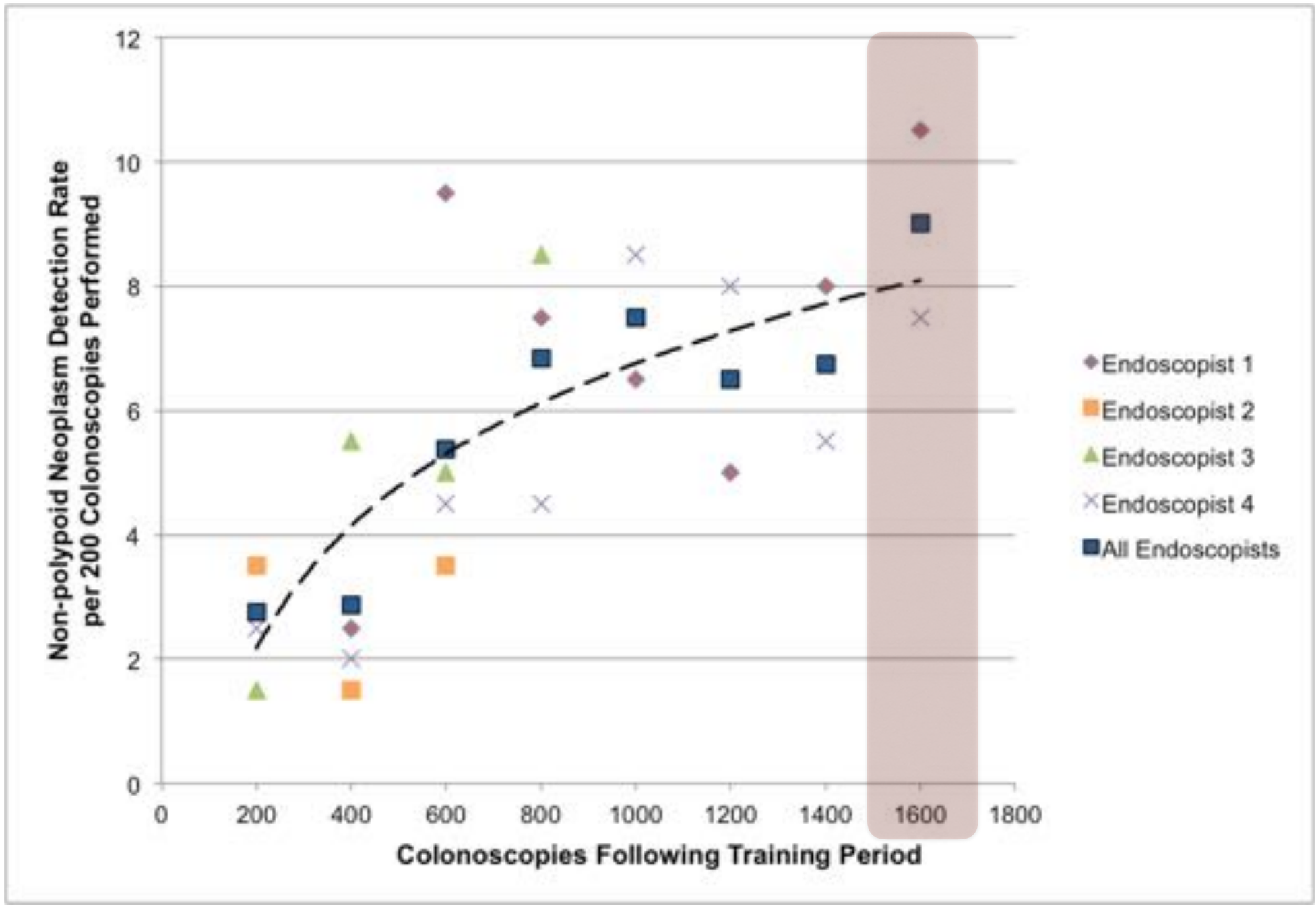


Adenoma Detection is Not Innate
Training & Monitoring is Important



McGill S, Kaltenbach T, Friedland S and Soetikno R.Gut. 2015 Jan;64(1):184-5.

ENDOSCOPY

CME

An Endoscopic Quality Improvement Program Improves Detection of Colorectal Adenomas

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OBJECTIVES: **Adenoma detection rate (ADR) is a key measure of quality in colonoscopy. Low ADRs are associated with development of interval cancer after "negative" colonoscopy. Uncontrolled studies mandating longer withdrawal time, and other incentives, have not significantly improved ADR. We hypothesized that an endoscopist training program would increase ADRs.**

METHODS: **Our Endoscopic Quality Improvement Program (EQUIP) was an educational intervention for staff endoscopists. We measured ADRs for a baseline period, then randomly assigned half of the 15 endoscopists to undergo EQUIP training. We then examined baseline and post-training study ADRs for all endoscopists (trained and un-trained) to evaluate the impact of training. A total of 1,200 procedures were completed in each of the two study phases.**

RESULTS: **Patient characteristics were similar between randomization groups and between study phases. The overall ADR in baseline phase was 36% for both groups of endoscopists. In the post-training phase, the group of endoscopists randomized to EQUIP training had an increase in ADR to 47%, whereas the ADR for the group of endoscopists who were not trained remained unchanged at 35%. The effect of training on the endoscopist-specific ADRs was estimated with an odds ratio of 1.73 (95% confidence interval 1.24–2.41, *P*=0.0013).**

