Best of the Best in Colonoscopy at DDW

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Objectives

- **Colorectal Cancer Screening**
  - Review Current Recommendations
  - Identify Colonoscopy Quality Improvement Measures
  - Summarize Applications for Artificial Intelligence
- **Endoscopic Resection of Benign Complex Colorectal Lesions**
  - Describe the Surgery Outcomes Resection for BenignLesions
  - Recognize to Resect Nonpolypoid Dysplasia in IBD

In the US, 1 in 25 People will be Diagnosed with Colorectal Cancer

NIH SEER 2014-2016 Data

Cancer Stat Facts: Colorectal Cancer

Expand All | Collapse All

Statistics at a Glance

At a Glance

Estimated New Cases in 2019	145,600
% of All New Cancer Cases	8.3%

Estimated Deaths in 2019	51,020
% of All Cancer Deaths	8.4%

Percent Surviving 5 Years

64.4%

2009-2015

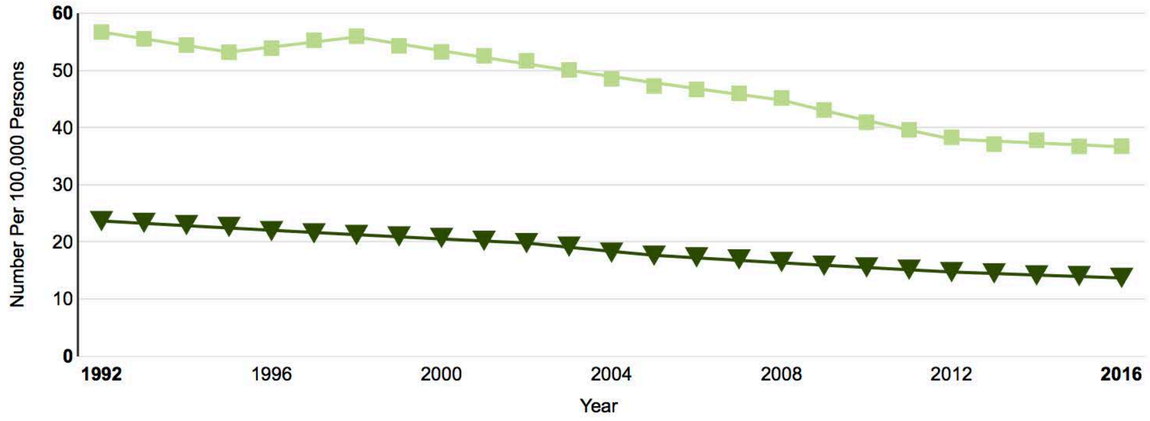
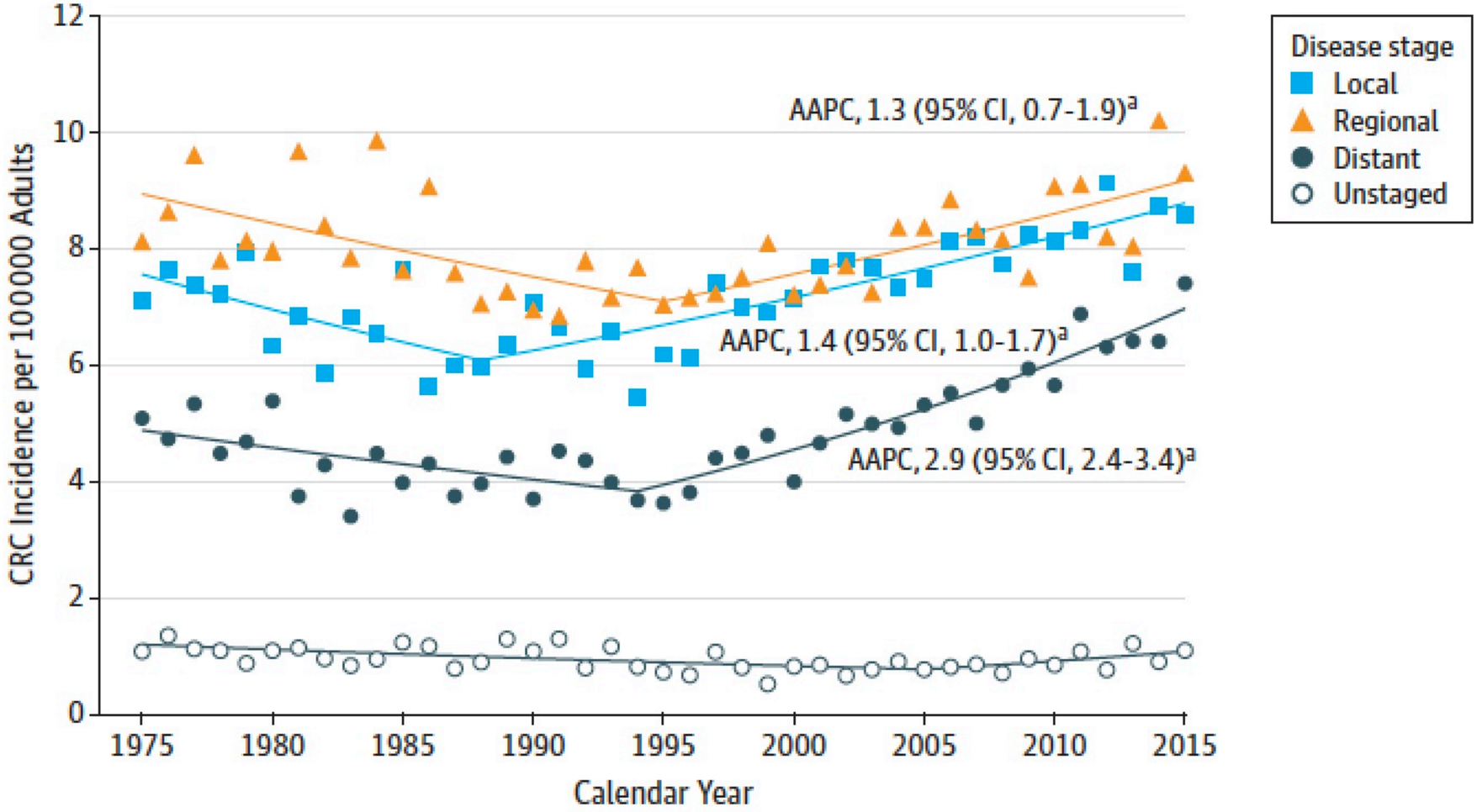
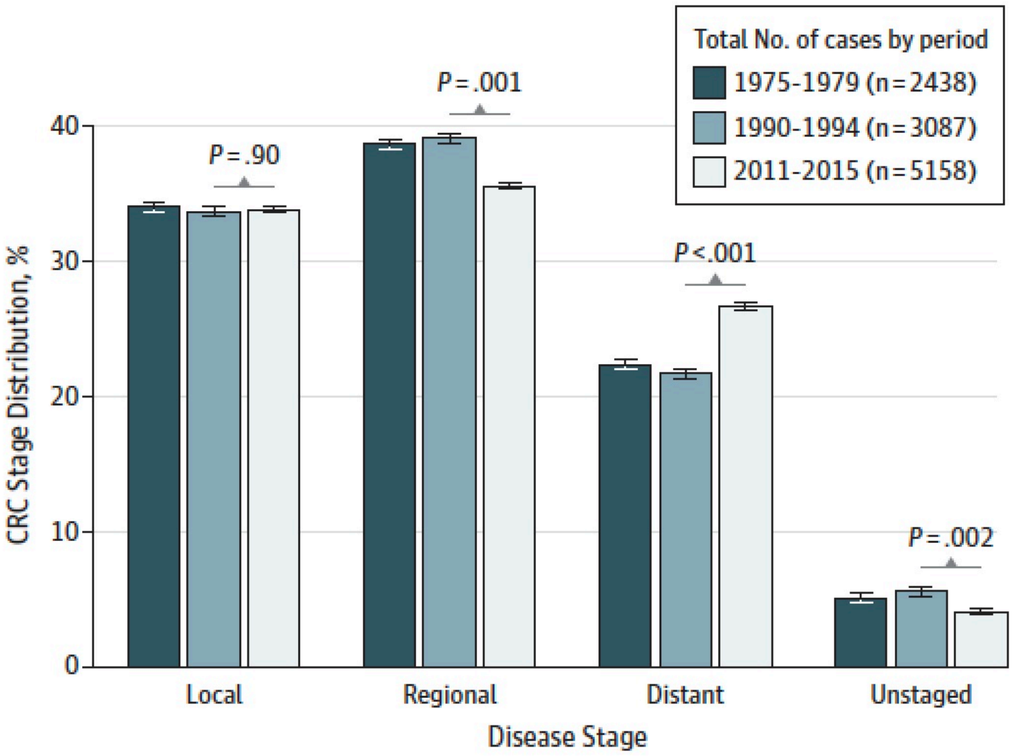


Figure 1. Trends in Colorectal Cancer (CRC) Incidence by Stage in Adults Aged 40 Through 49 Years



Meester et al JAMA 2019

Figure 2. Shift in Stage Distribution of Colorectal Cancers (CRCs) Diagnosed in Adults Aged 40 Through 49 Years[a]



[a] Data are from the Surveillance, Epidemiology, and End Results program. 95% Confidence intervals were derived using the Sison-Glaz method for multinomial data. Statistical tests (2-sided Pearson χ^2) assessed the stage-specific changes in proportions from 1990-1994 to 2011-2015. The differential relative increase by stage in the overall stage distribution was $P<.001$. Error bars indicate 95% CIs.

Meester et al JAMA 2019

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)*.

Member Alert

A Message to Members of ACG, AGA and ASGE Regarding a

Statement from the Multisociety Task Force on Colorectal Cancer

The US Multi-Society Task Force (MSTF) on Colorectal Cancer represents the American College of Gastroenterology, the American Gastroenterological Association and The American Society for Gastrointestinal Endoscopy. The MSTF issues recommendations on prevention of colorectal cancer and issued screening recommendations for colorectal cancer in 2017.

The MSTF has previously recommended that colorectal cancer screening for average-risk persons (persons who do not have a family history of colorectal cancer in a first-degree relative) begin at age 45 years in African Americans and age 50 in other groups. The MSTF has reviewed the recent recommendation from the American Cancer Society (ACS) to lower the age to begin screening from 50 to 45 years in all Americans. This change was a qualified recommendation based largely on a modeling study utilizing updated data on the incidence of colorectal cancer in younger people.

Evidence from screening studies to support lowering the screening age is very limited at this time. Based on the modeling study used to support the ACS recommendation, the MSTF recognizes that lowering the screening age to 45 may improve early detection and prevention of CRC. The MSTF expects the new ACS recommendation to stimulate investigation that will clarify the benefits and risks of earlier screening.

June 8, 2018

Actual US CRC Burden in 45-49 year olds

- Half of all cancers in those under 50
- 45-49 year olds - 2017
  - 7000 new CRC cases
  - 1800 CRC deaths

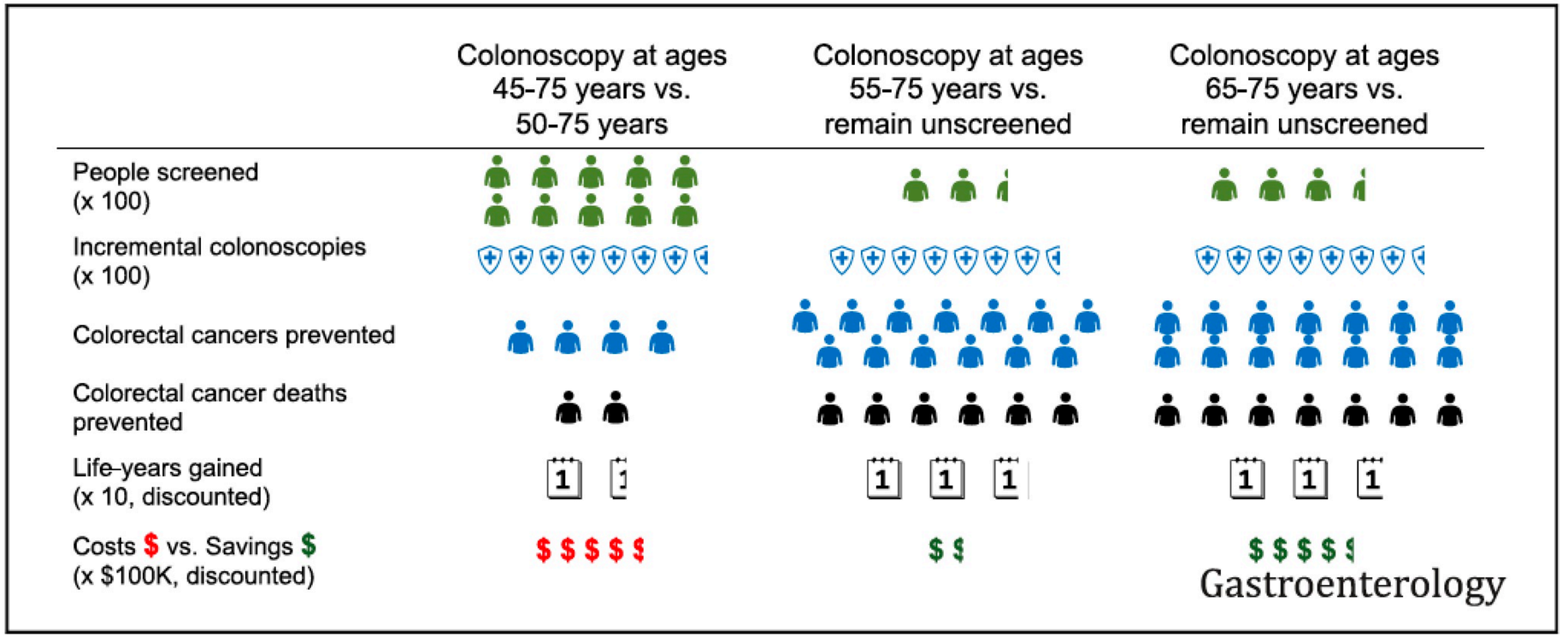
Age (years)	Percentage of all CRC	Years of Life Lost
45-49	5.1%	10%
50-54	7.6%	13%

Wolf et al CA Cancer J Clin, Cierzki et al DDW 2019

Cost-Effectiveness and National Effects of Initiating Colorectal Cancer Screening for Average-Risk Persons at Age 45 Years Instead of 50 Years

Uri Ladabaum,[1] Ajitha Mannalithara,[1] Reinier G. S. Meester,[1] Samir Gupta,[2] and Robert E. Schoen[3]

[1]Division of Gastroenterology and Hepatology, Department of Medicine, Stanford University School of Medicine, Stanford, California; [2]Veterans Affairs San Diego Healthcare System, Division of Gastroenterology, Department of Internal Medicine, Moores Cancer Center, University of California–San Diego, San Diego, California; [3]Division of Gastroenterology, Hepatology and Nutrition, and Department of Epidemiology, University of Pittsburgh, Pittsburgh, Pennsylvania



Screening starting at 45 yo is Cost Effective

- Colonoscopy screening at 45 saved 4 CRCs and 2 CRC deaths per 1000 screened
- 14 QALY at $33,900/QALY gained
- Screening starting at 45 years old is cost effective, consider a risk stratified organized approach to optimally control costs
- More cost effective to increase adherence in persons over 50 years.

Rex DDW 2019, Imperiale DDW 2019 review of
Ladabaum et al Gastroenterology 2019

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

This article is being published jointly in *Gastroenterology, American Journal of Gastroenterology,* and *Gastrointestinal Endoscopy.*
0016-5085/$36.00
http://dx.doi.org/10.1053/j.gastro.2017.05.013

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%

Clean: **Bowel Preparation**

↓

Scope insertion: **Cecal Intubation Rate**

↓

Inspection: **Adenoma Detection Rate**

↓

Lesion Characterization

↓

Polypectomy: **Complete**

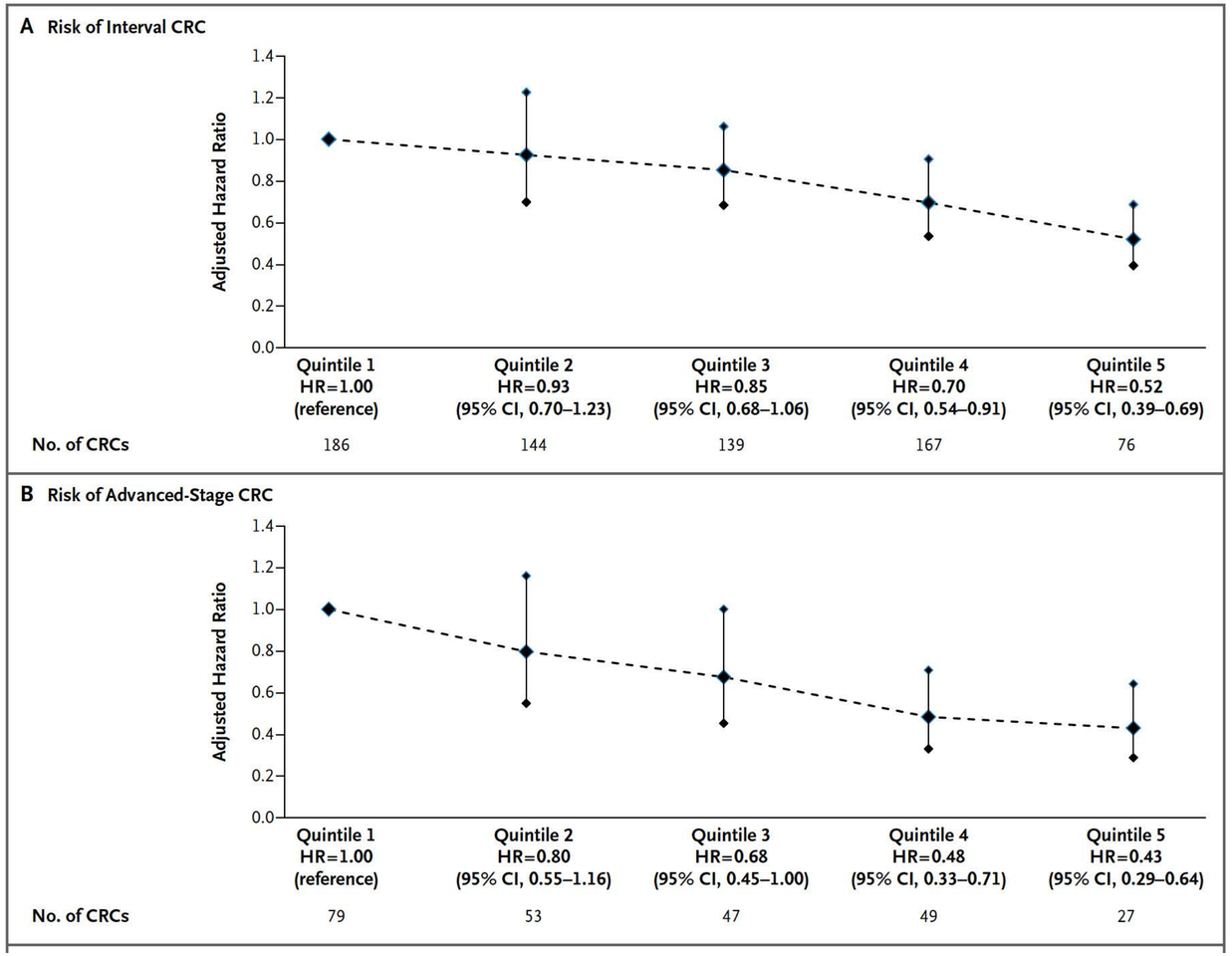
✕

Cancer

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

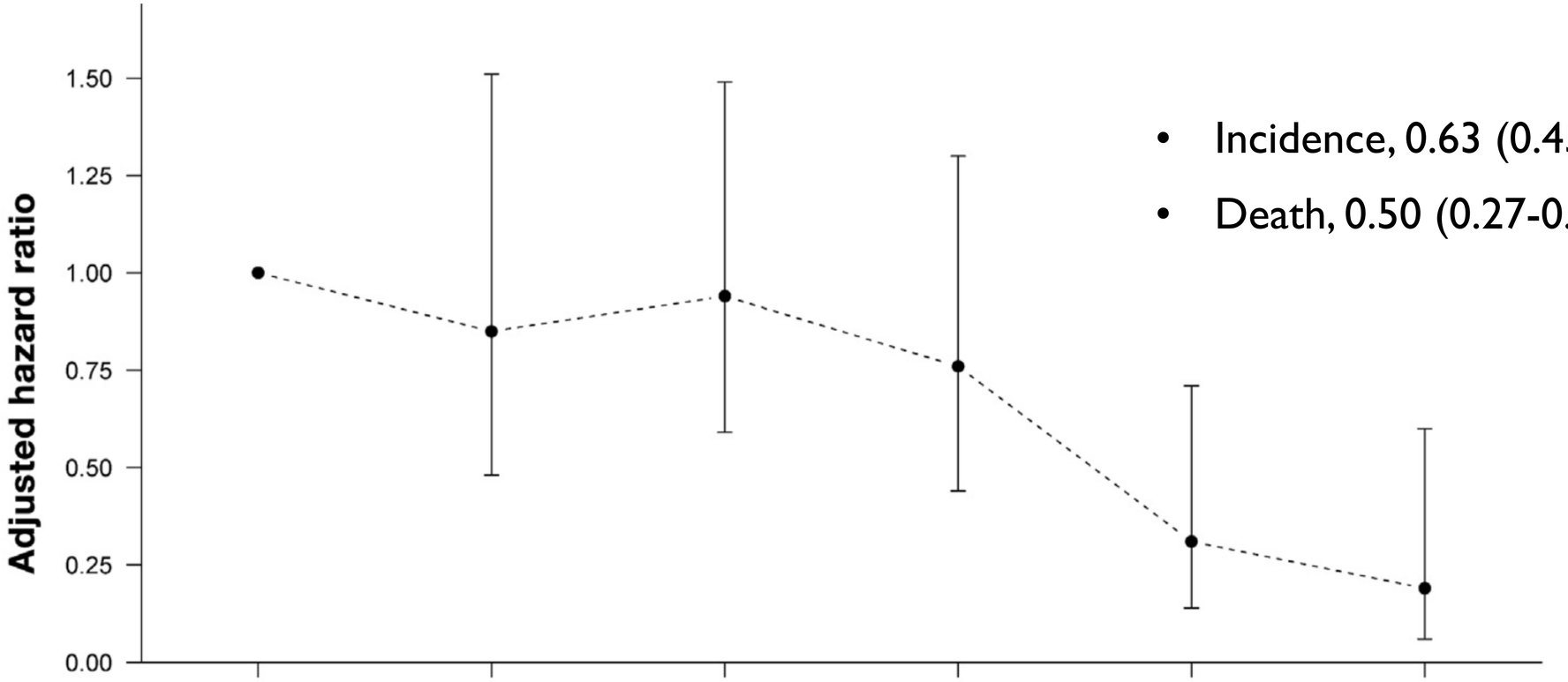
ADR is Correlated with Interval Cancer

- 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.