CONCLUSIONS: **Our results indicate that ADRs can be improved considerably through simple educational efforts. Ultimately, a trial involving a larger number of endoscopists is needed to validate the utility of our training methods and determine whether improvements in ADRs lead to reduced colorectal cancer.**

SUPPLEMENTARY MATERIAL is linked to the online version of the paper at http://www.nature.com/ajg

Am J Gastroenterol 2013; 108:219–226; doi:10.1038/ajg.2012.417; published online 8 January 2013

INTRODUCTION

Screening colonoscopy and other screening methods have been largely credited for the recent decline in the incidence and death rates of colorectal cancer (CRC). Despite this decline, CRC is projected to remain third among cancers for both men and women in 2011 (1).

Although colonoscopy remains an effective method of CRC screening and prevention (2), it is imperfect. Adenoma miss rates have been estimated to be as high as 24% in tandem colonoscopy studies (3,4). One large population study estimated the risk of a new CRC diagnosis within 3 years of negative screening colonoscopy to be as high as 6% (5). Right-sided lesions, flat polyps, and variability in endoscopist quality measures are all potential reasons why interval cancers develop (5–8). The adenoma detection rate (ADR) is a validated predictor of development of interval CRC risk after screening colonoscopy (9). However, wide variability still exists between endoscopists in this important measure (10–12).

Technical-, patient-, and provider-related factors have all been explored to explain differences in adenoma detection. Adequacy of bowel preparation, withdrawal time, and time of day have all been associated with adenoma rates and their detection (13–16). The performing endoscopist, independent of patient-related factors, has recently been shown to strongly influence adenoma detection (17). Endoscopist behaviors, such as time spent on inspection, looking behind folds, cleansing, and distention of the colon, are also associated with higher adenoma detectors (18,19). Despite this knowledge, there remains little data on how to improve adenoma detection among individual endoscopists.

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OPEN ACCESS

ORIGINAL ARTICLE

Leadership training to improve adenoma detection rate in screening colonoscopy: a randomised trial

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▶ Additional material is published online only. To view please visit the journal online (http://dx.doi.org/10.1136/gutjnl-2014-307503).

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ABSTRACT

Objective Suboptimal adenoma detection rate (ADR) at colonoscopy is associated with increased risk of interval colorectal cancer. It is uncertain how ADR might be improved. We compared the effect of leadership training versus feedback only on colonoscopy quality in a countrywide randomised trial.

Design 40 colonoscopy screening centres with suboptimal performance in the Polish screening programme (centre leader ADR ≤25% during preintervention phase January to December 2011) were randomised to either a Train-Colonoscopy-Leaders (TCLs) programme (assessment, hands-on training, post-training feedback) or feedback only (individual quality measures). Colonoscopies performed June to December 2012 (early postintervention) and January to December 2013 (late postintervention) were used to calculate changes in quality measures. Primary outcome was change in leaders' ADR. Mixed effect models using ORs and 95% CIs were computed.

Results The study included 24 582 colonoscopies performed by 38 leaders and 56 617 colonoscopies performed by 138 endoscopists at the participating centres. The absolute difference between the TCL and feedback groups in mean ADR improvement of leaders was 7.1% and 4.2% in early and late postintervention phases, respectively. The TCL group had larger improvement in ADR in early (OR 1.61; 95% CI 1.29 to 2.01; p<0.001) and late (OR 1.35; 95% CI 1.10 to 1.66; p=0.004) postintervention phases. In the late postintervention phase, the absolute difference between the TCL and feedback groups in mean ADR improvement of entire centres was 3.9% (OR 1.25; 95% CI 1.04 to 1.50; p=0.017).

Conclusions Teaching centre leaders in colonoscopy training improved important quality measures in screening colonoscopy.

Trial registration number NCT01667198.

Significance of this study

What is already known on this subject?
- Suboptimal adenoma detection at colonoscopy is associated with increased risk of interval colorectal cancer and colorectal cancer death.
- Interventions targeting endoscopist performance have been generally ineffective for improving adenoma detection rates.
- One small study performed at single academic institution showed adenoma detection rate improvement with training.

What are the new findings?
- Dedicated Train-Colonoscopy-Leaders course significantly improved adenoma detection rate, proximal adenoma detection rate and non-polypoid lesion detection rate in screening colonoscopy.
- The training of screening centre leaders in teaching high quality colonoscopy changed their own practice and had also significant effect on overall centre performance.
- The Train-Colonoscopy-Leaders course had sustained effect on colonoscopy performance over 1.5 years.

How might it impact on clinical practice in the foreseeable future?
- Developed training curriculum may help to improve adenoma detection rate and non-polypoid lesion detection rate at colonoscopy.

CrossMark

To cite: Kaminski MF, Anderson J, Valori R, *et al*. *Gut* 2016;**65**:616–624.

INTRODUCTION

During recent years, several studies have shown that important patient outcome measures such as interval cancer rates after screening colonoscopy or mortality after cancer surgery are related to quality of hospitals and individual physicians.[1–3] However, there is a lack of high quality studies investigating the effect of quality improvement interventions on patient outcome measures.

Screening colonoscopy is widely used for prevention and early detection of colorectal cancer (CRC).[4] High quality colonoscopy achieving accurate detection and removal of adenomas is considered the key to screening efficacy.[5–7] Professional societies recommend that endoscopists measure quality indicators such as adenoma detection rate (ADR), caecal intubation rate (CIR) and colonoscope withdrawal time.[6 7] We have previously shown that an individual endoscopist's ADR is an independent predictor for interval cancer after screening colonoscopy.[1] Recently, a large US study confirmed this association and expanded it to include CRC death.[3] Thus, adenoma detection is of paramount importance for the success of CRC screening programmes. However, it has been uncertain how to improve ADR in endoscopists with suboptimal performance.

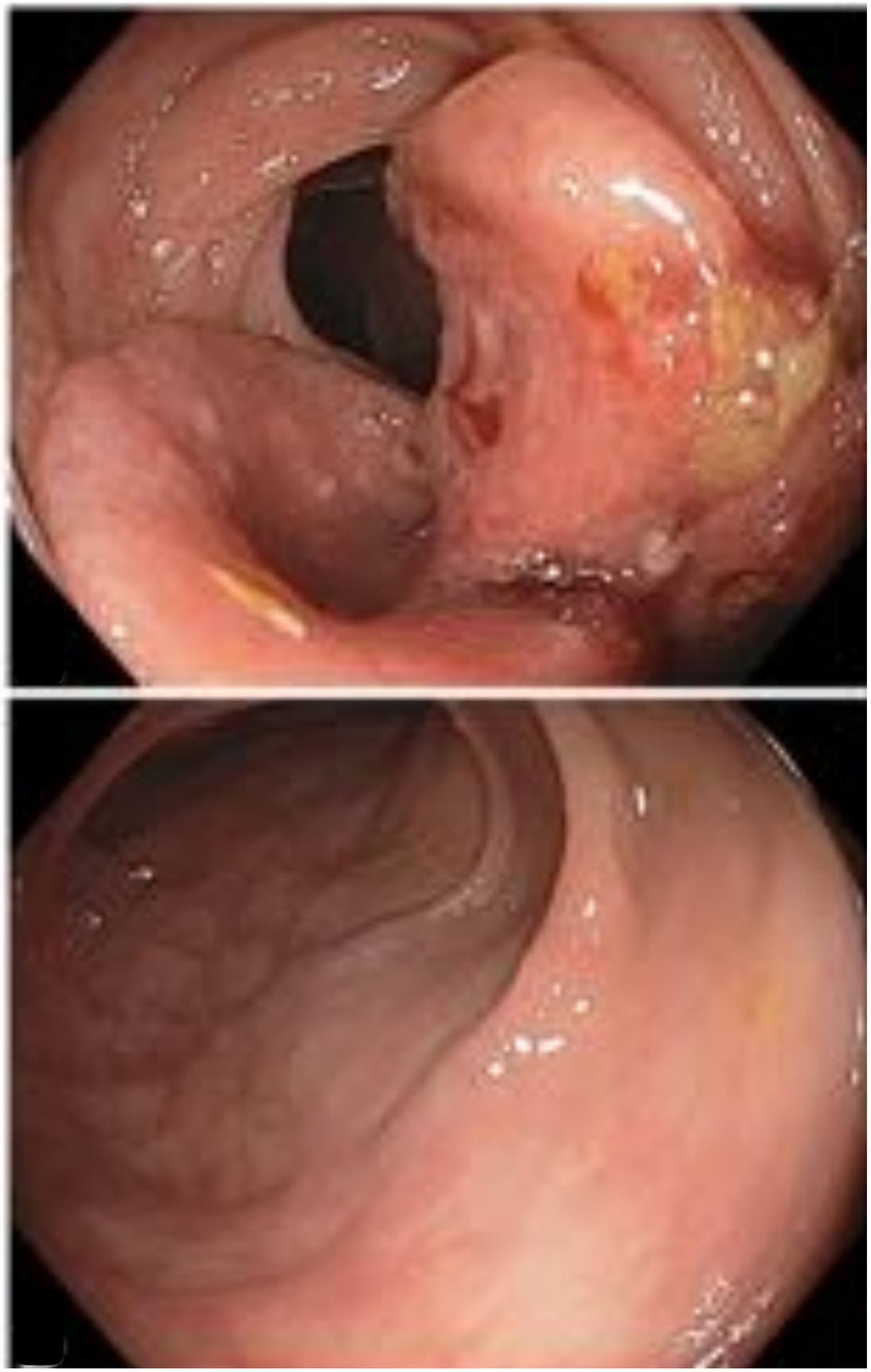
Major Issues in US Colonoscopy for Cost-Effective Colorectal Cancer Prevention

1. Some are not measuring ADR
2. Incomplete uptake of split bowel prep dosing
3. Use of shortened surveillance intervals
4. Ineffective polypectomy technique
5. Surgical resection of benign colorectal polyps