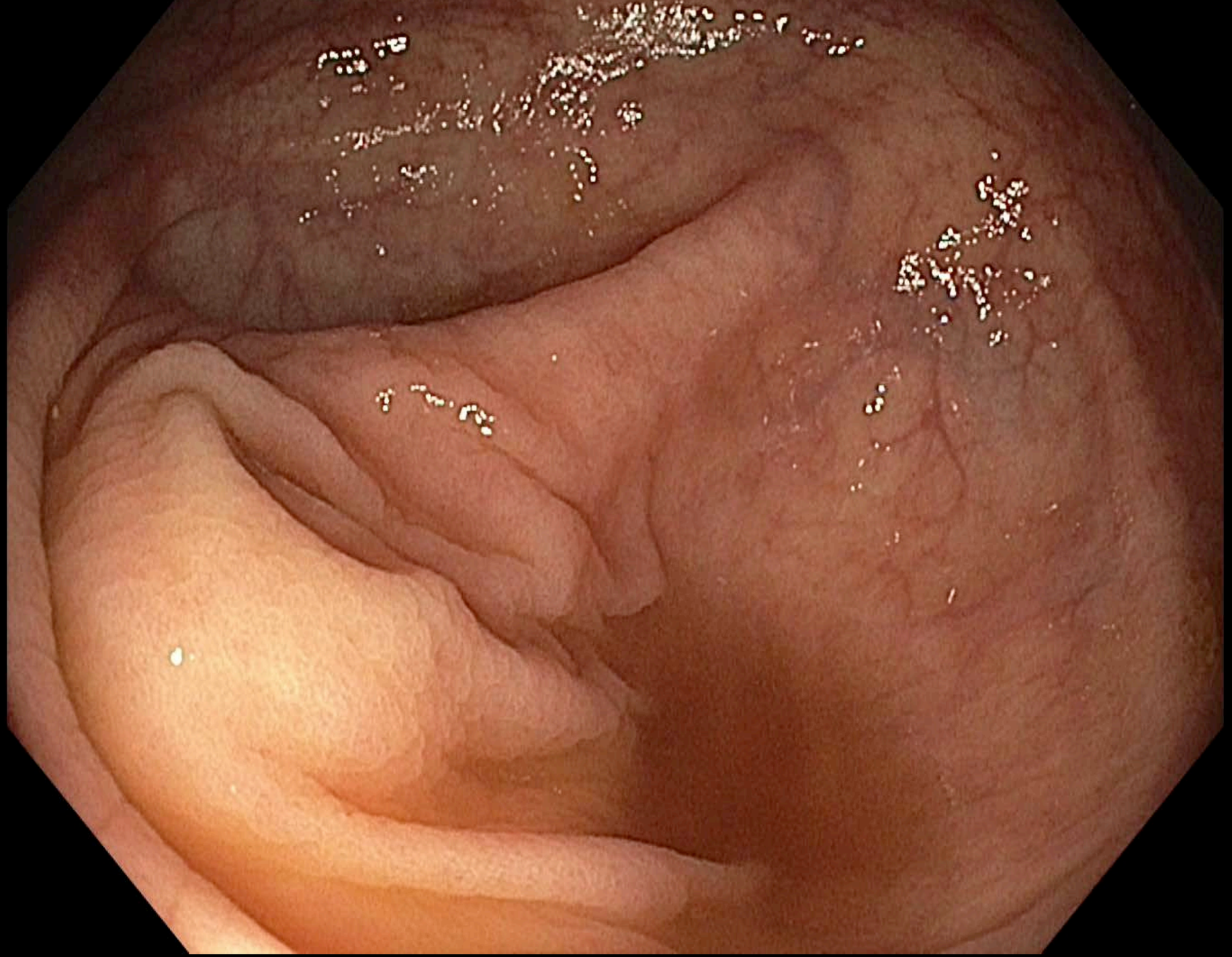
Increases in ADRs from Individual Endoscopists Reduces Interval Cancer

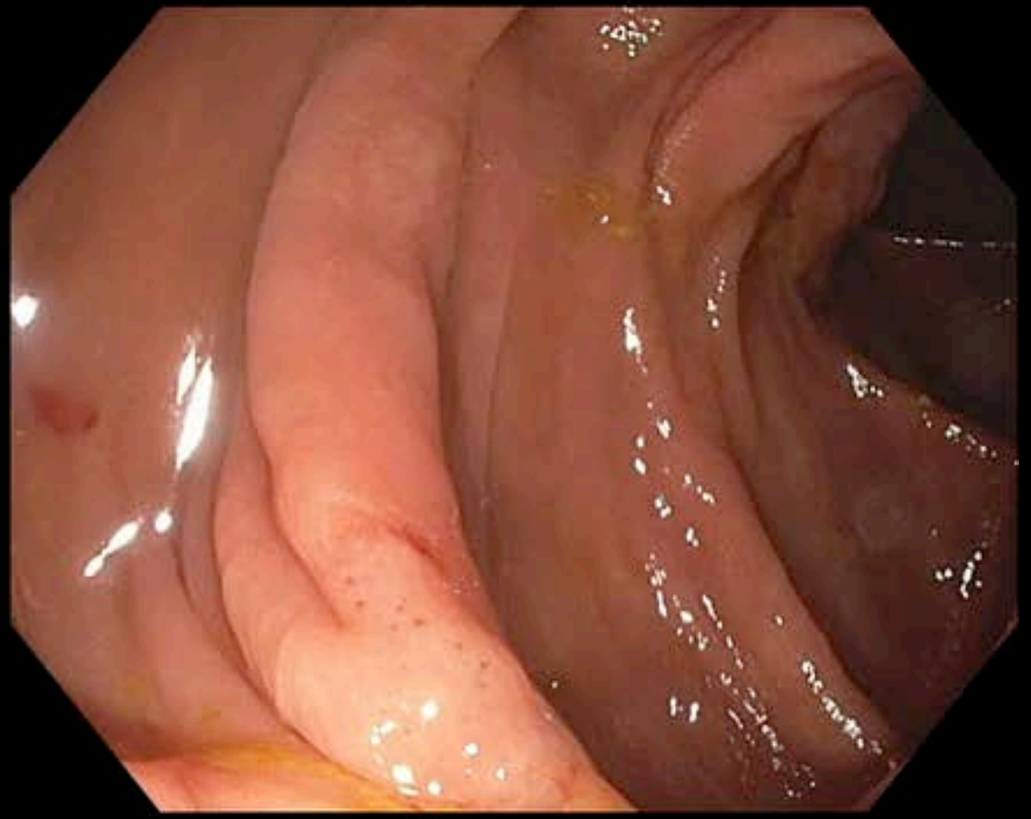


	No improvement	Improvement from 1 to 2	Improvement from 1 or 2 to 3	Improvement from 1−3 to 4	Improvement from 1−4 to 5	Remain in 5th
HR	1.00	0.90	0.74	0.64	0.27	0.18
95% CI		(0.61, 1.34)	(0.47, 1.16)	(0.41, 1.01)	(0.12, 0.63)	(0.06, 0.56)
No. of cancers/ 100,000 p−yrs	25.34	22.67	18.86	16.25	7.09	4.49

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

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





Well-differentiated T1sm LN 0 ly0 v0

Individualized Feedback on Colonoscopy Skills Improves Group Colonoscopy Quality in Providers with Lower Adenoma Detection Rates

Anna Duloy MD[1], Mariah Wood BA[2], Mark Benson MD[3],
Andrew Gawron MD PhD[4], Charles Kahi MD[5], Tonya Kaltenbach MD MS[6],
Rena Yadlapati MD MS[1], Dyanna Gregory MS[2], Rajesh Keswani MD MS[2]

[1]University of Colorado; [2]Northwestern University; [3]University of Wisconsin School of Medicine;
[4]University of Utah; [5]Indiana University School of Medicine; [6]University of California San Francisco

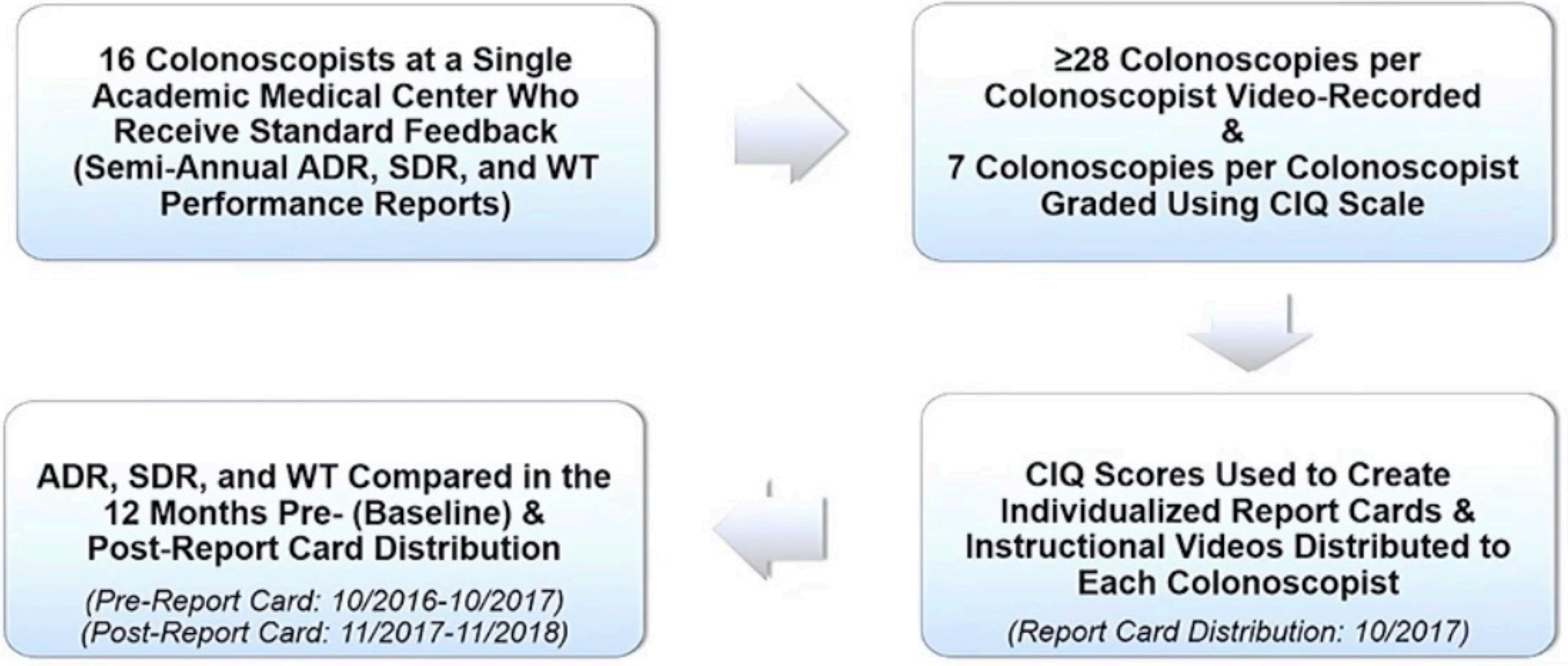
Colonoscopy Inspection Quality (CIQ) Scale

Score	0	1	2	3	4	5
Fold Examination	**Very Poor** *Not looking behind any folds; "straight pull-back" technique*	**Poor**	**Fair**	**Good**	**Very Good**	**Excellent** *Looking behind all folds*
Cleaning	**Very Poor** *No attempt to clean stool and pools of liquid*	**Poor**	**Fair**	**Good**	**Very Good**	**Excellent** *All stool and pools of liquid removed*
Luminal Distension	**Very Poor** *No colonic distension or spasm*	**Poor**	**Fair**	**Good**	**Very Good**	**Excellent** *Optimal colonic distension*

Modified from Rex D, GIE 2000; Duloy et al, CGH 2019

Methods: *Study Design*

- Pre-post study



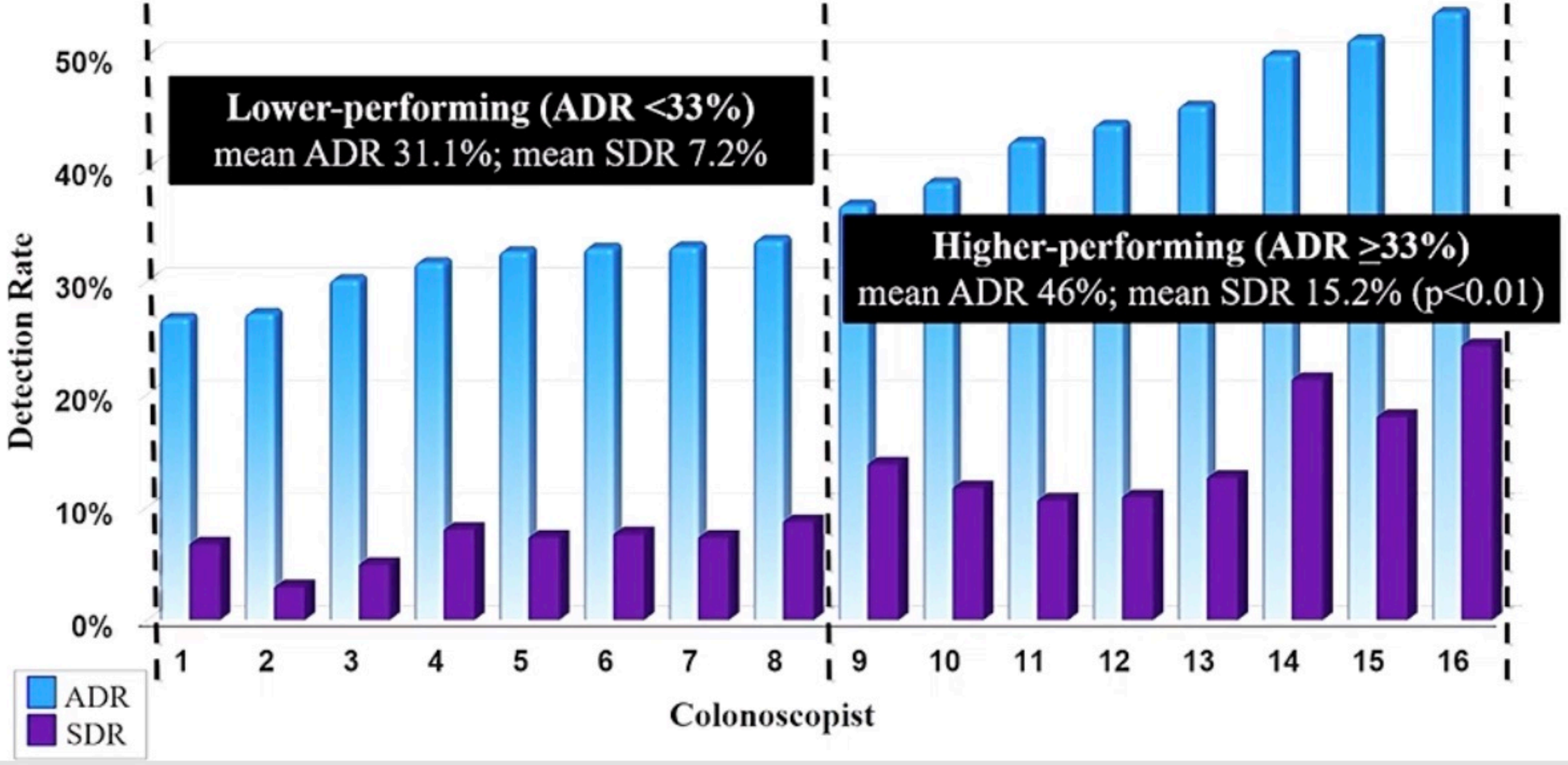
CIQ SCORES	Your score	Cohort score	25th percentile	50th percentile	75th percentile
Fold Examination Score (0-25)	**13.4**	14.2	11.7	14.9	16.3
Cleaning Score (0-25)	**16.9**	18.6	16.9	18.6	21.4
Distension Score (0-25)	**17.1**	17.7	15.9	17.1	20.7
Total Score (0-75)	**47.4**	50.6	44.3	50.1	57.7

FOLD EXAMINATION – VIDEO
0 = very poor, not looking behind any folds, "straight pull-back" technique
5 = poor; 10 = fair; 15 = good; 20 = very good
25 = excellent, looking behind all folds

CLEANING – VIDEO
0 = very poor, no attempt to clean stool/pools of liquid
5 = poor; 10 = fair; 15 = good; 20 = very good
25 = excellent, all stool/pools of liquid removed

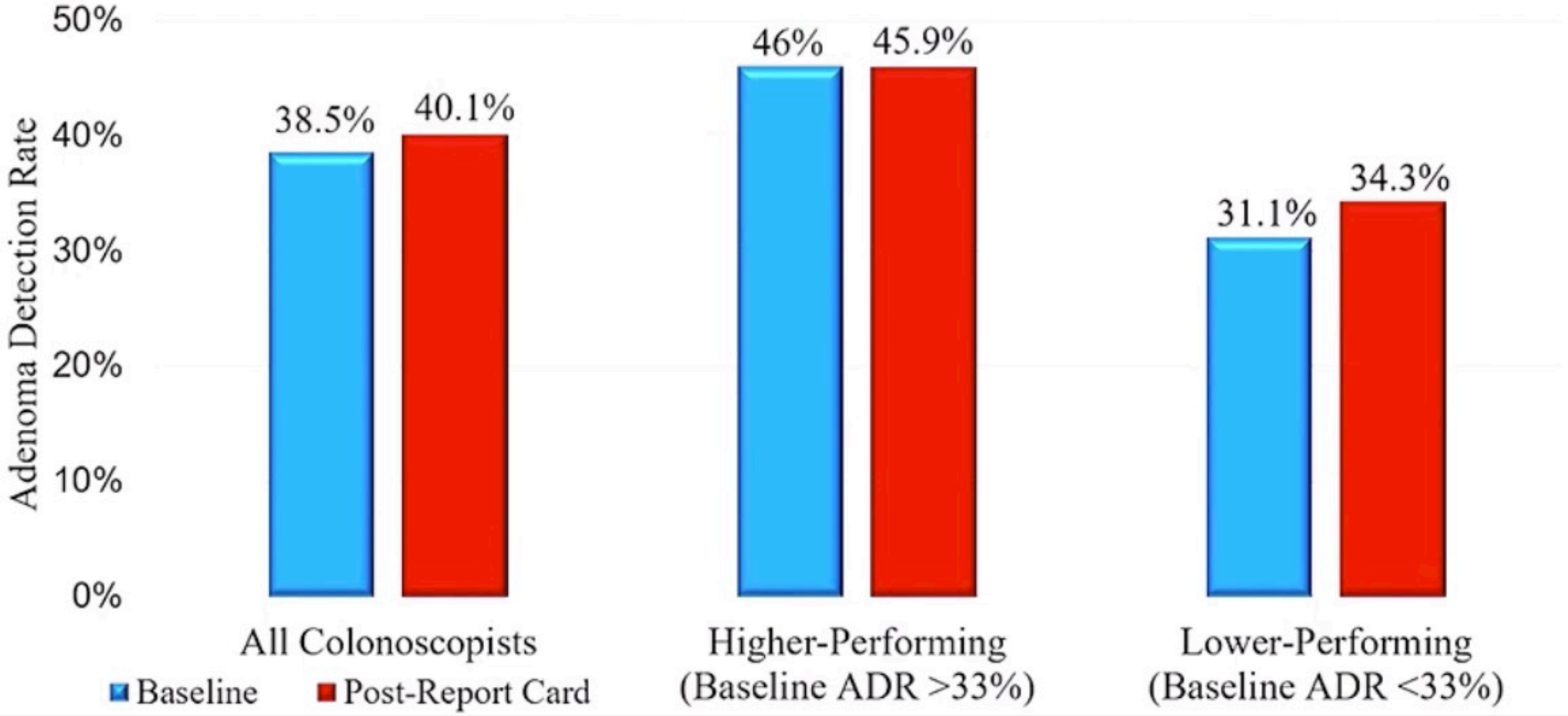
DISTENSION – VIDEO
0 = very poor, no colonic distension or spasm
5 = poor; 10 = fair; 15 = good; 20 = very good
25 = excellent, full colonic distension

Baseline ADR and SDR



Baseline vs Post-Report Card: **ADR**

ADR significantly improved among lower-performing colonoscopists ($p<0.05$)