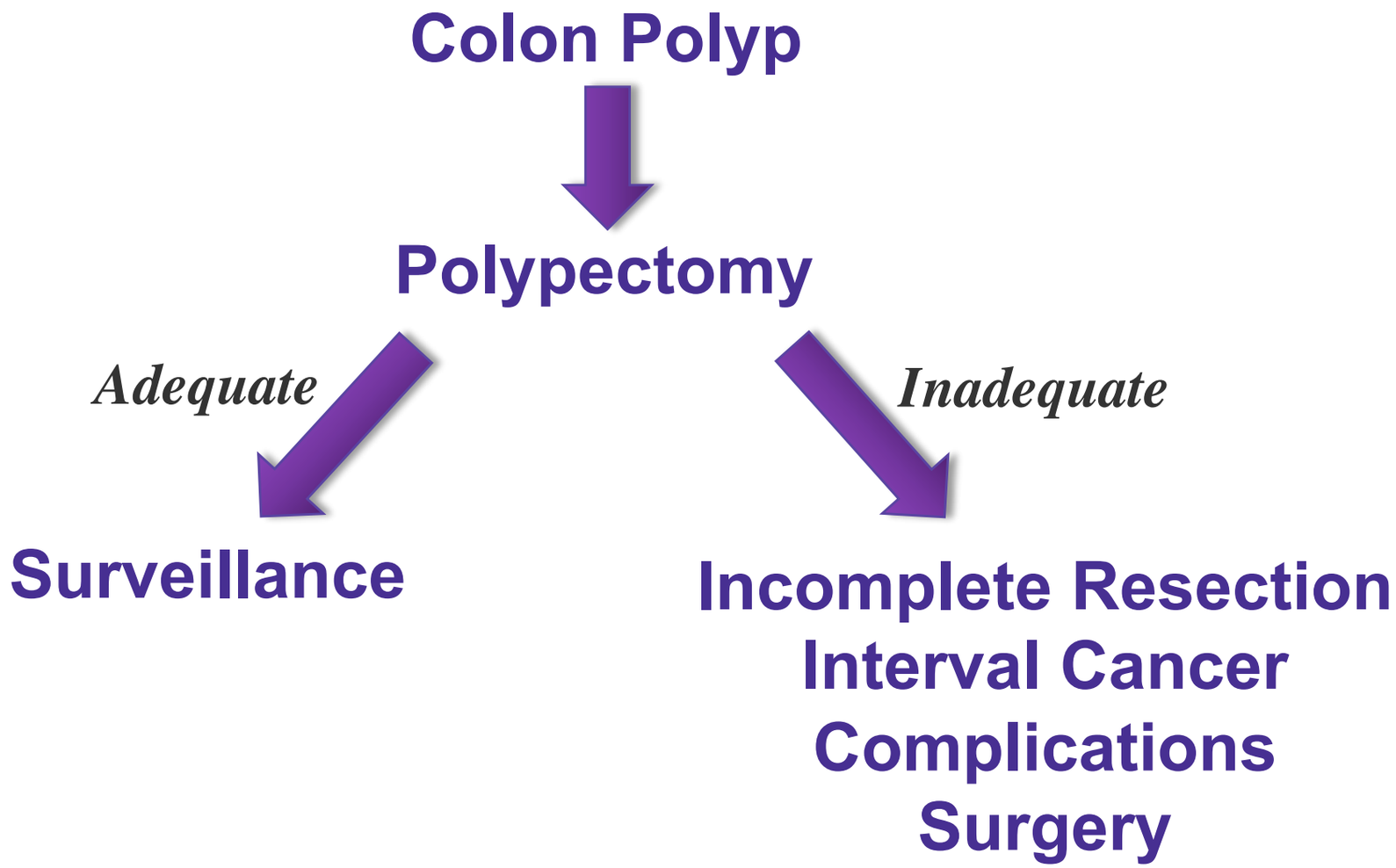
Doug Rex, Quality Indicators of Colonoscopy Implications in Colorectal Cancer Screening DDW 2018

Colon Cancer Prevention

Colorectal cancer prevention through detection and removal of colon polyps



Consequences of Inadequate Polypectomy



Pohl H et al, Gastro 2013; Robertson D et al, Gut 2014; Keswani R et al, GIE 2016.

Variable performance in polypectomy

- **CARE study - Gastro 2013**
    - 3 fold variation in resection efficacy
    - range of incomplete resection 7-22%
- **Duloy et al - GIE 2017**
    - 3 fold variation in technical competency
    - Range of competent resection 30-90%
    - No association of polypectomy competency with ADR or withdrawal time

ORIGINAL ARTICLE: Clinical Endoscopy

Assessing colon polypectomy competency and its association with established quality metrics

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Background and Aims: Inadequate polypectomy leads to incomplete resection, interval colorectal cancer, and adverse events. However, polypectomy competency is rarely reported, and quality metrics are lacking. The primary aims of this study were to assess polypectomy competency among a cohort of gastroenterologists and to measure the correlation between polypectomy competency and established colonoscopy quality metrics (adenoma detection rate and withdrawal time).

Methods: We conducted a prospective observational study to assess polypectomy competency among 13 high-volume screening colonoscopists at an academic medical center. Over 6 weeks, we made video recordings of ≥28 colonoscopies per colonoscopist and randomly selected 10 polypectomies per colonoscopist for evaluation. Two raters graded the polypectomies by using the Direct Observation of Polypectomy Skills, a polypectomy competency assessment tool, which assesses individual polypectomy skills and overall competency.