Increasing Physician Adenoma Detection Rate is Associated With a Reduced Risk of Post-Colonoscopy Colorectal Cancer

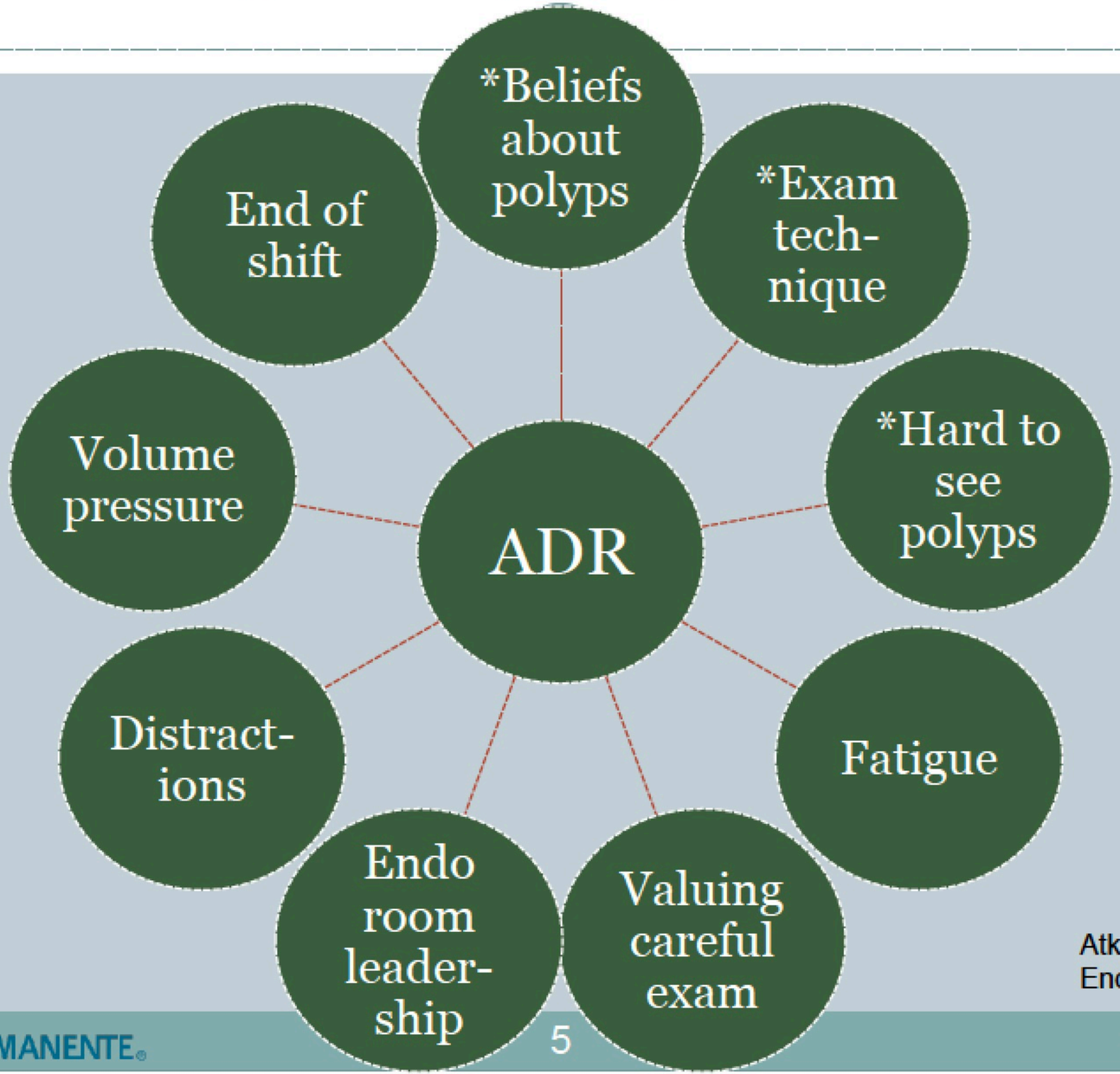
Douglas Corley, MD, PhD

Corley DA, Jensen CD, Lee JK, Levin TR, Doubeni CA, Zauber AG, Schottinger JE, Ghai NR, Zhao WK, Udaltsova N, Fireman B, Quesenberry CP.

Digestive Disease Week, May 20, 2019

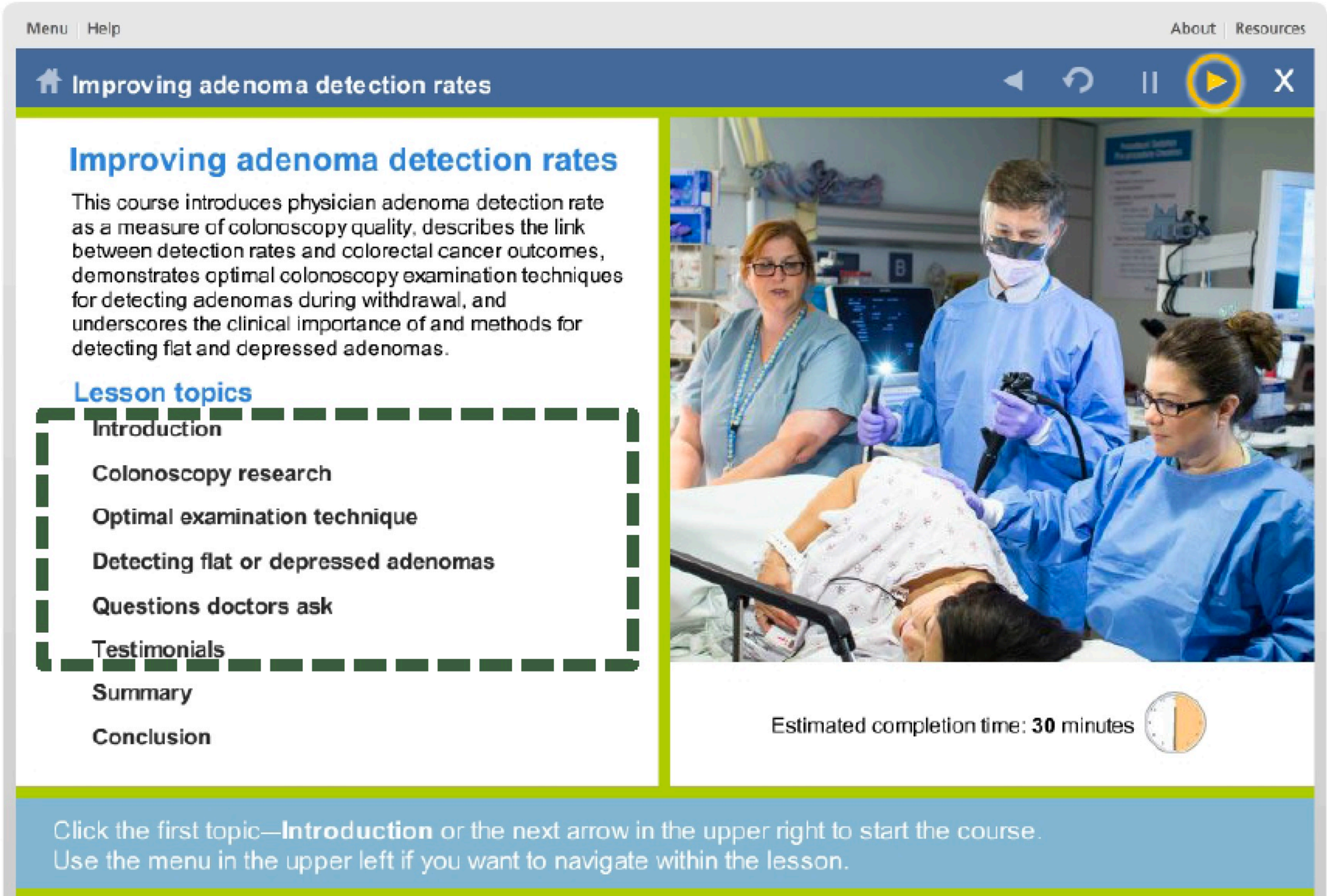
Permanente Medicine
The Permanente Medical Group

A prior study identified potential underlying reasons using focus groups of GI and nurses



Atkins L et al. Gastrointest Endosc 2016;83:617-26

Single-arm intervention: online interactive training, ADR feedback, 20 med centers, 86 GI MDs in 2014



Increases in ADRs

	Baseline (2013)	Post-Intervention (2015-2016)
Endoscopists, n	86	86
Colonoscopies performed:		
Screening indication, total, n	12266	20897
Screening indication, per endoscopist, median, n (IQR)	130 (92, 181)	242 (163, 289)
All indications, total, n	49576	99920
All indications, per endoscopist, median, n (IQR)	601 (481, 701)	1233 (975, 1374)
Endoscopist ADRs (based on screening colonoscopies):		
Quartile 1: 18-27%, n (%)	31 (36.1)	13 (15.1)
Quartile 2: 28-33%, n (%)	18 (20.9)	19 (22.1)
Quartile 3: 34-41%, n (%)	25 (29.1)	25 (29.1)
Quartile 4: 4260%, n (%)	12 (14.0)	29 (33.7)
Patients:		
Age, mean (SD), years	63 (8.8)	63 (8.6)
Sex, male, n (%)	24134 (48.7)	49185 (49.2)

ADR, adenoma detection rate; IQR, interquartile range; n, number; SD, standard deviation

Corley et al. DDW 2019

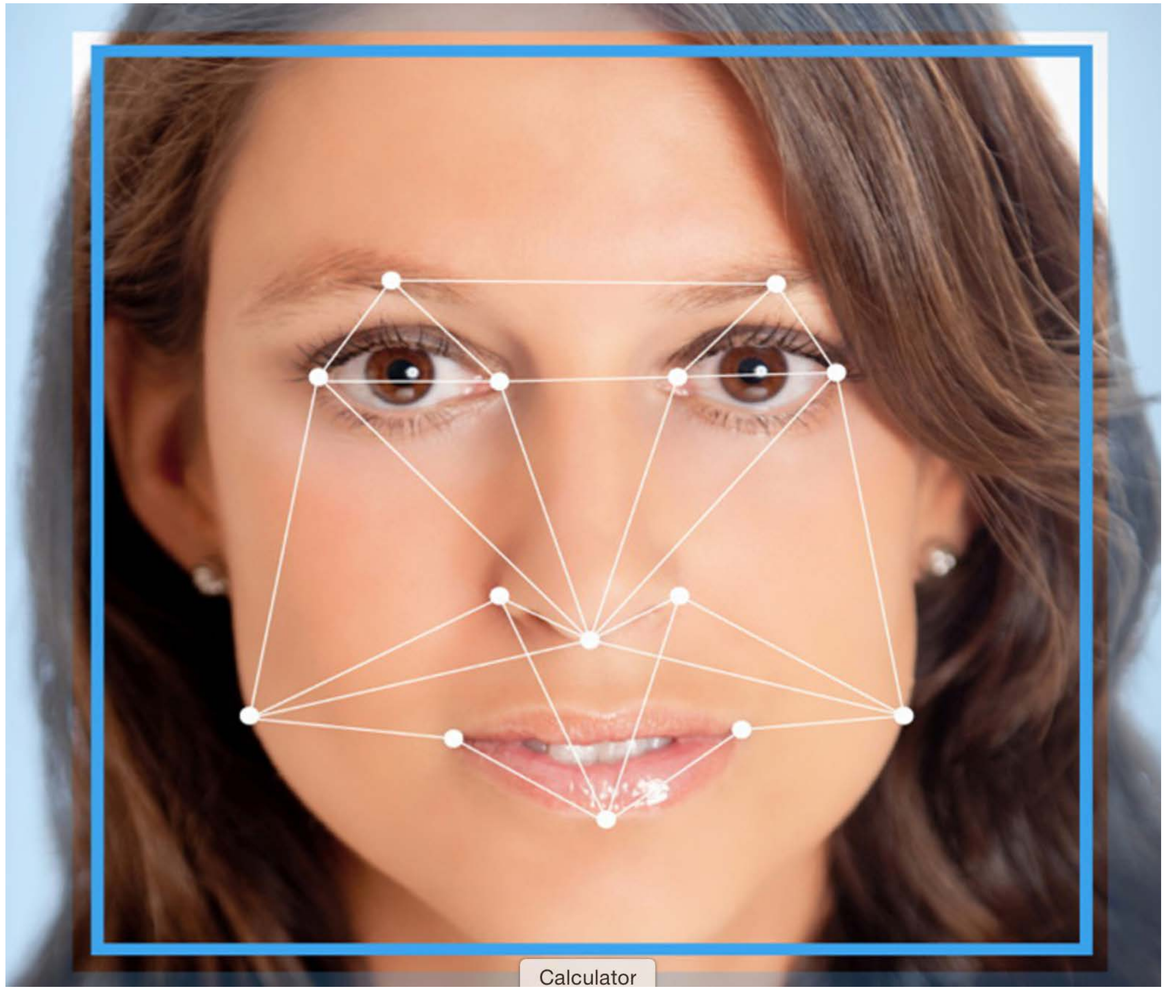
Increases in ADRs from Individual Endoscopists Reduces Interval Cancer

	Total n	PCCRC Cases n (%)	HR (95% CI)
Total exams	102269		
No increase ADR	20194	17 (0.084)	1.00 (referent)
Increase/maintain high ADR	82075	37 (0.045)	**0.58 (0.33, 0.97)**

Cox proportional hazards model
Adjusted for patient age and sex, colonoscopy indication (screening/not screening), and clustering of patient and physician

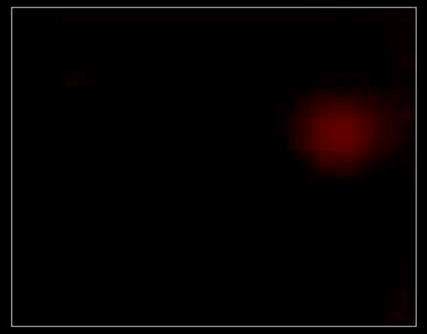
Can Computers Aid Our in Colonoscopy Performance?

Phone Face Recognition - Why not Smart Endoscopy?



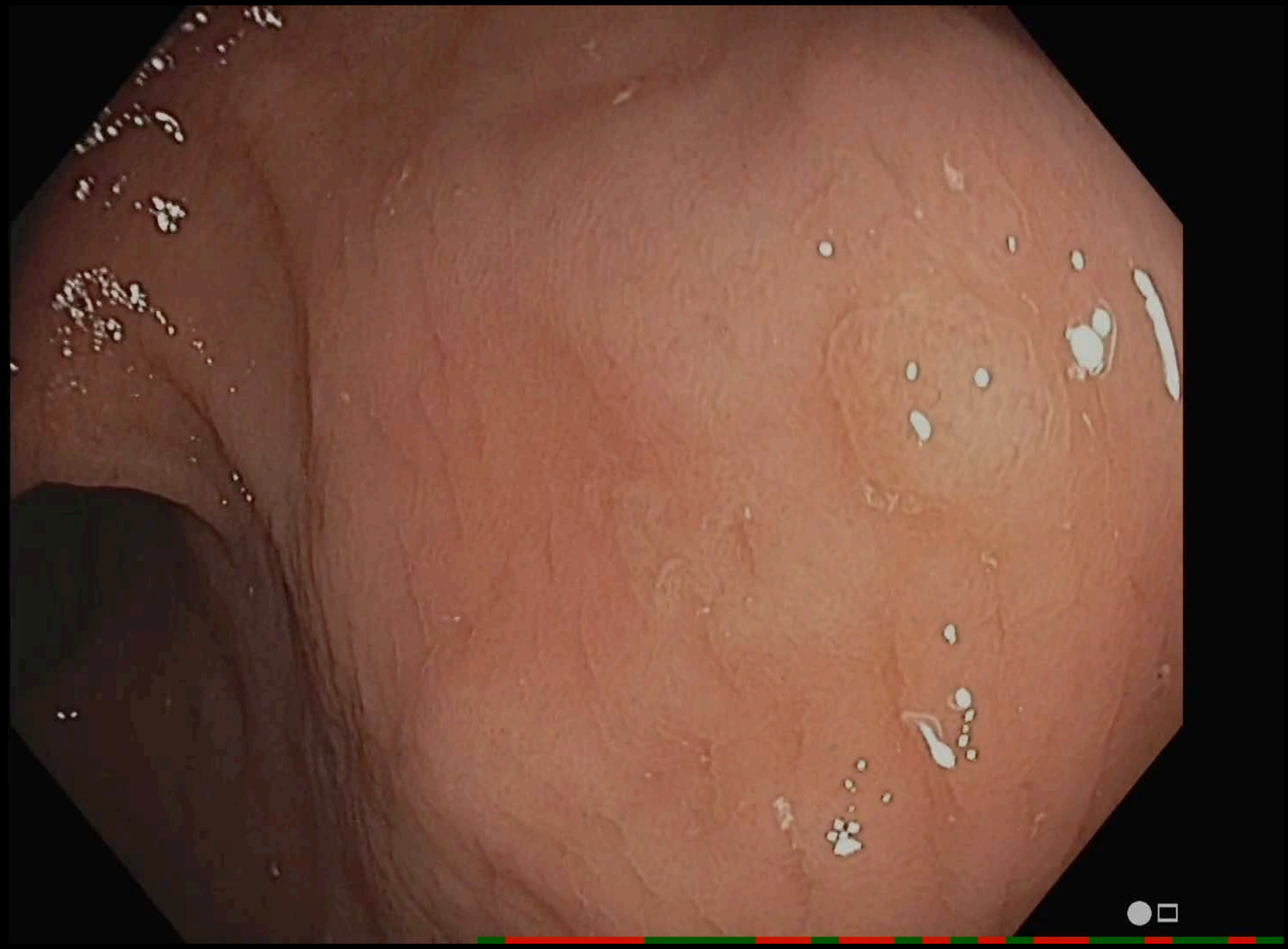
- Insertion information
- Endoscope handling feedback
- Cecal intubation documentation
- Inspection score
- Surface area of colon viewed
- Lesion recognition
- Lesion characterization
- Complete resection assessment
- Competency assessment
- Tool feedback
- Report generator

Cadens - Imagia - Satis



Polyp-Detection:

Polyp

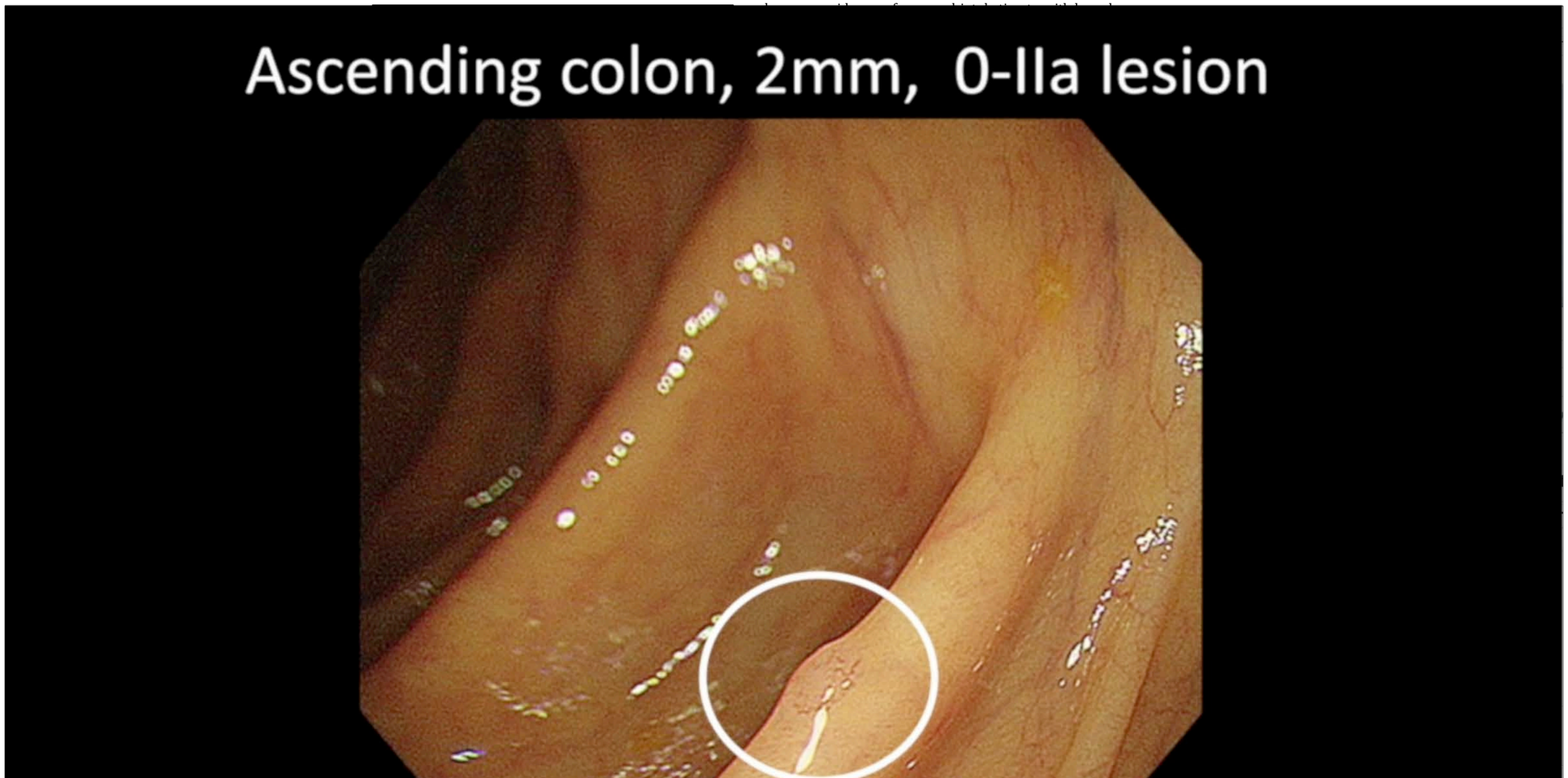


Jacques Bergman and Patrick S. Yachimski, Section Editors

Artificial Intelligence-Assisted Polyp Detection for Colonoscopy: Initial Experience