Results: We evaluated 130 polypectomies. A total of 83 polypectomies (64%) were rated as competent, which was more likely for diminutive (70%) than small and/or large polyps (50%, $P = .03$). Overall Direct Observation of Polypectomy Skills competency scores varied significantly among colonoscopists ($P = .001$), with overall polypectomy competency rates ranging between 30% and 90%. Individual skills scores, such as accurately directing the snare over the lesion ($P = .02$) and trapping an appropriate amount of tissue within the snare ($P = .001$) varied significantly between colonoscopists. Polypectomy competency rates did not significantly correlate with the adenoma detection rate ($r = 0.4$; $P = .2$) or withdrawal time ($r = 0.2$; $P = .5$).

Conclusions: Polypectomy competency varies significantly among colonoscopists and does not sufficiently correlate with established quality metrics. Given the clinical implications of suboptimal polypectomy, efforts to educate colonoscopists in polypectomy techniques and develop a metric of polypectomy quality are needed. (Gastrointest Endosc 2018;87:635-44.)

Colonoscopy reduces colorectal cancer (CRC) incidence and mortality through the detection and removal of precancerous polyps in the colon.[1] The majority of colonoscopy quality improvement efforts have focused on improving polyp detection.[2] In contrast, little work has focused on ensuring effective colon polyp resection. Unfortunately, incomplete polypectomy may occur in a significant proportion of patients undergoing colonoscopy. In a prospective study of 1427 patients undergoing colonoscopy, approximately 10% of polyps were incompletely resected.[3] An ineffective polypectomy technique may lead to costly referral to surgery[4] or even interval CRC. It is estimated that up to 30% of interval CRCs may be due to incomplete polyp resection.[5] Thus, it is imperative that we ensure that all colonoscopists can remove polyps effectively.

Abbreviations: ADR, adenoma detection rate; CRC, colorectal cancer; DOPyS, Direct Observation of Polypectomy Skills.

DISCLOSURE: *T. Kaltenbach is a consultant for Olympus America. R. Keswani is a consultant for Boston Scientific, Cook Medical, and Medtronics. All other authors disclosed no financial relationships relevant to this publication.*

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Polypectomy Competency

Assessed polypectomy competency among a cohort of 13 attending gastroenterologists using the DOPyS tool

Measured the correlation between polypectomy competency and established quality metrics – adenoma detection rate (ADR) and withdrawal time (WT)

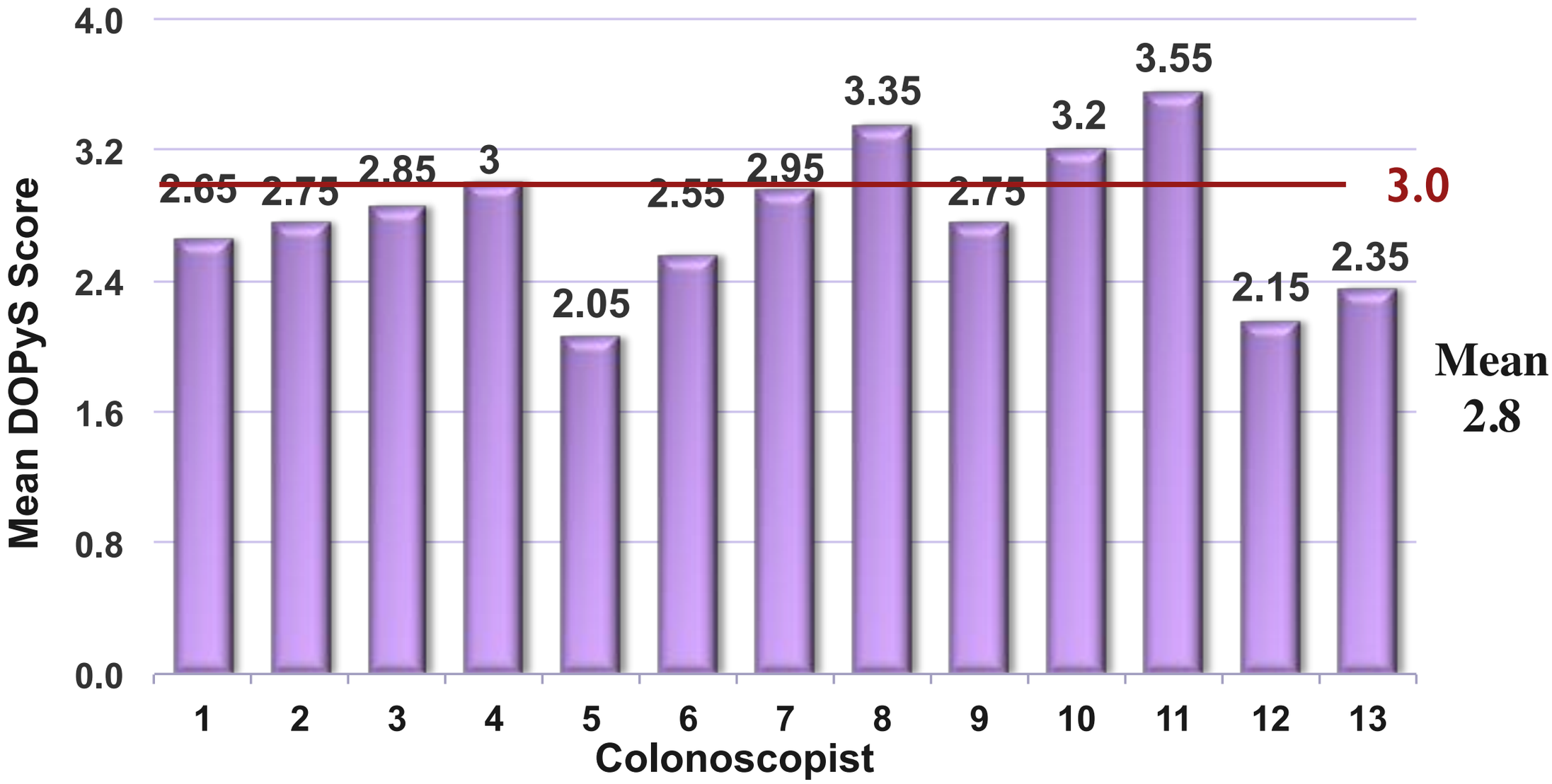
Validated Polypectomy Competency Assessment Tool - DOPyS

Direct Observation of Polypectomy Skills (DOPyS)
33 individual skills and overall polypectomy competency
graded from 1-4, with a score ≥3 denoting competency

Skill	Descriptors
Achieves optimal polyp view and position	• **Ensures clear views by aspiration/insufflation/wash** • **Maintains optimal polyp position (5-6 o'clock)** • **Takes appropriate action for position correction and clear views throughout the procedure**

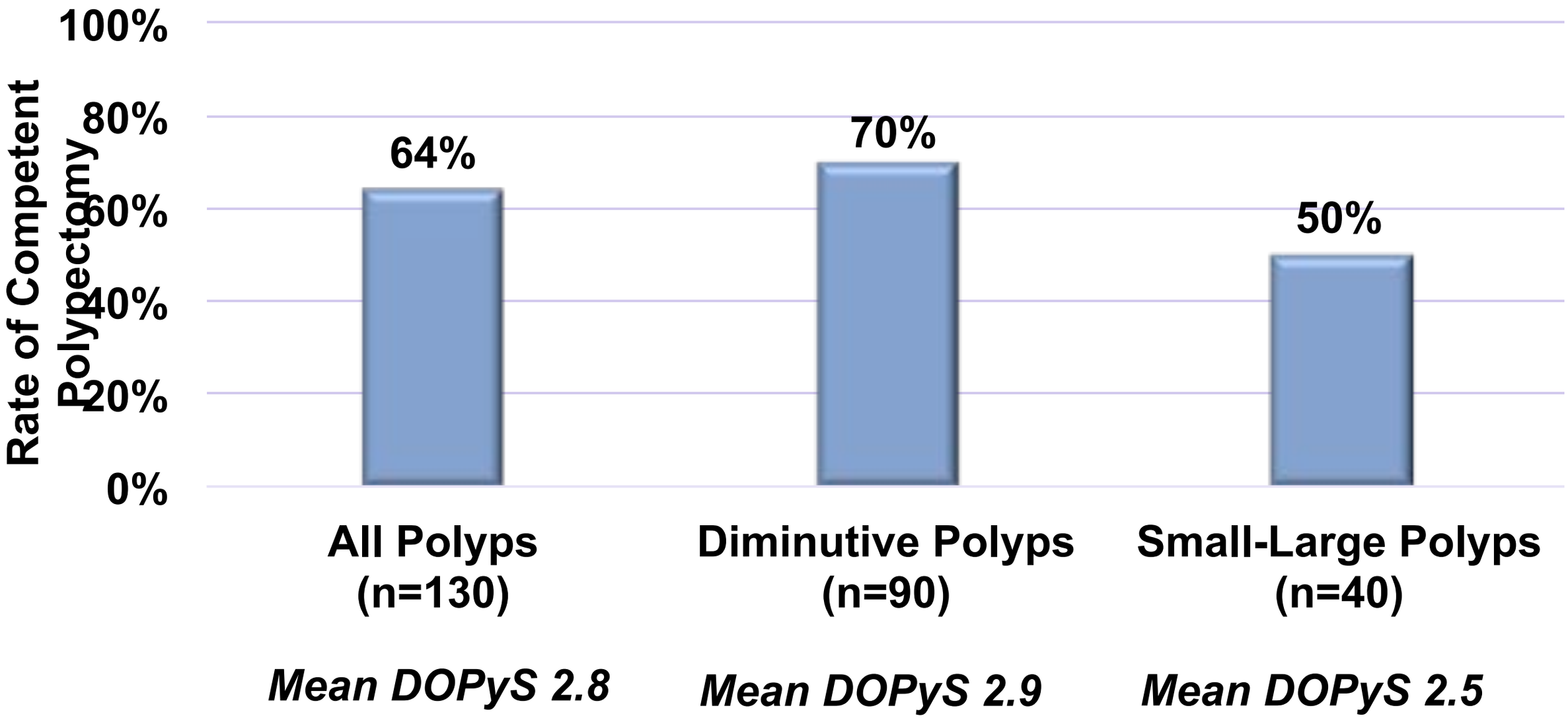
Gupta S et al, GIE 2011; Gupta S et al, GIE 2012