Masashi Misawa,[1] Shin-ei Kudo,[1] Yuichi Mori,[1] Tomonari Cho,[1] Shinichi Kataoka,[1] Akihiro Yamauchi,[1] Yushi Ogawa,[1] Yasuharu Maeda,[1] Kenichi Takeda,[1] Katsuro Ichimasa,[1] Hiroki Nakamura,[1] Yusuke Yagawa,[1] Naoya Toyoshima,[1] Noriyuki Ogata,[1] Toyoki Kudo,[1] Tomokazu Hisayuki,[1] Takemasa Hayashi,[1] Kunihiko Wakamura,[1] Toshiyuki Baba,[1] Fumio Ishida,[1] Hayato Itoh,[2] Holger Roth,[2] Masahiro Oda,[2] and Kensaku Mori[2]

[1]Digestive Disease Center, Showa University Northern Yokohama Hospital, Yokohama, [2]Graduate School of Informatics, Nagoya University, Nagoya, Japan



Cadens - Imagia - Satis

Confidence:

Probability:

NICE Classification:

Gastroenterology 2018;154:568–575

Accurate Classification of Diminutive Colorectal Polyps Using Computer-Aided Analysis

Peng-Jen Chen,[1] Meng-Chiung Lin,[2,3] Mei-Ju Lai,[4] Jung-Chun Lin,[1] Henry Horng-Shing Lu,[5] and Vincent S. Tseng[6]

[1]Division of Gastroenterology, Tri-Service General Hospital, National Defense Medical Center, Taipei, Taiwan; [2]Department of Biological Science and Technology, National Chiao Tung University, Hsinchu, Taiwan; [3]Division of Gastroenterology, Taichung Armed Forces General Hospital, Taichung, Taiwan; [4]Department of Pathology, Tri-Service General Hospital, National Defense Medical Center, Taipei, Taiwan; [5]Big Data Research Center and Institute of Statistics, National Chiao Tung University, Hsinchu, Taiwan; and [6]Department of Computer Science, National Chiao Tung University, Hsinchu, Taiwan

CLINICAL AT

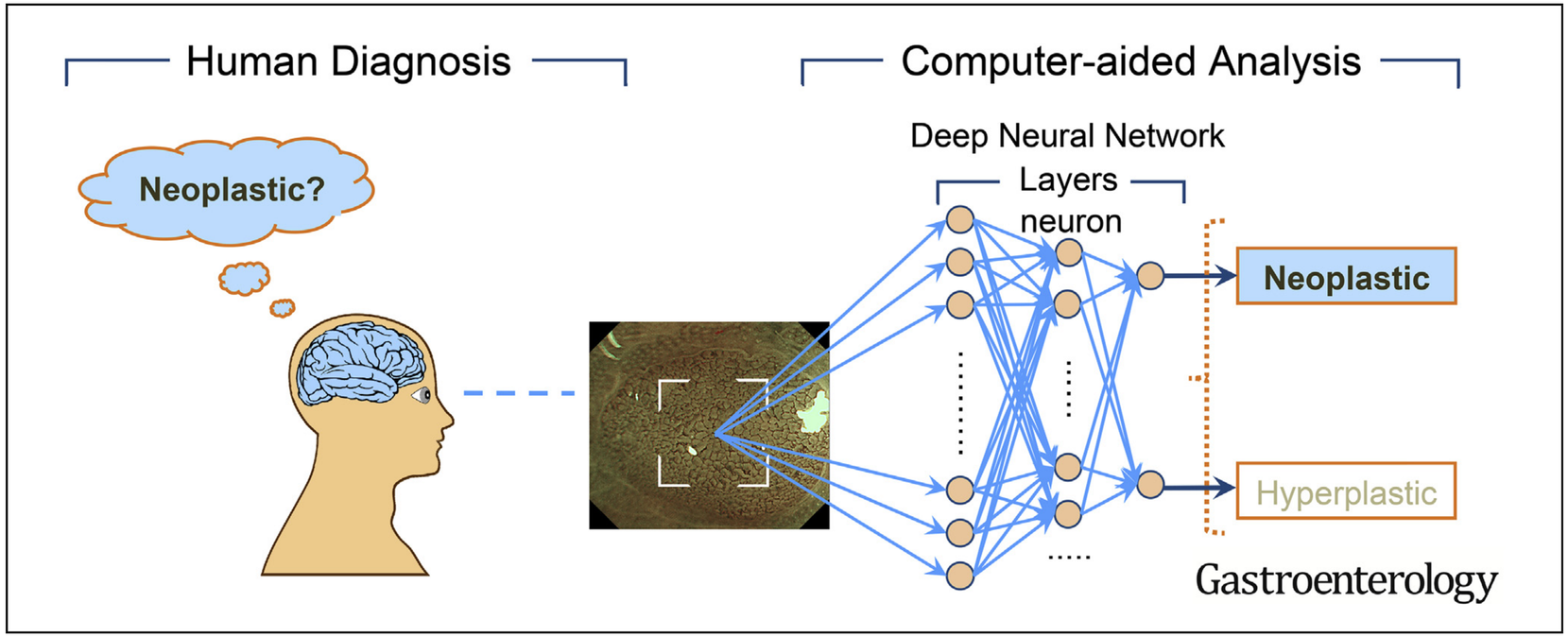


Table 2. Diagnostic Performance of Deep Neural Network and Humans in Differentiating Neoplastic and Hyperplastic Colorectal Diminutive Polyps

	Sensitivity n (%)	Specificity n (%)	Accuracy n (%)	PPV n (%)	NPV n (%)	Diagnostic time Seconds
DNN-CAD	181/188 (96.3)	75/96 (78.1)	256/284 (90.1)	181/202 (89.6)	75/82 (91.5)	0.45 ± 0.07
Expert 1	183/188 (97.3)	74/96 (77.1)	183/284 (90.5)	183/205 (89.3)	74/79 (93.7)	1.68 ± 1.35[a]
Expert 2	184/188 (97.9)	63/96 (65.6)[a]	247/284 (87.0)	184/217 (84.8)	63/67 (94.0)	1.39 ± 1.24[a]
Novice 1	183/188 (97.3)	67/96 (69.8)	250/284 (88.0)	183/212 (86.3)	67/72 (93.1)	1.54 ± 1.07[a]
Novice 2	176/188 (93.6)	63/96 (65.6)[a]	239/284 (84.2)[a]	176/209 (84.2)	63/75 (84.0)	2.09 ± 1.95[a]
Novice 3	154/188 (81.9)[a]	74/96 (77.1)	228/284 (80.3)[a]	154/176 (87.5)	74/108 (68.5)	2.04 ± 1.20[a]
Novice 4	158/188 (84.0)[a]	85/96 (88.5)	74/284 (85.6)	158/169 (93.5)	85/115 (73.9)	1.42 ± 0.90[a]

DNN-CAD, computer-assisted diagnosis with deep neural network; PPV, positive predictive value; NPV, negative predictive value.

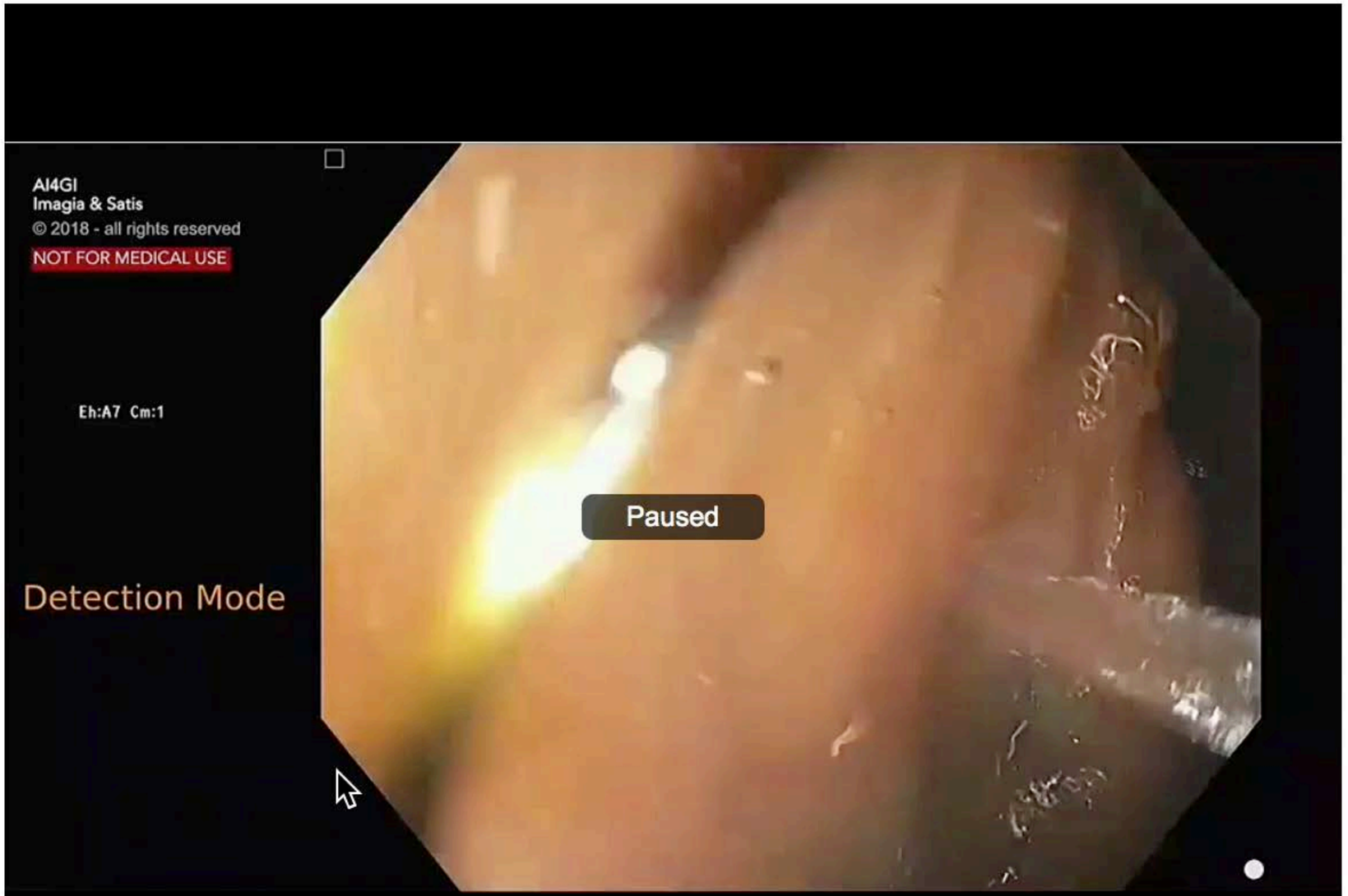
[a]Significant difference compared with DNN-CAD.

08:00 AM| #3130| Advancements in Endoscopic Imaging to Improve Screening and Surveill…

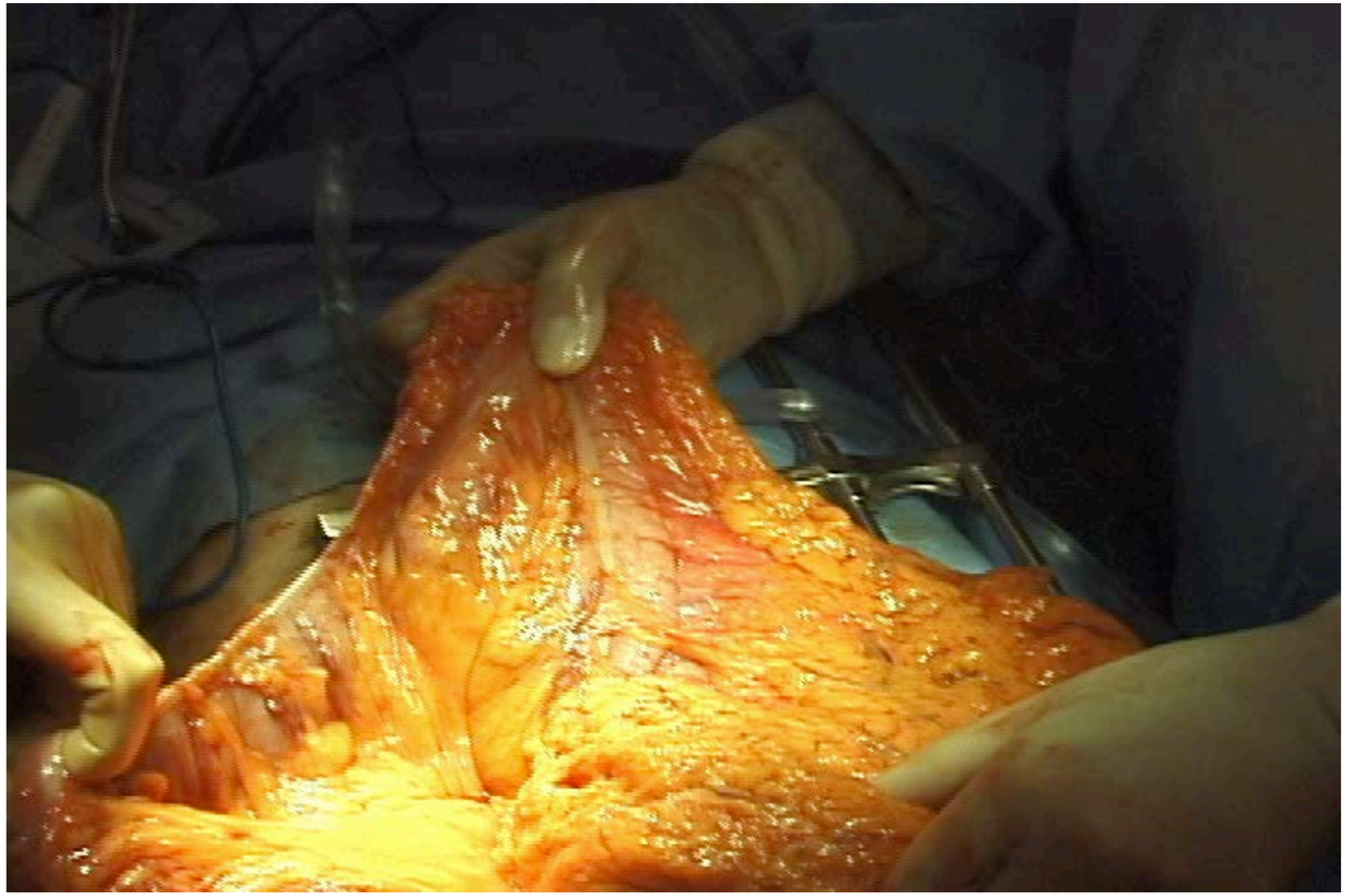
ARTIFICIAL INTELLIGENCE FOR REAL-TIME MULTIPLE POLYP DETECTION WITH IDENTIFICATION, TRACKING, AND OPTICAL BIOPSY DURING COLONOSCOPY

Michael Byrne

BOOKMARK LIKE



In the West, Much can be done ....



- Endoscopic resection of complex lesions has been shown to be safe & effective throughout the GI tract.
- However, the Majority of polyps > 2cm are surgically treated
  - Despite surgical costs are five times higher than endoscopic resection costs
  - Endoscopic perceptions:difficult technique, increased time, use of resources, inadequate reimbursement

Overhiser & Rex. Clin Gastroenterol Hepatol 2007 Onken et al. Am J Gastroenterolog 2002

Morbidity and mortality after surgery for nonmalignant colorectal polyps

Anne F. Peery, MD, MSCR,[1] Nicholas J. Shaheen, MD, MPH,[1] Katherine S. Cools, MD,[2] Todd H. Baron, MD,[1] Mark Koruda, MD,[2] Joseph A. Galanko, PhD,[1] Ian S. Grimm, MD[1]

Chapel Hill, North Carolina, USA

Background and Aims: Despite evidence that most nonmalignant colorectal polyps can be managed endoscopically, a substantial proportion of patients with a nonmalignant colorectal polyp are still sent to surgery. Risks associated with this surgery are not well characterized. We describe 30-day postoperative morbidity and mortality and explore risk factors for adverse events in patients undergoing surgical resection for nonmalignant colorectal polyps.

Methods: We analyzed data collected prospectively as part of the National Surgical Quality Improvement Program. Our analysis included 12,732 patients who underwent elective surgery for a nonmalignant colorectal polyp from 2011 through 2014. We report adverse events within 30 days of the index surgery. Modified Poisson regression was used to estimate risk ratios and 95% confidence intervals.

Results: Thirty-day mortality was .7%. The risk of a major postoperative adverse event was 14%. Within 30 days of resection, 7.8% of patients were readmitted and 3.6% of patients had a second major surgery. The index surgery resulted in a colostomy in 1.8% and ileostomy in .4% of patients. Patients who had surgical resection of a nonmalignant polyp in the rectum or anal canal compared with the colon had a risk ratio of 1.58 (95% confidence interval, 1.09-2.28) for surgical site infection and 6.51 (95% confidence interval, 4.97-8.52) for ostomy.

Conclusions: Surgery for a nonmalignant colorectal polyp is associated with significant morbidity and mortality. A better understanding of the risks and benefits associated with surgical management of nonmalignant colorectal polyps will better inform discussions regarding the relative merits of management strategies. (Gastrointest Endosc 2018;87:243-50.)

Screening endoscopy (sigmoidoscopy and colonoscopy) with polypectomy reduces the incidence of and mortality from colorectal cancer.[1-4] Most polyps are removed with endoscopic resection, although polyps considered to be complex because of size, location, or morphology are commonly resected surgically.[5-7] An estimated 1% of all patients with a nonmalignant colorectal polyp will be sent for surgical resection.[8-10] In the United States, 73,000 elective colectomies for colorectal cancer and nonmalignant polyps are performed annually.[9] Of these, 32% are performed on patients with nonmalignant disease[9] even though most advanced colonic neoplasms can also be safely and effectively removed with endoscopic techniques. Endoscopic assessment of polyp

Abbreviations: ACS, American College of Surgeons; CI, confidence interval; CPT, Current Procedural Terminology; NSQIP, National Surgical Quality Improvement Program; RR, risk ratio.

DISCLOSURE: *All authors disclosed no financial relationships relevant to this publication. Research support for this study was provided in part by the National Center for Advancing Translational Sciences, National Institutes of Health (grants KL2TR001109, Peery, and P30DK349897, Peery and Galanko).*

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If you would like to chat with an author of this article, you may contact Dr Peery at Anne_Peery@med.unc.edu.