Polypectomy competency varied significantly between colonoscopists



Duloy et al. Gastrointest Endosc 2018

Low Rate of Competent Polypectomy



Duloy et al. Gastrointest Endosc 2018

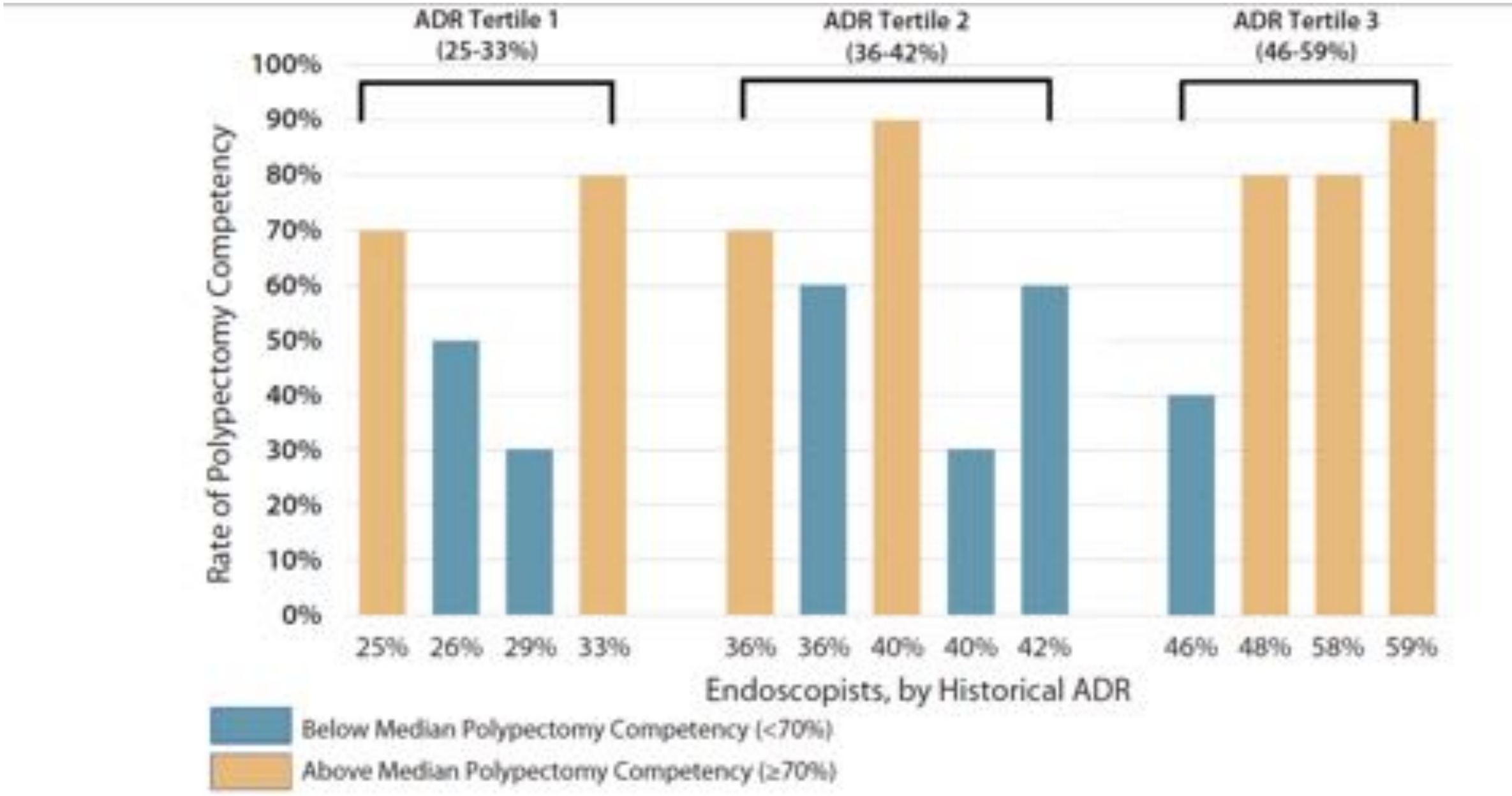
Individual Skill Polypectomy Competency, n=130

Skill	% Competent	Variation Among Colonoscopists
Achieves optimal polyp position	61%	p<0.001
Determines full extent of polyp	72%	p<0.04
Uses appropriate technique	70%	NS
Adjusts/stabilizes scope position	58%	p=0.001
Examines remnant stalk/base	57%	p<0.001
Identifies and treats residual polyp	58%	p<0.001

Individual Skill Polypectomy Competency, n=130

Skill	% Competent	Variation Among Colonoscopists
Selects appropriate snare size and directs snare accurately over lesion	73%	NS
Correctly selects en-bloc or piecemeal removal depending on size	81%	NS
Appropriate amount of tissue trapped within the snare	50%	p = 0.001
Uses cold versus hot snare, as appropriate	91%	NS

Polypectomy competency rates do not correlate with ADR



Duloy et al. Gastrointest Endosc 2018

A Colon Polypectomy Report Card Improves Polypectomy Competency: Results of a Prospective Quality Improvement Study

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INTRODUCTION

- Poor polypectomy technique may lead to interval colorectal cancer and/or adverse events
- Despite this, endoscopists rarely receive feedback on polypectomy technique
- In prior work, we showed that polypectomy competency varies significantly between colonoscopists and does not correlate with established colonoscopy quality metrics

AIM

- To determine the effect of a polypectomy skills report card upon subsequent polypectomy performance

METHODS

- We conducted a *3-phase* prospective single-blinded study of colonoscopists at a single academic medical center

RESULTS

- We graded 220 polypectomies (110 pre- and 110 post-report card) performed by 11 colonoscopists
- All colonoscopists reviewed their report cards and 64% watched the instructional videos

Polyp & Polypectomy Characteristics

- Mean polyp size and number of diminutive (≤5mm) polyps did not significantly differ between the pre- and post-report card phases; all polyps were ≤15mm in both phases
- Most polyps were resected by cold snare in both phases; however, cold snare use increased significantly from the pre-to post-report card phase (58% vs 76%, P=0.001)
- Rate of piecemeal polypectomy significantly decreased from the pre- to post-report card phase (40% vs 21%, P=0.001)

Polypectomy Competency

- Mean DOPyS score increased significantly between the pre- and post-report card phases (2.7±0.9 vs 3.3±0.8, P=0.01); this improvement was seen for diminutive (2.7±0.9 vs 3.3±0.8, P <0.0001), but not small-to-large polyps (2.7±0.7 vs 2.4±1.0, P=0.3)
- Rate of competent polypectomy significantly improved from the pre- to post-report card phase (56% vs 69%, P=0.04); this improvement was seen for diminutive (57% vs 82%, P=0.001), but not small-large polyps (55% vs 36%, P=0.2)

Effect of Report Card on Overall Polypectomy Competence and Individual Polypectomy Skills

	Phase 2: Pre-Report Card	Phase 3: Post-Report Card	P Value
Polyp Characteristics			
Mean Polyp Size, mm (SD)	4.3 ± 2.3	4.3 ± 2.3	1.00
Diminutive Polyps (≤5 mm), n (%)	86 (78%)	86 (78%)	1.0
Small-to-Large Polyps (>5 mm), n (%)	24 (22%)	24 (22%)	1.0
Polypectomy Characteristics			
Rate of Piecemeal Polypectomy	40.0%	20.9%	0.001
Polypectomy Technique			
Cold Snare, n (%)	64 (58.2%)	84 (76.4%)	0.001
Hot Snare, n (%)	35 (31.8%)	11 (10%)	
Hot Forceps, n (%)	11 (10%)	15 (13.6%)	
Overall Polypectomy Competence			
All Polyps			
Mean DOPyS Score (SD)	2.7 ± 0.87	3.3 ± 0.76	0.01
Rate of Competent Polypectomy	55.5%	69.1%	0.04
Diminutive Polyps (≤5 mm)			
Mean DOPyS Score (SD)	2.7 ± 0.89	3.3 ± 0.76	<0.0001
Rate of Competent Polypectomy, %)	56.7%	80.5%	0.001
Small-to-Large Polyps (>5 mm)			
Mean DOPyS Score (SD)	2.4 ± 0.81	2.4 ± 0.97	1.0
Rate of Competent Polypectomy, %)	35.8%	36.4%	1.0
Individual Polypectomy Skills			
Attempts to achieve optimal polyp position	1.8 ± 0.9	1.8 ± 0.9	0.9*
Use of multiple snare passes	2.4 ± 0.7	2.2 ± 0.7	0.01
Selects appropriate technique	2.1 ± 1.0	2.4 ± 0.9	0.05
Selects snare appropriately over polyp	2.0 ± 0.9	2.2 ± 0.9	0.2
Chooses appropriate amount of tissue to suspend within snare	2.0 ± 0.9	2.1 ± 0.9	0.2
Identifies and appropriately treats residual polyp	2.5 ± 0.8	2.8 ± 1.0	0.01

CONCLUSIONS

- Report cards effectively improved polypectomy technique, primarily due to improvements in resecting diminutive polyps
- The improved competency and decreased piecemeal resection may reduce the risk of polyp recurrence
- Further education is needed to improve large polyp resection

Table 2. Overall Polypectomy Competency in the Pre- vs. Post-Report Card Phases

	Phase 2: Pre-report Card	Phase 3: Post-report Card	P-Value
All Polyps			
Mean DOPyS Score (SD)	2.7 ± 0.87	3.0 ± 0.76	0.01
Rate of Competent Polypectomy	56.4%	69.1%	0.04
Diminutive Polyps (<6 mm)			
Mean DOPyS Score (SD)	2.7 ± 0.91	3.3 ± 0.76	<0.0001
Rate of Competent Polypectomy (%)	56.7%	80.5%	0.001
Small-to-Large Polyps (≥6 mm)			
Mean DOPyS Score (SD)	2.65 ± 0.65	2.4 ± 0.93	0.3
Rate of Competent Polypectomy (%)	55.0%	35.7%	0.2

Conclusion

- ADR is associated with quality colonoscopy -interval colorectal cancer & death.

- Competencies in detection (ADR) and polypectomy signficantly vary amongst endoscopists, and improved with feedback and education.

- Now is time to measure & report quality metrics in colonoscopy.

Thank You

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