TABLE 2. Thirty-day adverse events after surgery for nonmalignant colorectal polyps stratified by surgical approach

Adverse event	Laparoscopic (n = 9717)	Open (n = 3015)	All procedures (n = 12,732)
Mortality	46 (.5)	39 (1.3)	85 (.7)
≥1 Major events*	1134 (12)	696 (23)	1830 (14)
Readmission	648 (6.7)	347 (11.5)	995 (7.8)
Reoperation	308 (3.2)	151 (5.0)	459 (3.6)
Colostomy with index surgery	86 (.9)	144 (4.8)	230 (1.8)
Ileostomy with index surgery	13 (.1)	35 (1.2)	48 (.4)
Surgical site infection			
Superficial	388 (4.0)	212 (7.0)	600 (4.7)
Deep	62 (.6)	25 (.8)	87 (.7)
Anastomotic leak or abscess	219 (2.3)	106 (3.5)	325 (2.6)
Wound dehiscence	40 (.4)	35 (1.2)	75 (.6)
Other postoperative infections			
Urinary tract infection	111 (1.1)	68 (2.3)	179 (1.4)
Pneumonia	110 (1.1)	64 (2.1)	174 (1.4)
Sepsis	154 (1.6)	80 (2.7)	234 (1.8)
Septic shock	68 (.7)	41 (1.4)	109 (.9)
Comorbid adverse events			
Acute renal failure	53 (.6)	40 (1.3)	93 (.7)
DVT/thrombophlebitis	59 (.6)	24 (.8)	83 (.7)
Pulmonary embolism	26 (.3)	16 (.5)	42 (.3)
Stroke/CVA	15 (.2)	6 (.2)	21 (.2)
Myocardial infarction	34 (.4)	26 (.9)	60 (.5)
Ventilator >48 h	74 (.8)	46 (1.5)	120 (.9)
Hospitalized >30 days	31 (.3)	18 (.6)	49 (.4)
Cardiac arrest	32 (.3)	21 (.7)	53 (.4)

Quality Matters: Improving the Quality of Care for Patients With Complex Colorectal Polyps

Ian Grimm, MD[1], Anne F. Peery, MD MSCR[1], Tonya Kaltenbach, MD, MS[2] and Seth D. Crockett, MD, MPH[1]

Am J Gastroenterol 2018; 113:317–321; doi:10.1038/ajg.2017.409; published online 7 November 2017

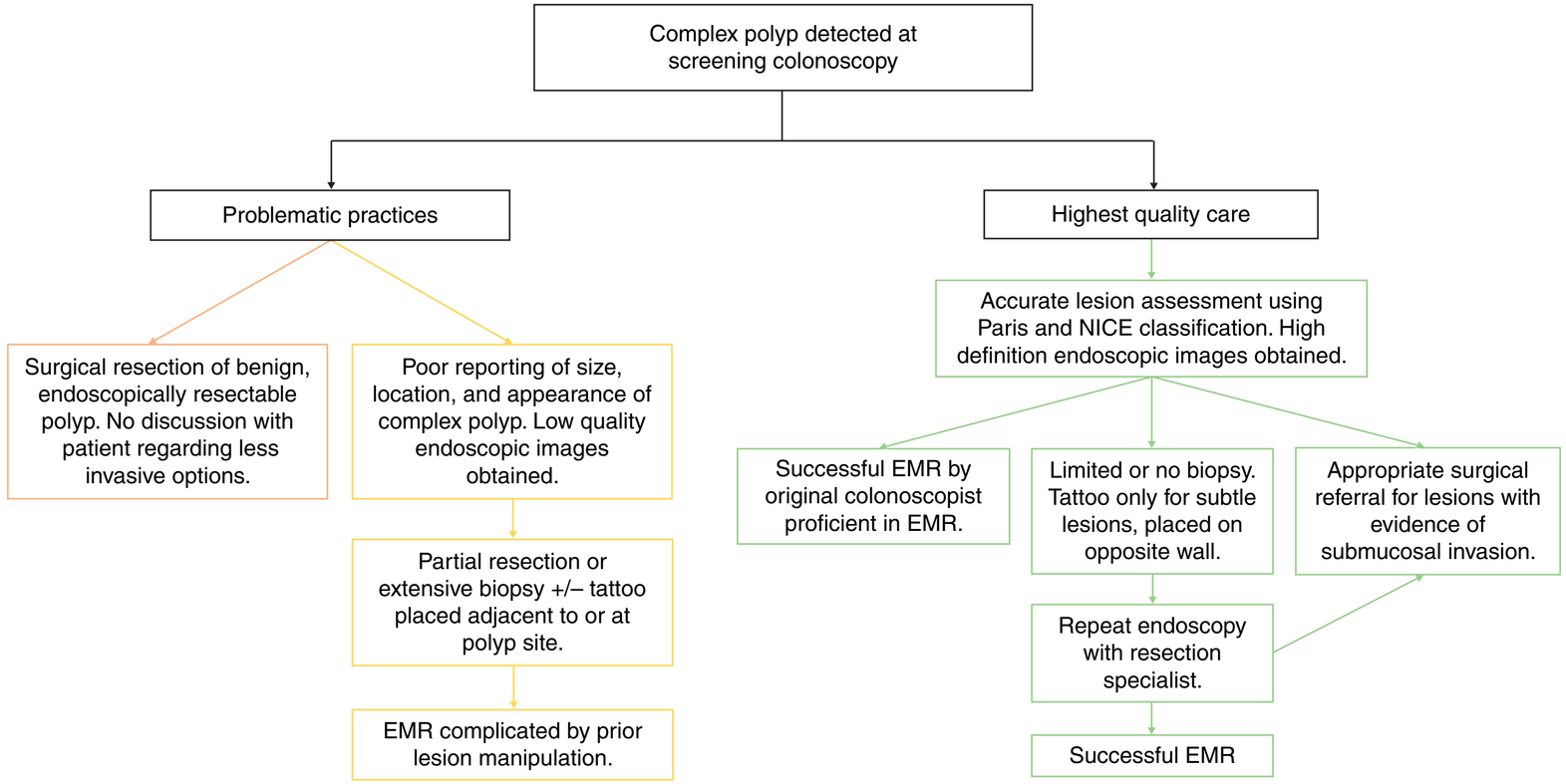

Figure 1. Best practices for high quality care of patients with complex polyps.

Longitudinal Outcomes of the Endoscopic Resection of Non-Polypoid Dysplastic Lesions in Patients with Inflammatory Bowel Disease

Tonya Kaltenbach MD MS[1, 2], Aurelia Fu MD[2], Ian Holmes MD[2], Carmel Malvar[1,2], Tiffany Nguyen-Vu[1,2], Imelda Merrera[1], Amandeep Shergill MD MS[1,2], Kenneth McQuaid MD[1,2], Robert V. Rouse MD[3] & Roy Soetikno MD MS[1]

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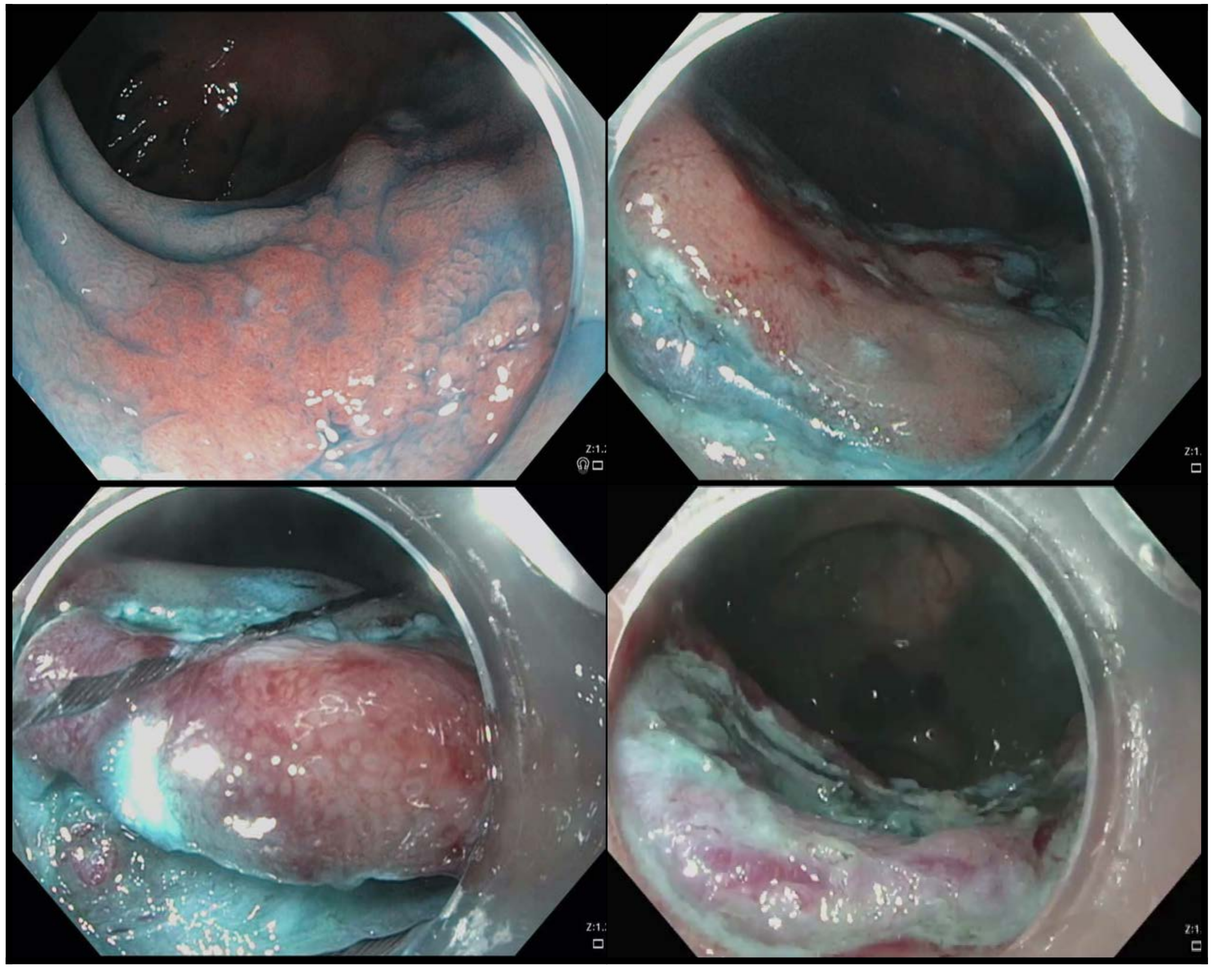
3. Veterans Affairs Palo Alto, Stanford University, Palo Alto, CA

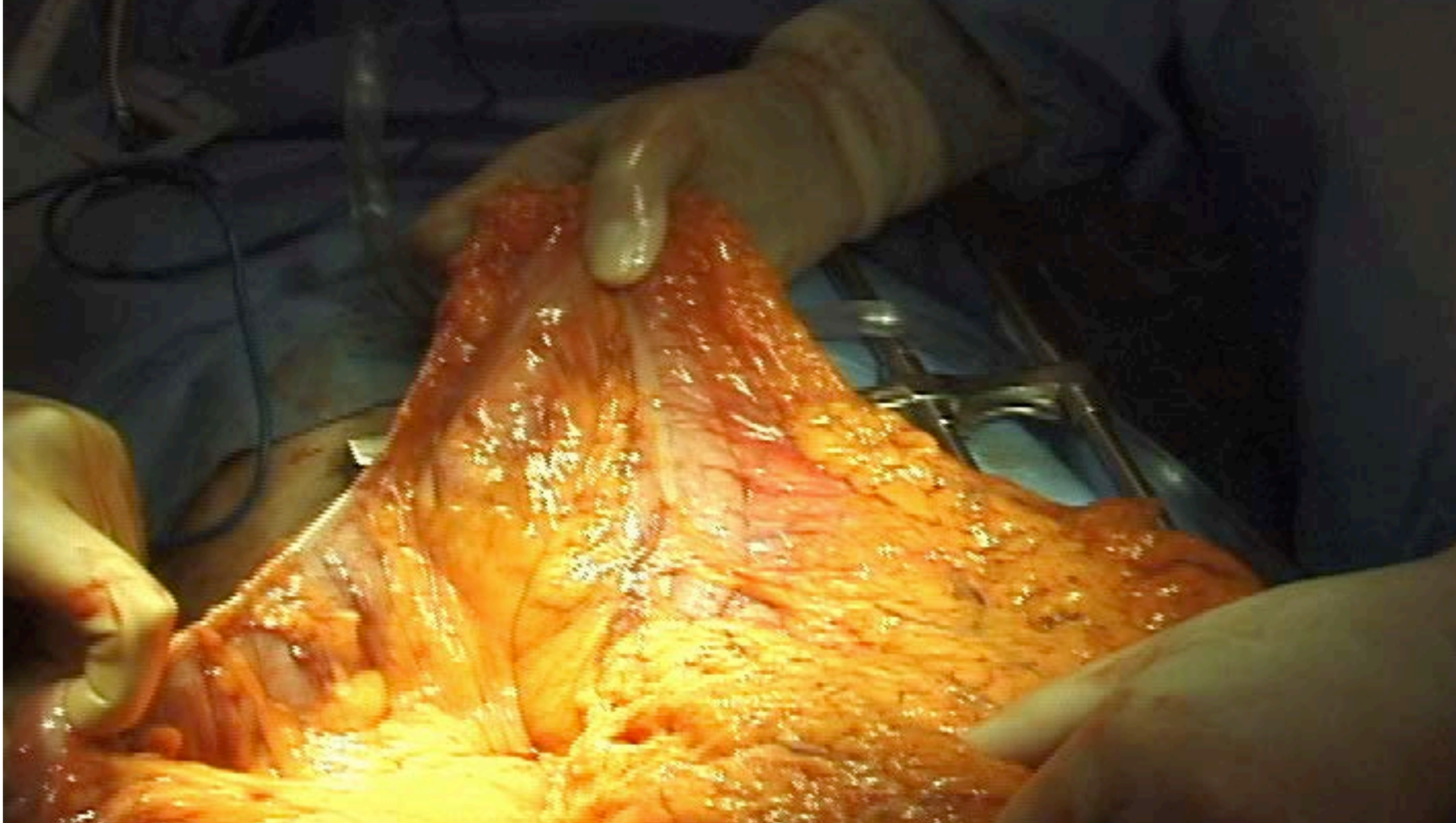
Introduction

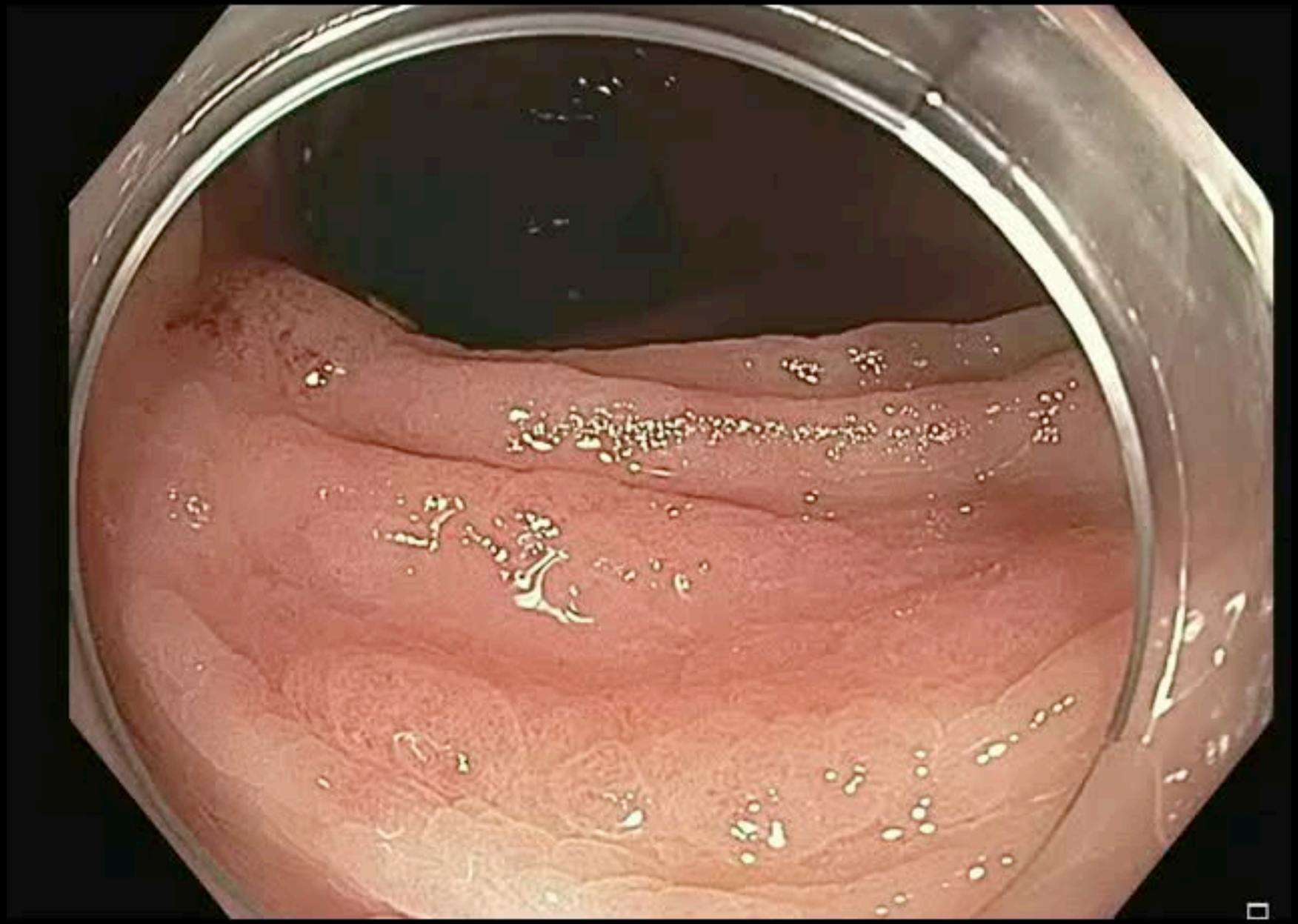
- Patients with inflammatory bowel disease (IBD) are at risk to develop colorectal cancer.
- Surveillance colonoscopy is recommended to detect dysplasia, the precursor to colorectal cancer.
- SCENIC guidelines recommend high definition colonoscopy, and suggested chromoendoscopy with targeted biopsy to optimize dysplasia detection.

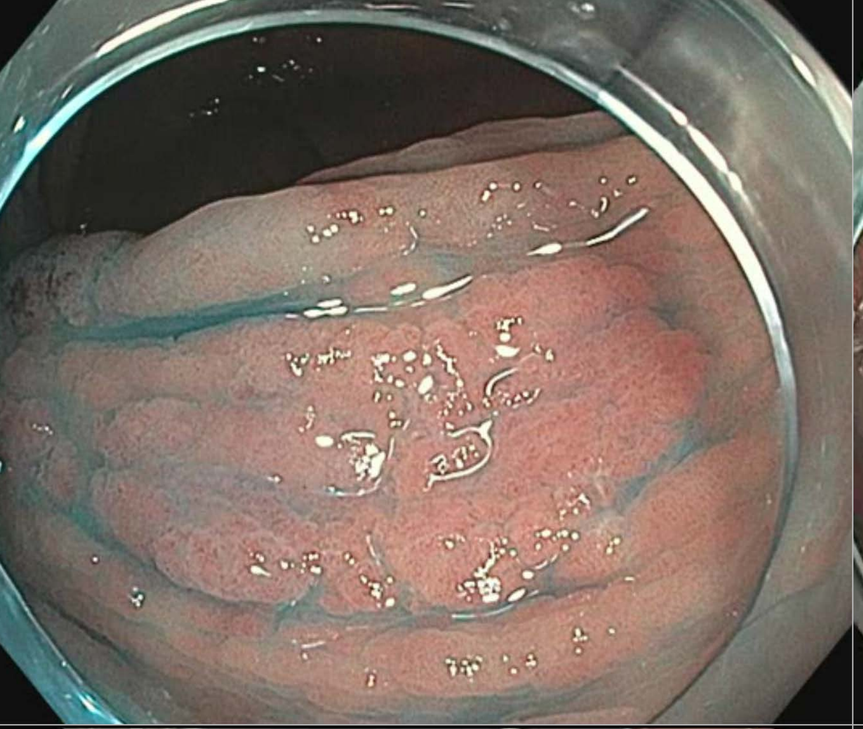
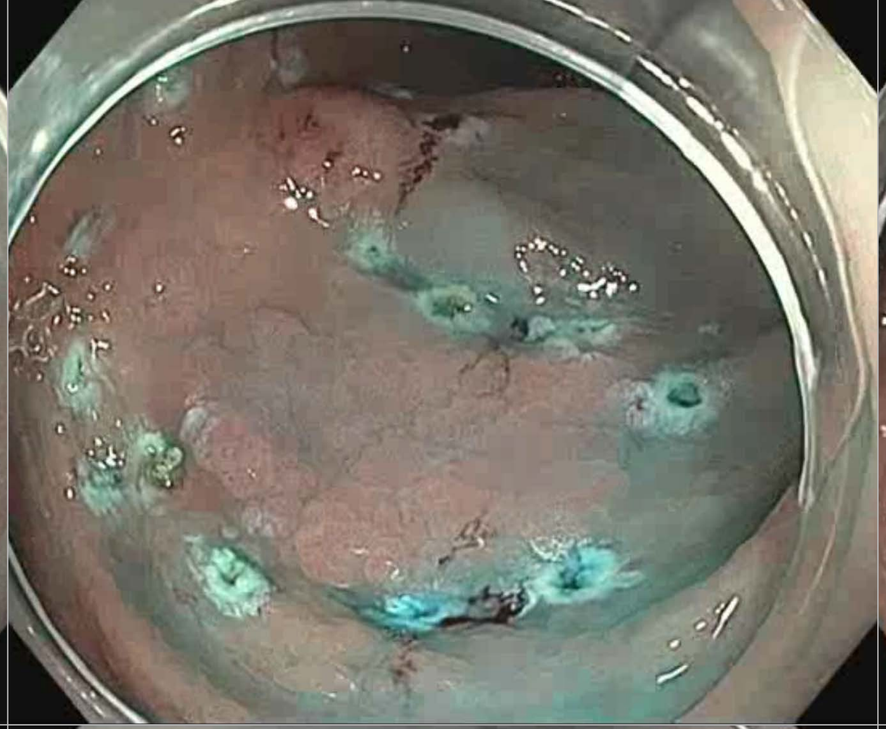
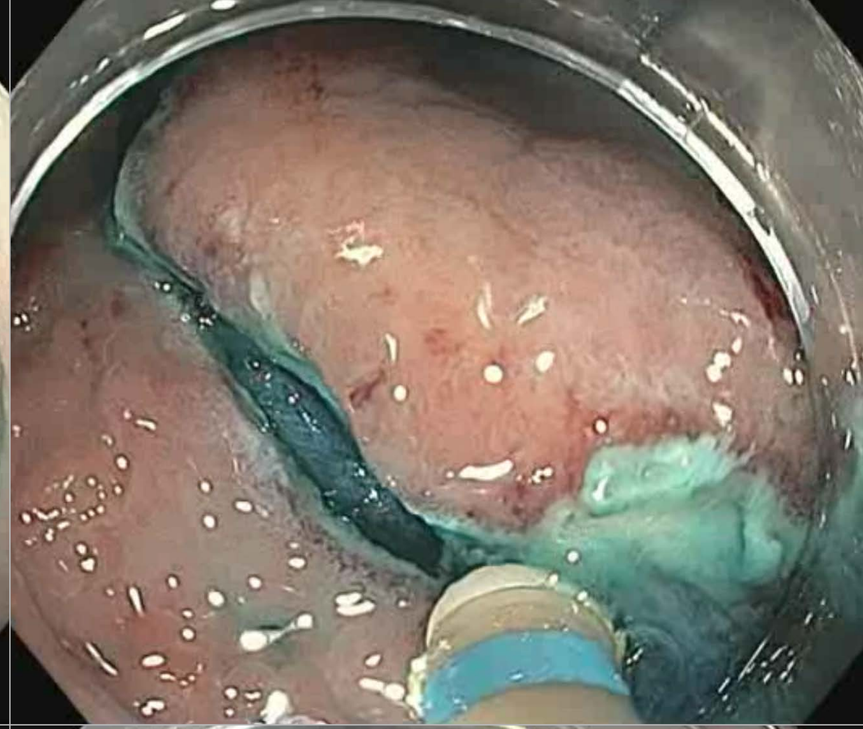
Introduction

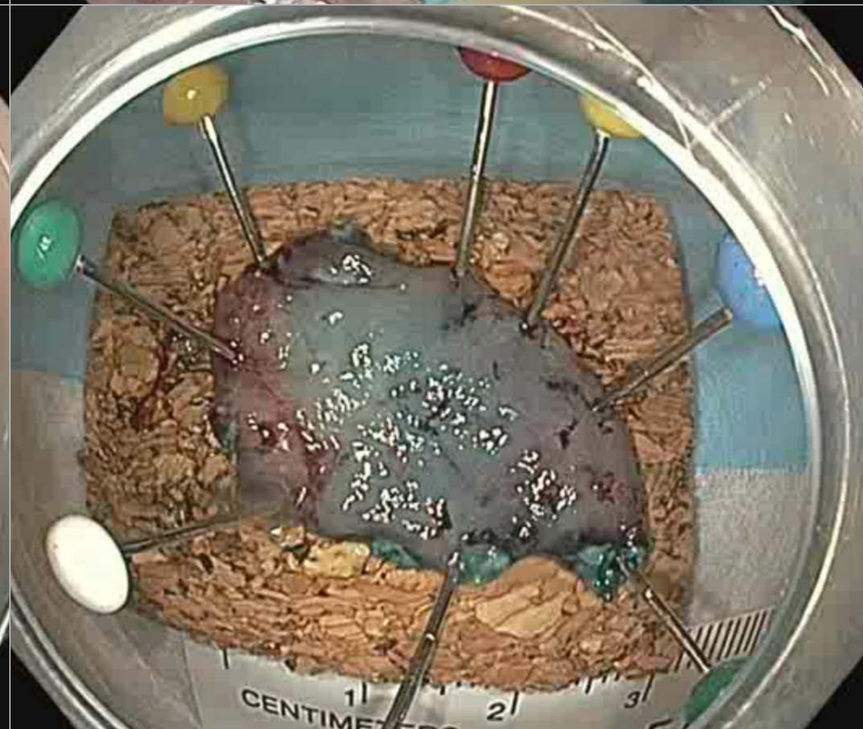
The optimal management of the nonpolypoid colorectal dysplasia (NP-CRD), which can be difficult to resect endoscopically, is less clear.





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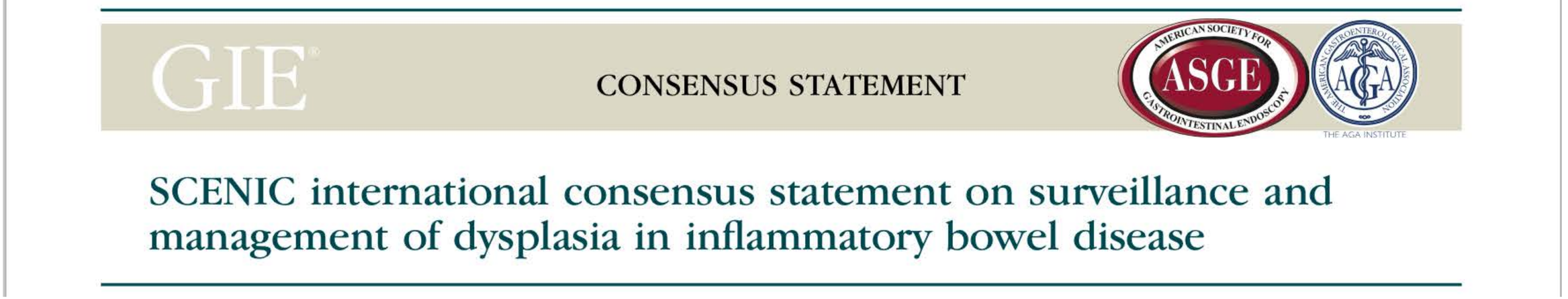


Statement 8: After complete removal of endoscopically resectable nonpolypoid dysplastic lesions, surveillance colonoscopy is suggested rather than colectomy.

(80% agreement; conditional recommendation; very low-quality of evidence)

Laine L, Kaltenbach T, Barkun A, McQuaid, Subramanian & Soetikno Gastroenterol 2015 Mar;81(3):489-501

Our Study

Hypothesis:

Endoscopic resection of NP-CRD is safe and effective.

Research Questions:

- What is the feasibility of endoscopic resection for nonpolypoid colorectal dysplastic lesions in IBD?
- What is the the incidence of local recurrence and cancer for nonpolypoid colorectal dysplastic lesions managed endoscopically?

Study Design

Methods: Systematic analysis of colonoscopy, pathology and complication review data from 2007-2017

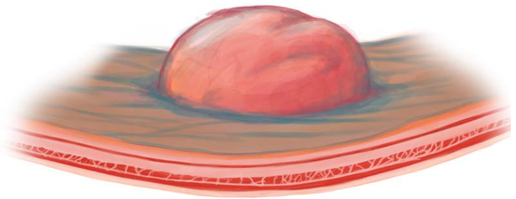
Setting: 2 Veterans Affairs Hospitals

Subjects:

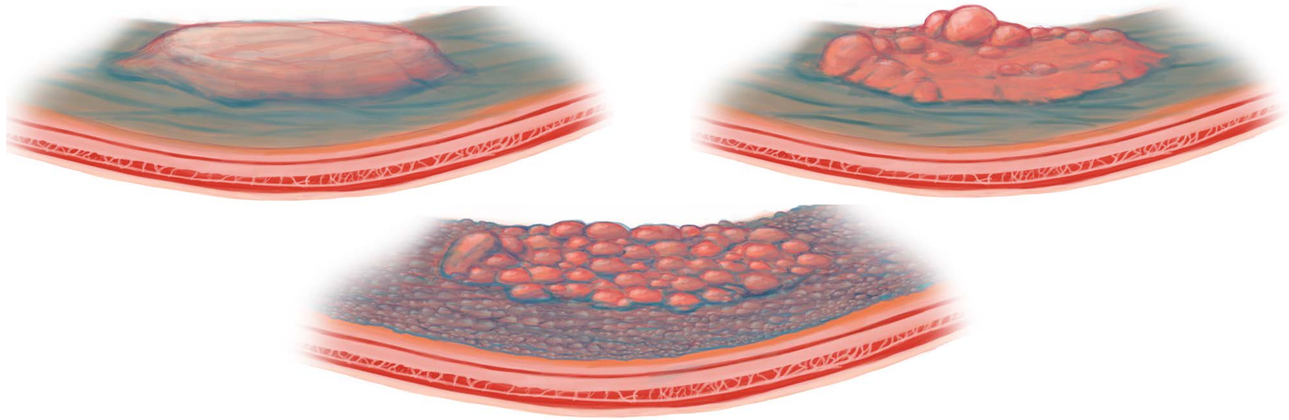
- Consecutive patients with inflammatory bowel disease who underwent elective colonoscopy
- Inclusion criteria: patients who had at least one nonpolypoid (based on Paris and SCENIC classifications) lesion ≥10mm

SCENIC Endoscopic Classification of Superficial Colorectal Dysplasia in IBD

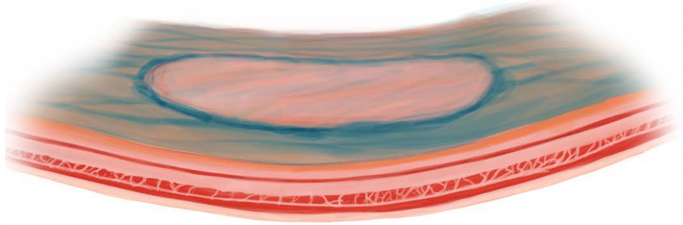
Pedunculated



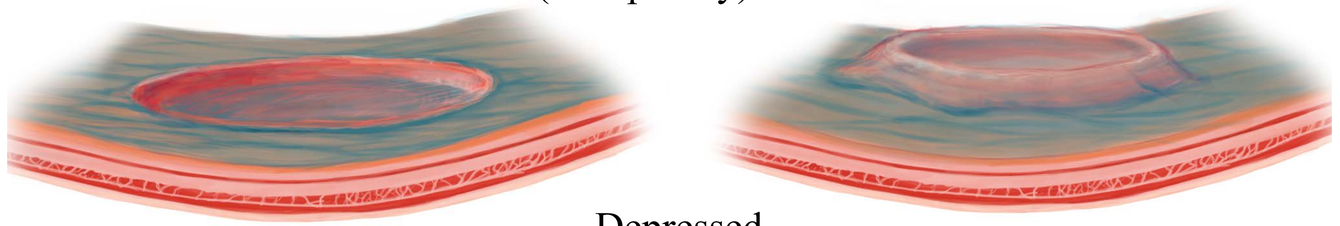
Sessile



Slightly elevated (Flat)



(Completely) Flat



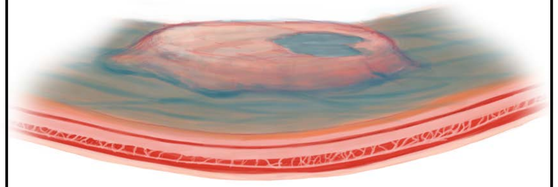
Depressed

Polypoid

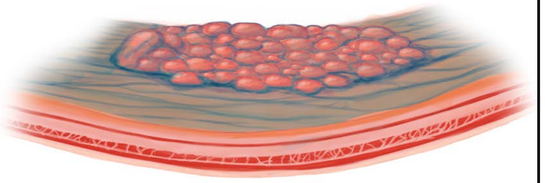
Nonpolypoid

Paris Endoscopic Classification of Superficial Neoplastic Lesions

+



Ulcer: present or absent

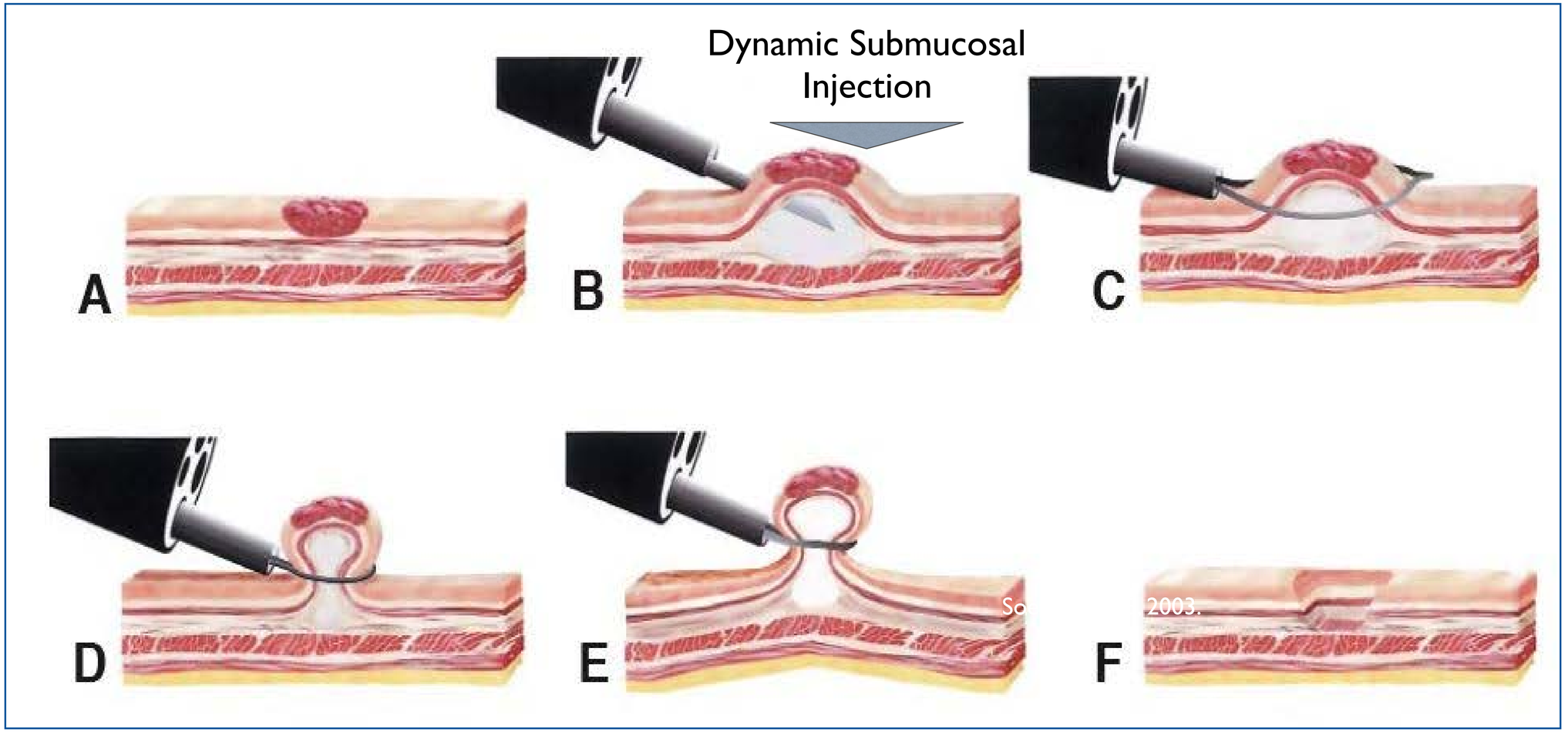


Border: present or absent

SCENIC descriptors

Laine L, Kaltenbach T, Barkun A, McQuaid, Subramanian & Soetikno Gastroenterol 2015 Mar;81(3):489-501

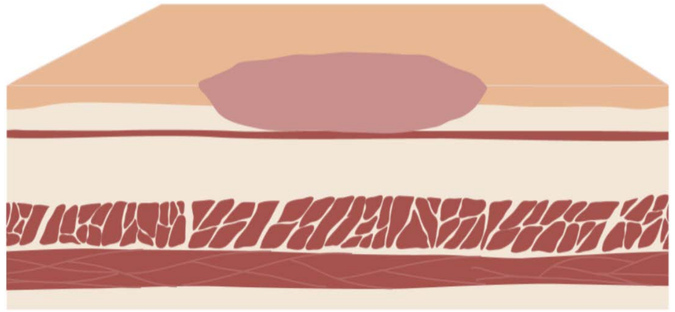
Endoscopic Mucosal Resection (EMR)



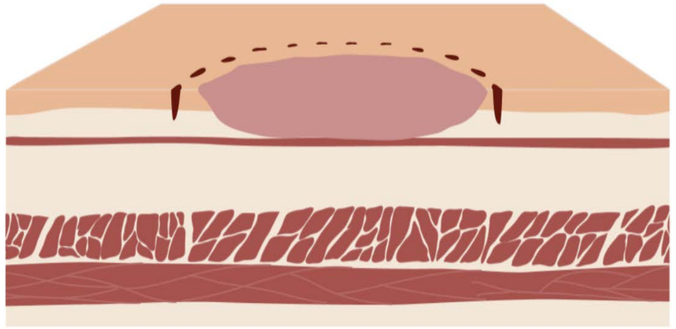
Soetikno, Gotoda, Nakanishi and Soehendra. GIE 2003.

Endoscopic Submucosal Dissection (ESD)

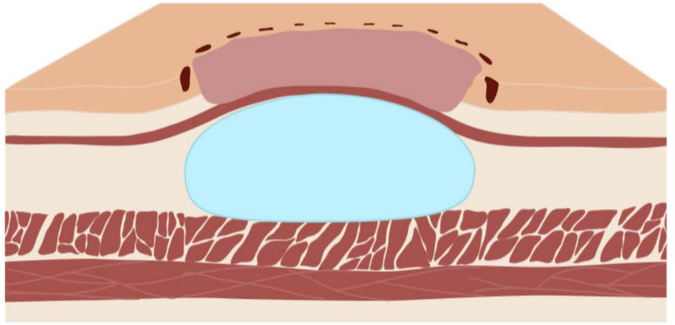
Pathology Assessment



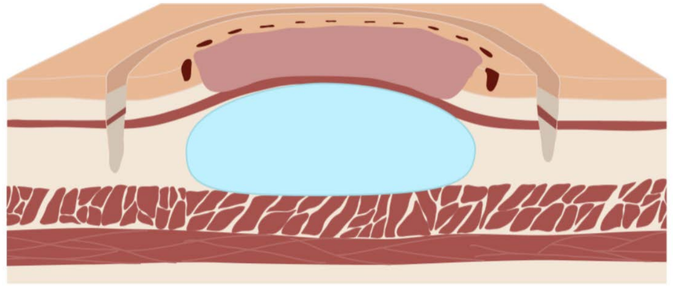
Marking of Margin



Submucosal Injection

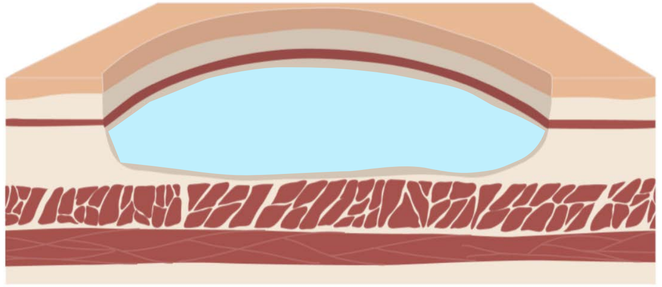


Circumferential Cut

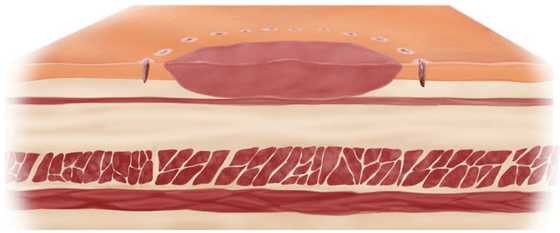


Dissection of Submucosa

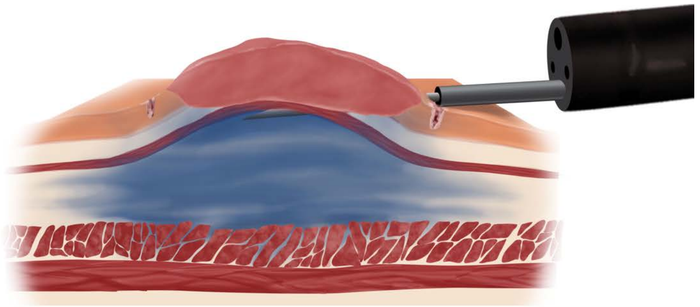
Resection



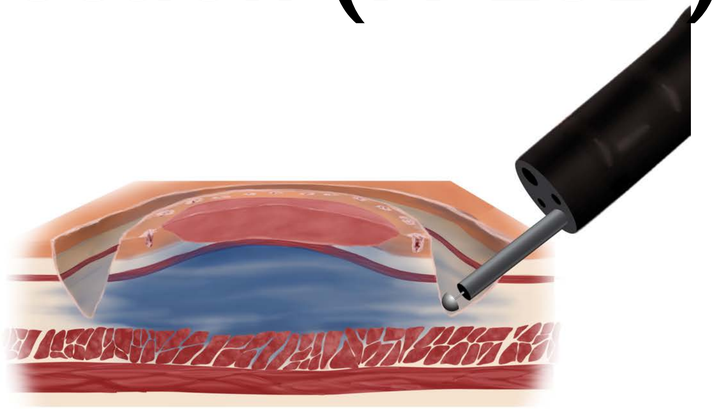
Hybrid Endoscopic Submucosal Dissection (H-ESD)



Marking



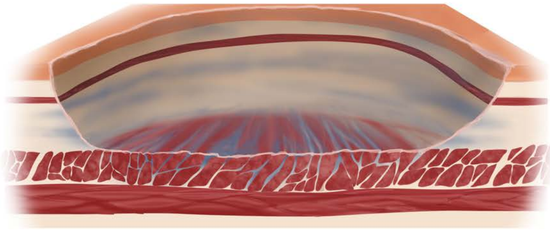
Dynamic Injection



Circumferential Incision

Dissection +/-

Snaring

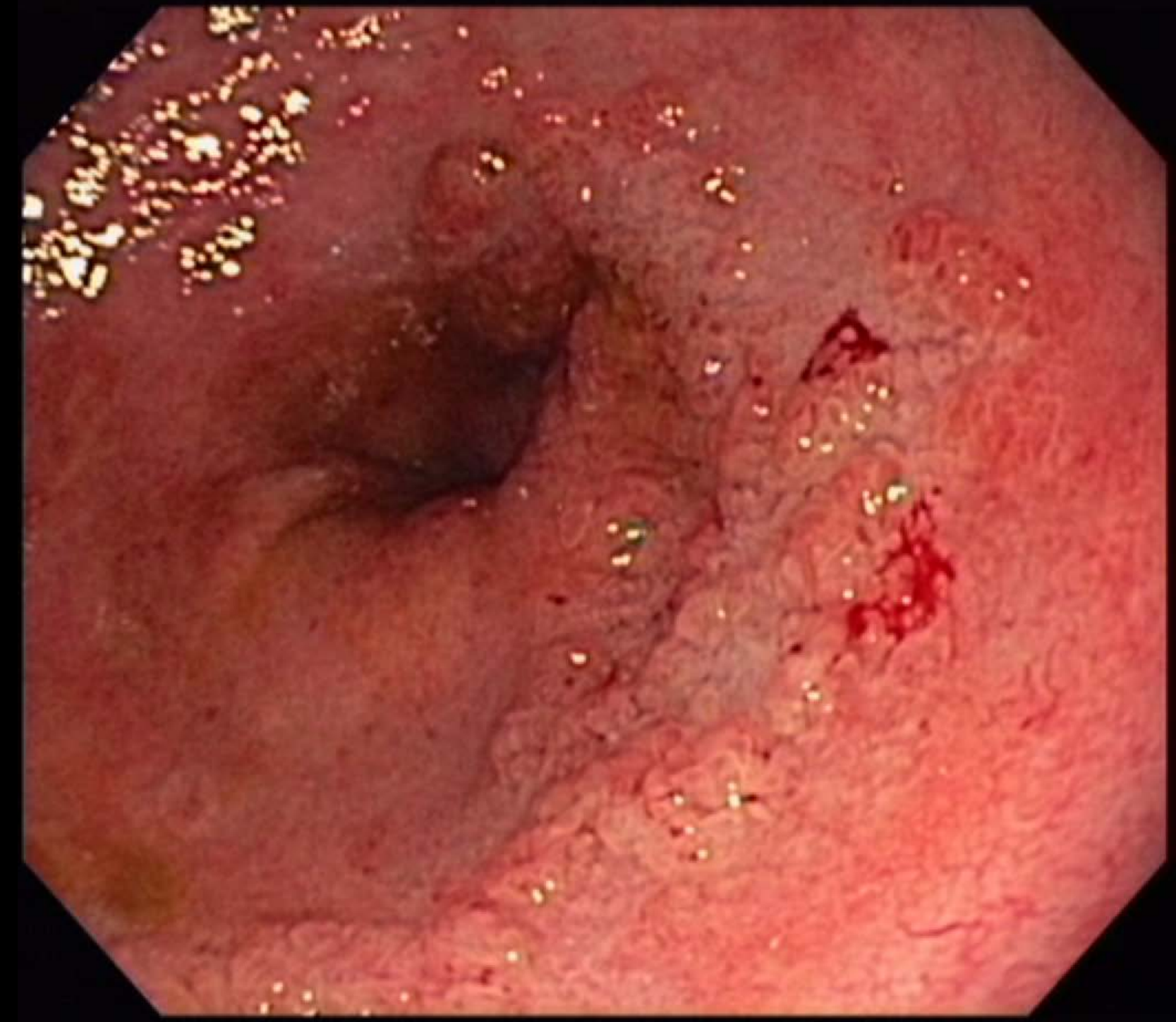


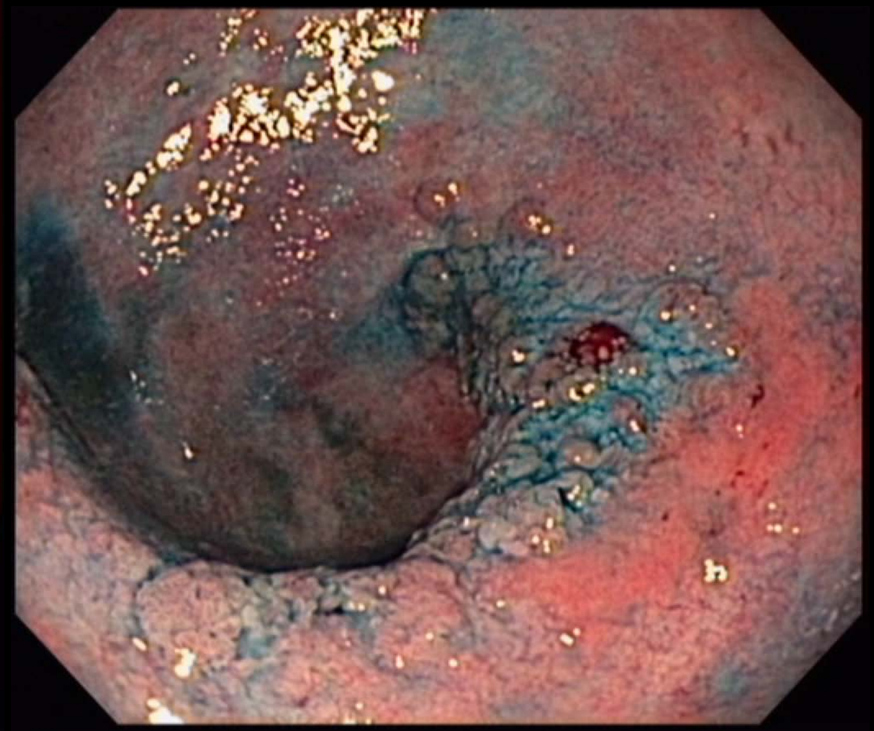
En-bloc Resection

Endoscopic Resection Principles in IBD Nonpolypoid Dysplasia

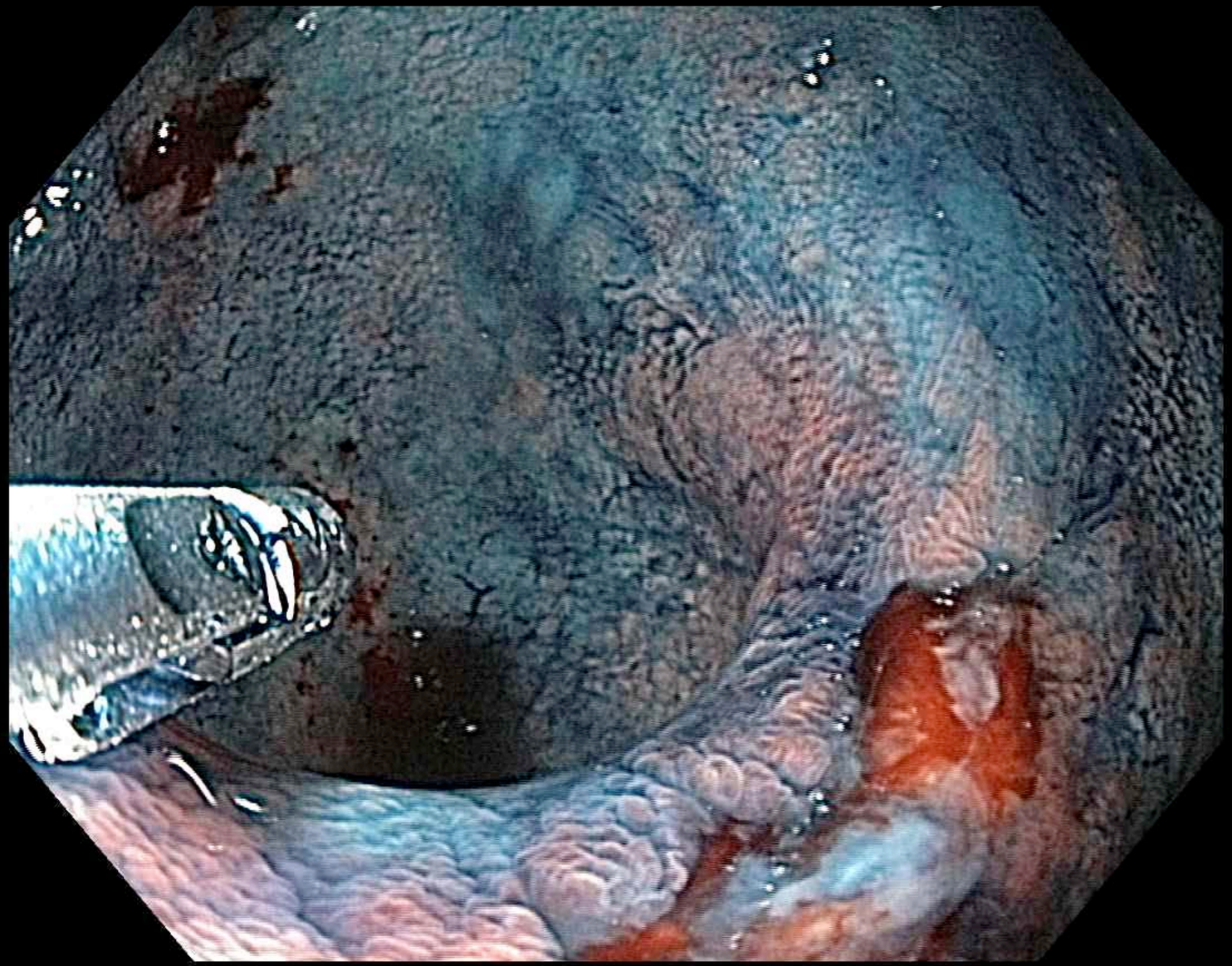
- The lesion must be circumscribed - biopsy of surrounding must be negative
- NP-CRN cannot be removed by multiple biopsies
- EMR is usually required for sessile or nonpolypoid
- ESD may be needed for the flat and the concerning for HGD
- Resections can be difficult and risky because of fibrosis

NOT Indicated — No Border

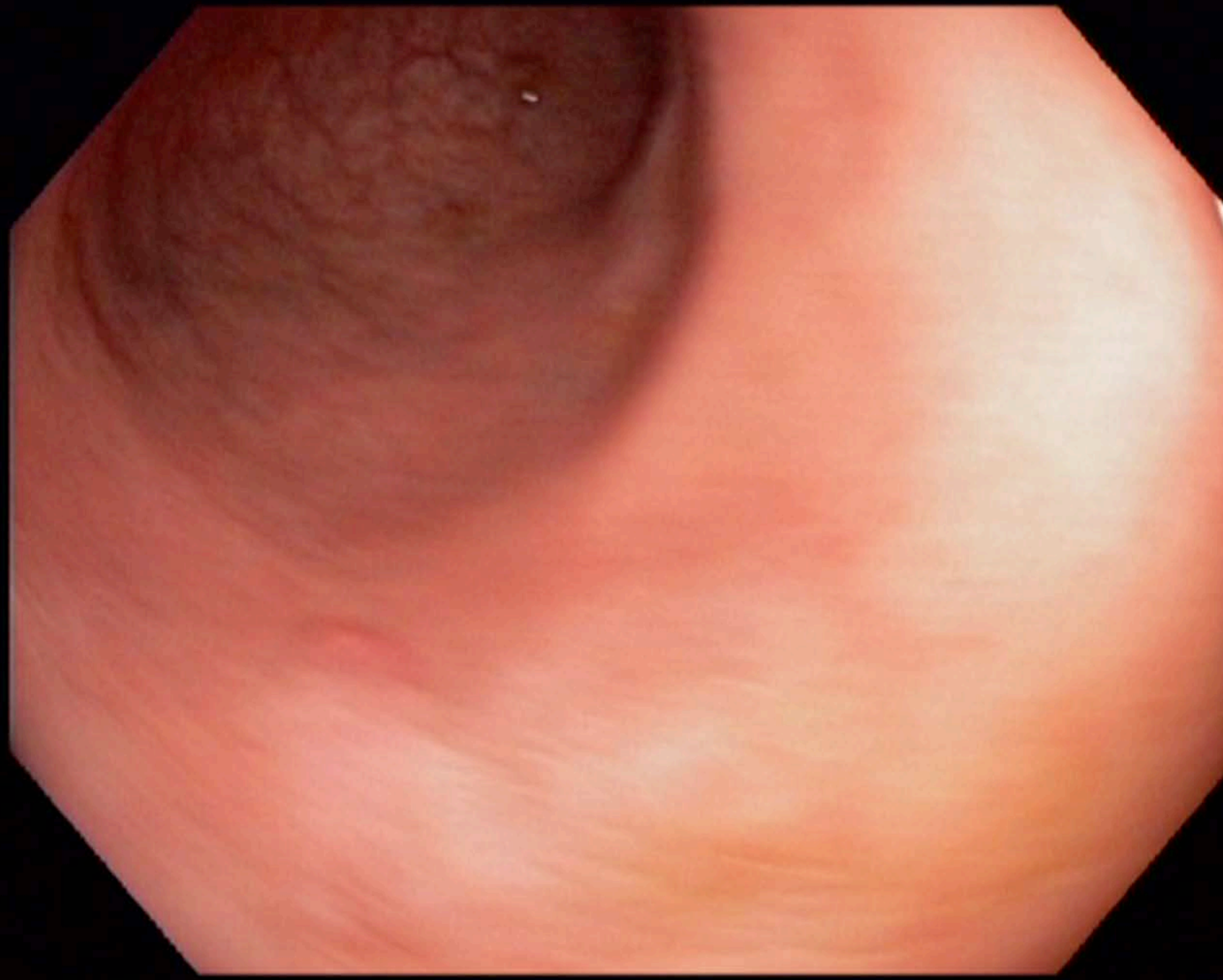




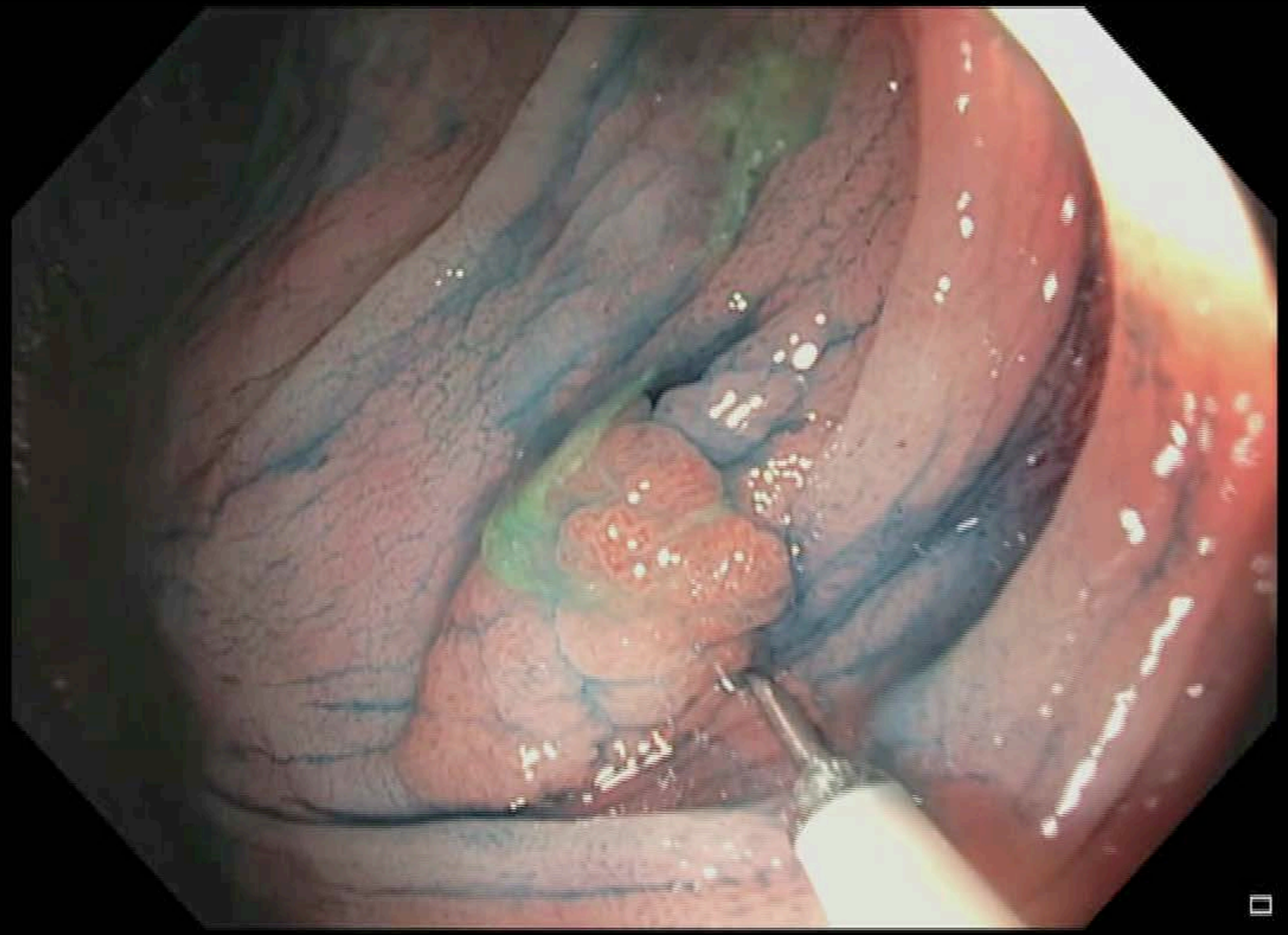
Biopsy and biopsy is generally inadequate for NP-CRN



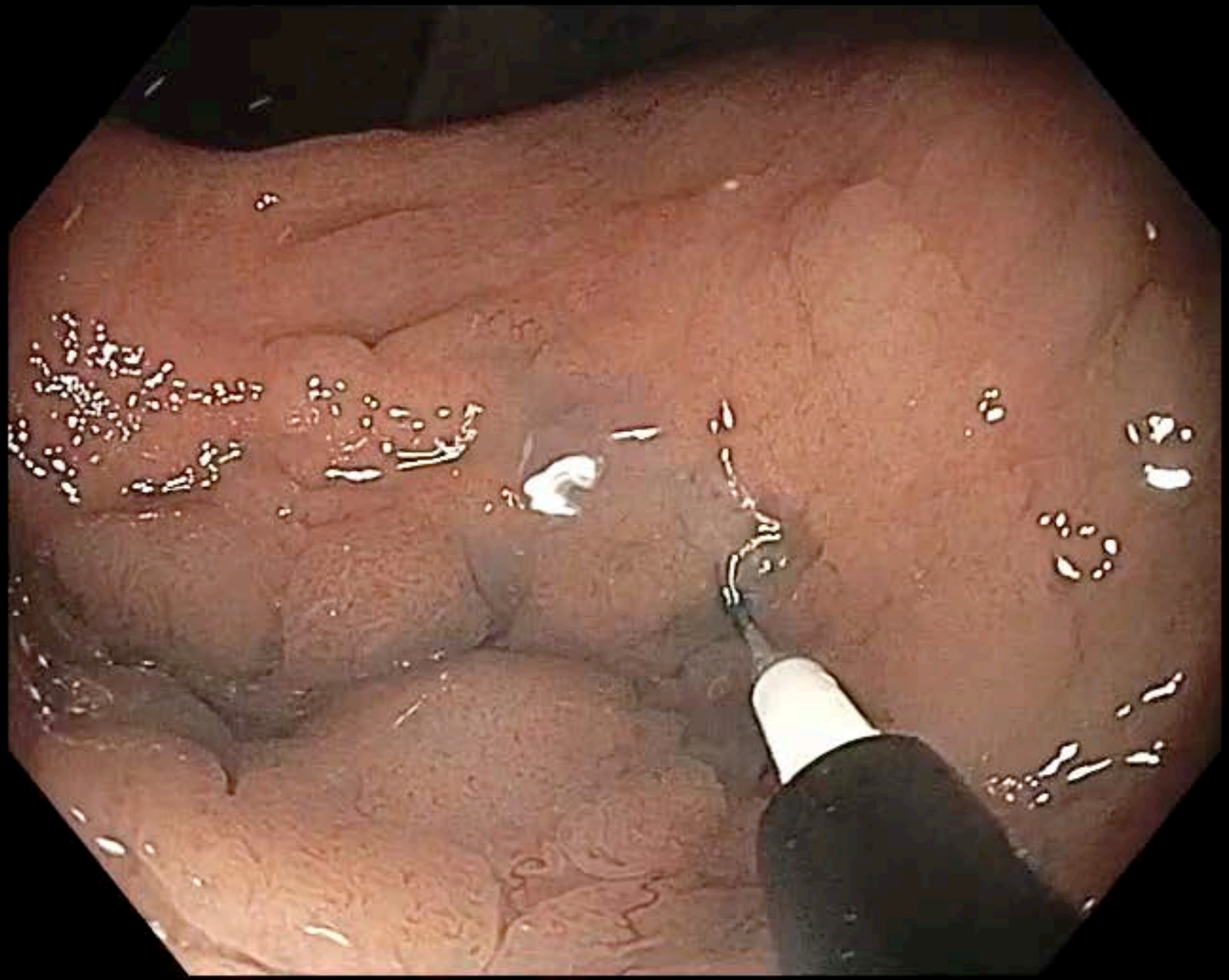
Polypectomy is generally inadequate for NP-CRN



Endoscopic Mucosal Resection with Dynamic Submucosal Injection

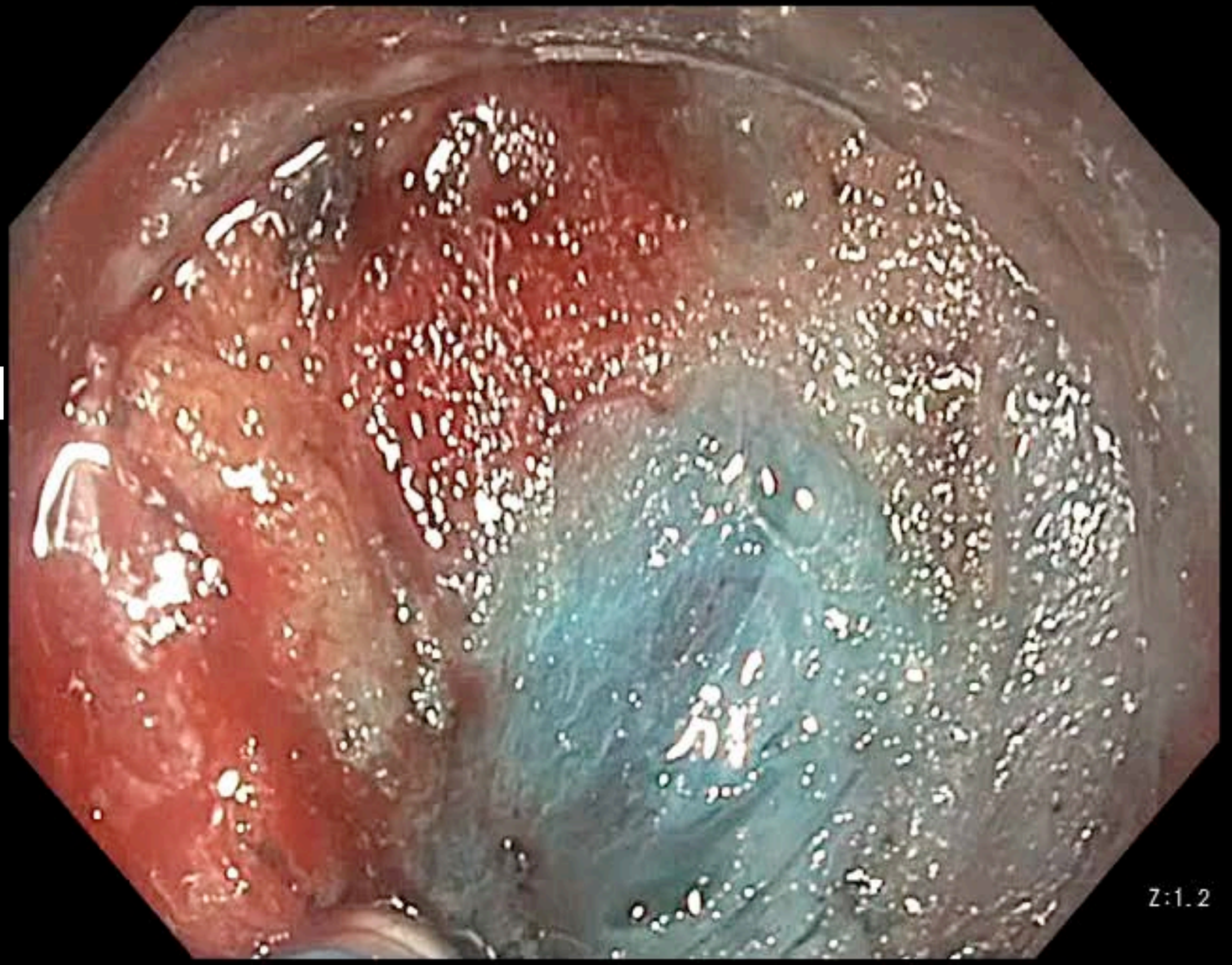


Does not lift with Dynamic Submucosal Injection



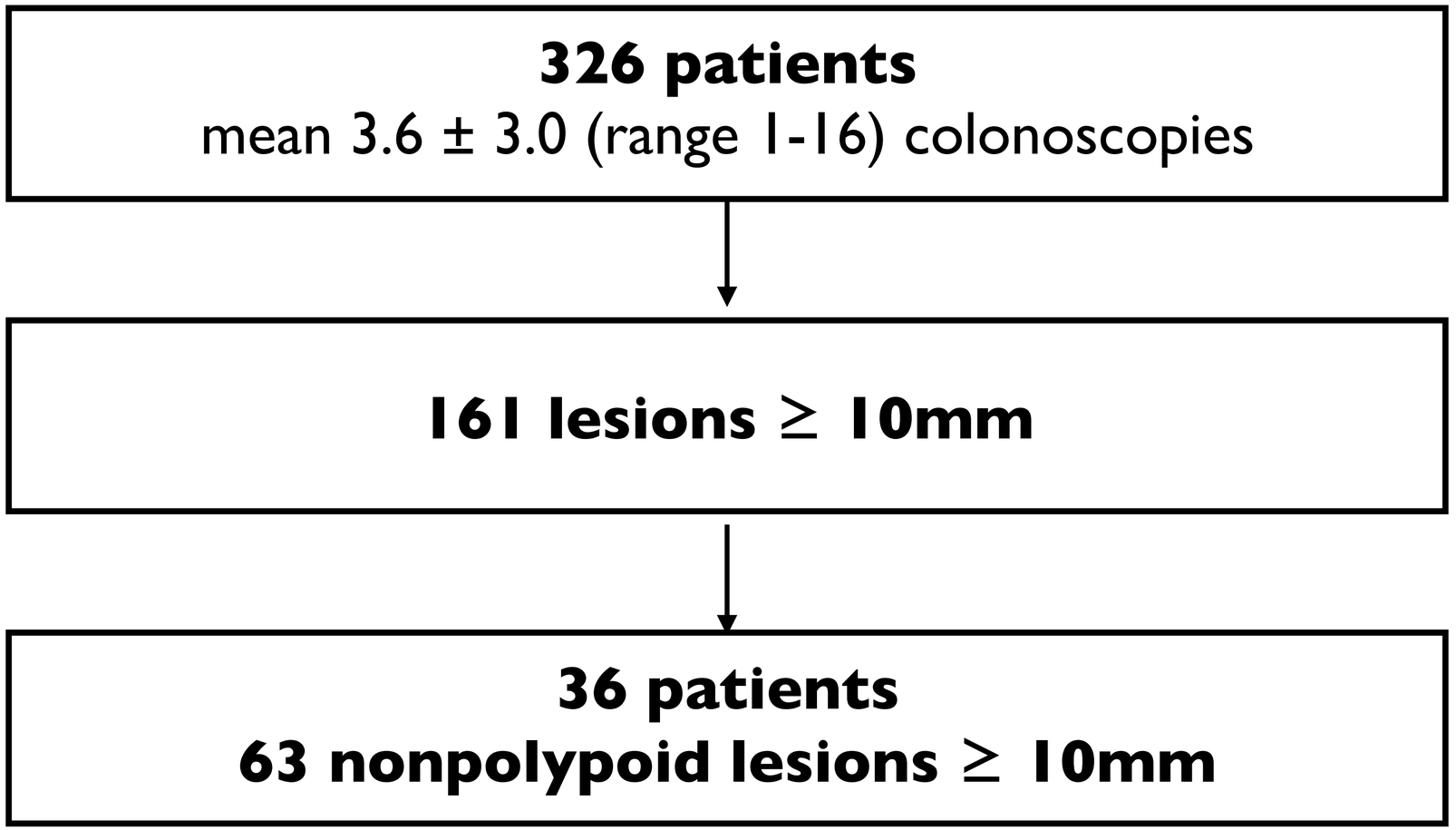
Courtesy of Roy Soetikno

Endoscopic Submucosal Dissection in IBD



SP4604V01

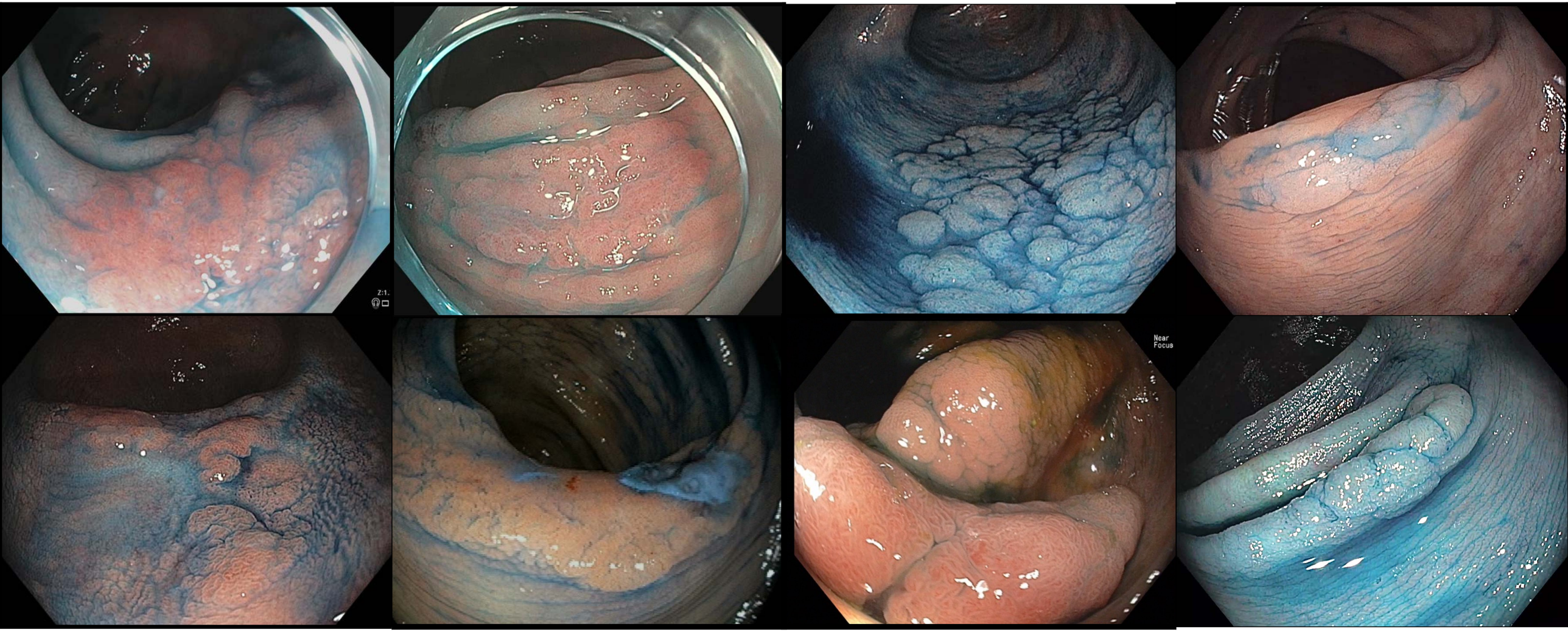
Patient Cohort



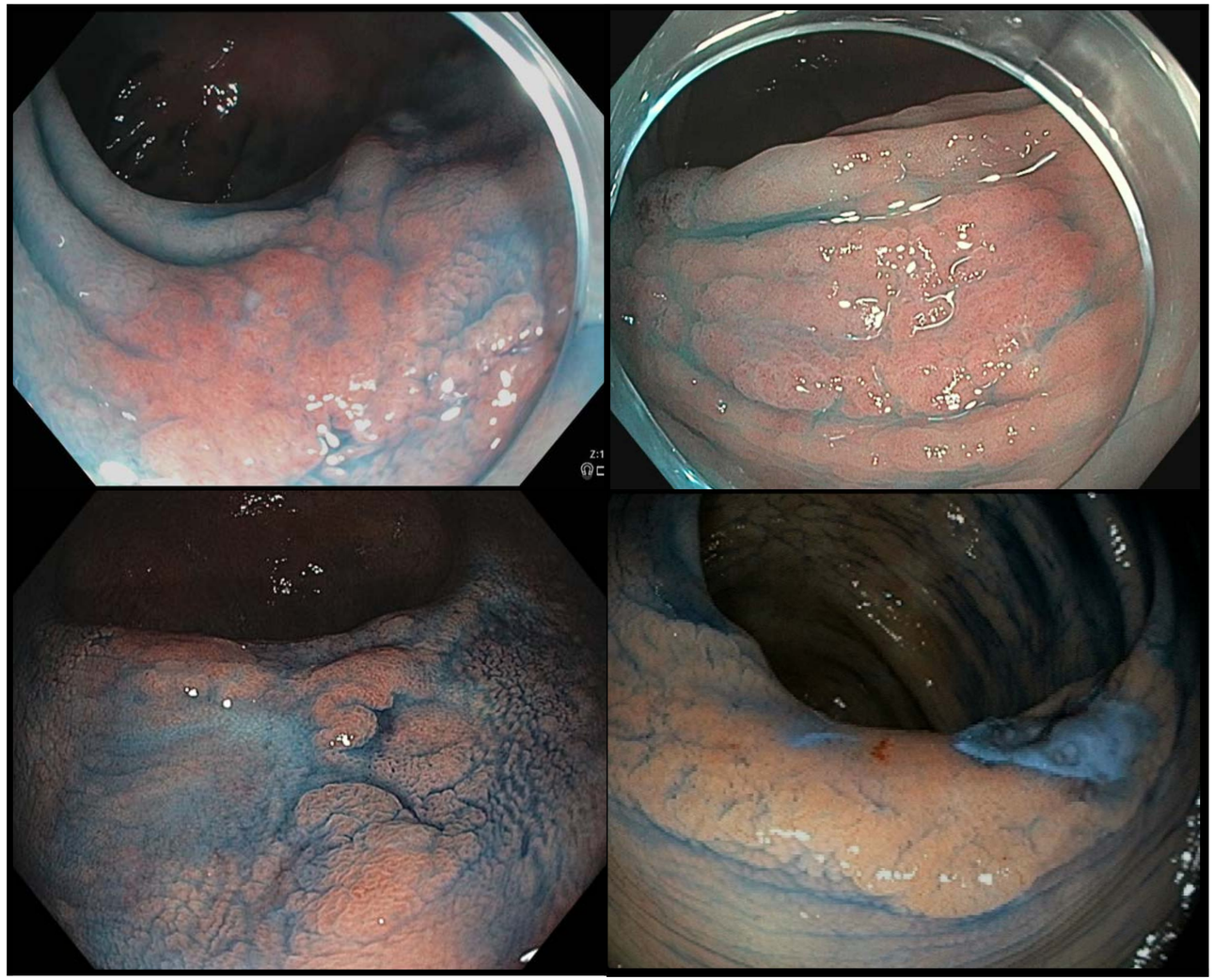
Patient Cancer Risk Factors (n=36)

Extent of Disease, n (%)	
Pancolitis	29 (80.5%)
Left-sided	6 (16.5%)
Proctitis	1 (3%)
History of CRC, n (%)	
Yes	3 (8.3%)
Family History of CRC, n (%)	
Yes	5 (13.9%)
Primary Sclerosing Cholangitis, n (%)	
Yes	1 (3%)

Nonpolypoid Lesion, n=63



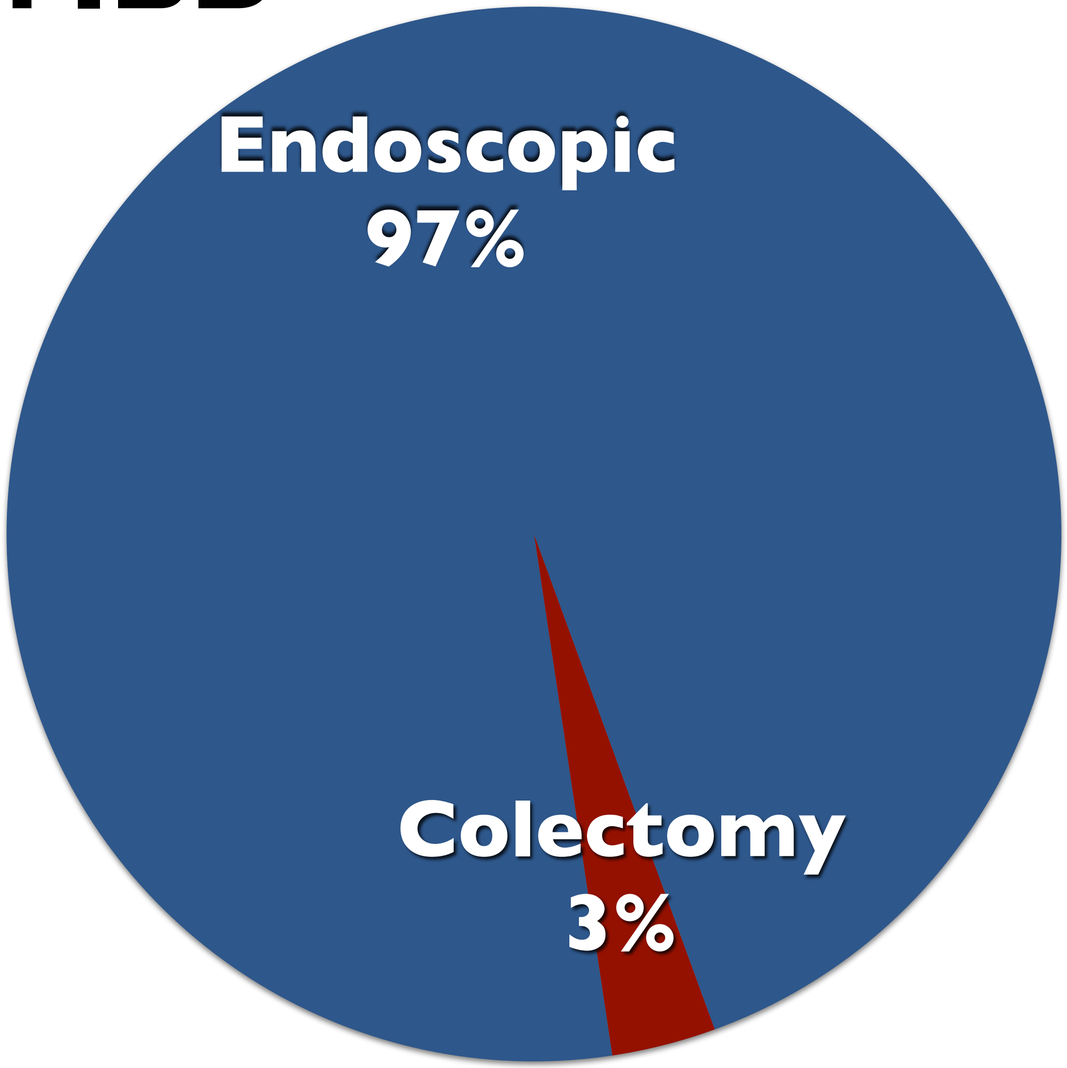
Nonpolypoid Lesion Characteristics, n=63



Mean Polyp Size (mm±SD, range)	
17.8 ± 8.9 (10-45)	
Location segment of lesion (n, %)	
Right	30 (47.6%)
Left	20 (31.8%)
Rectum	13 (20.6%)
Pathology	
High Grade Dysplasia	3 (4.8%)
Tubular Adenoma	27 (42.9%)
Sessile Serrated Lesion	14 (22.2%)
Hyperplastic	6 (9.5%)
Inflammatory	13 (20.6%)

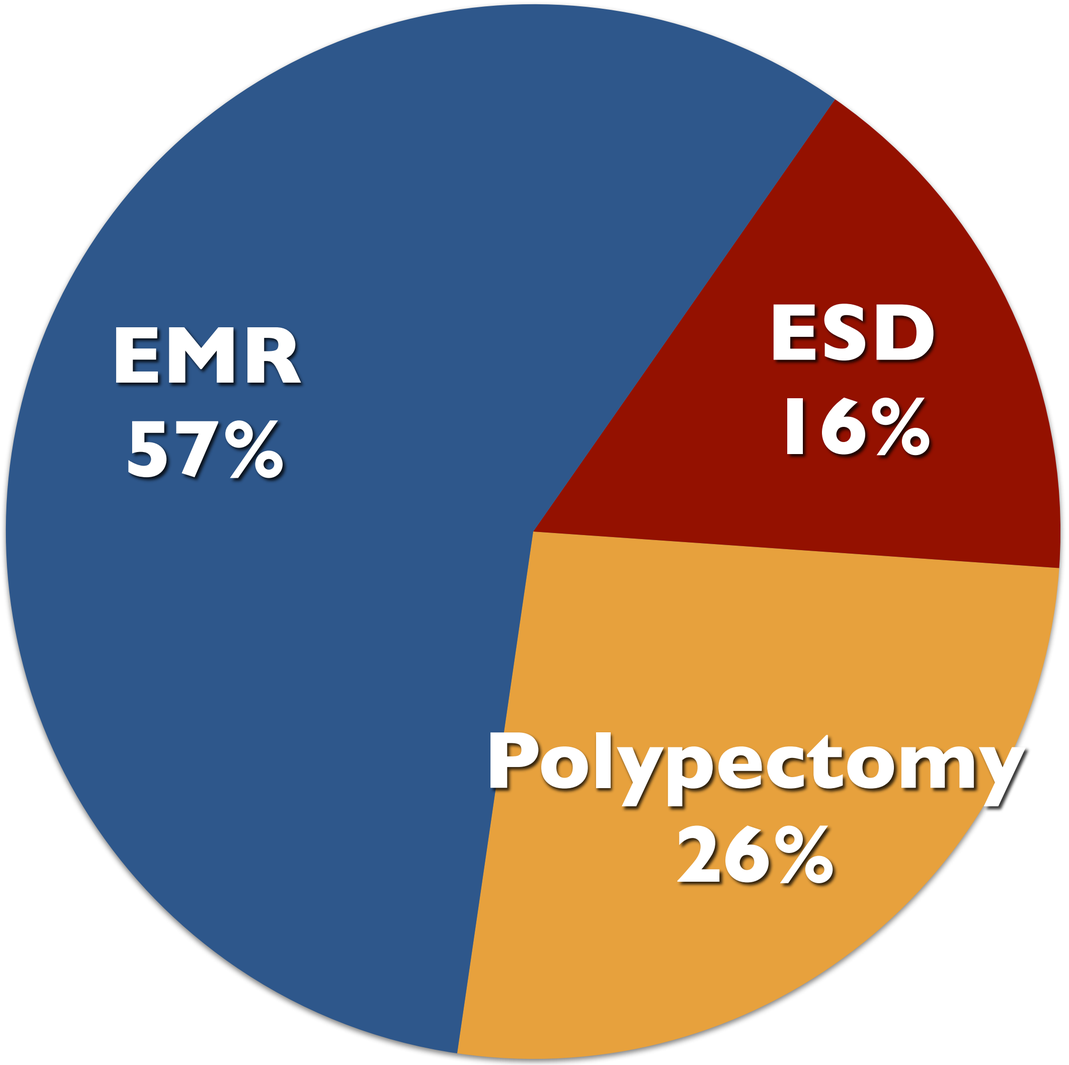
Primary Result- Endoscopic Resection is Feasible for Nonpolypoid Colorectal Dysplasia in IBD

NP-CRD
Management (n=63)

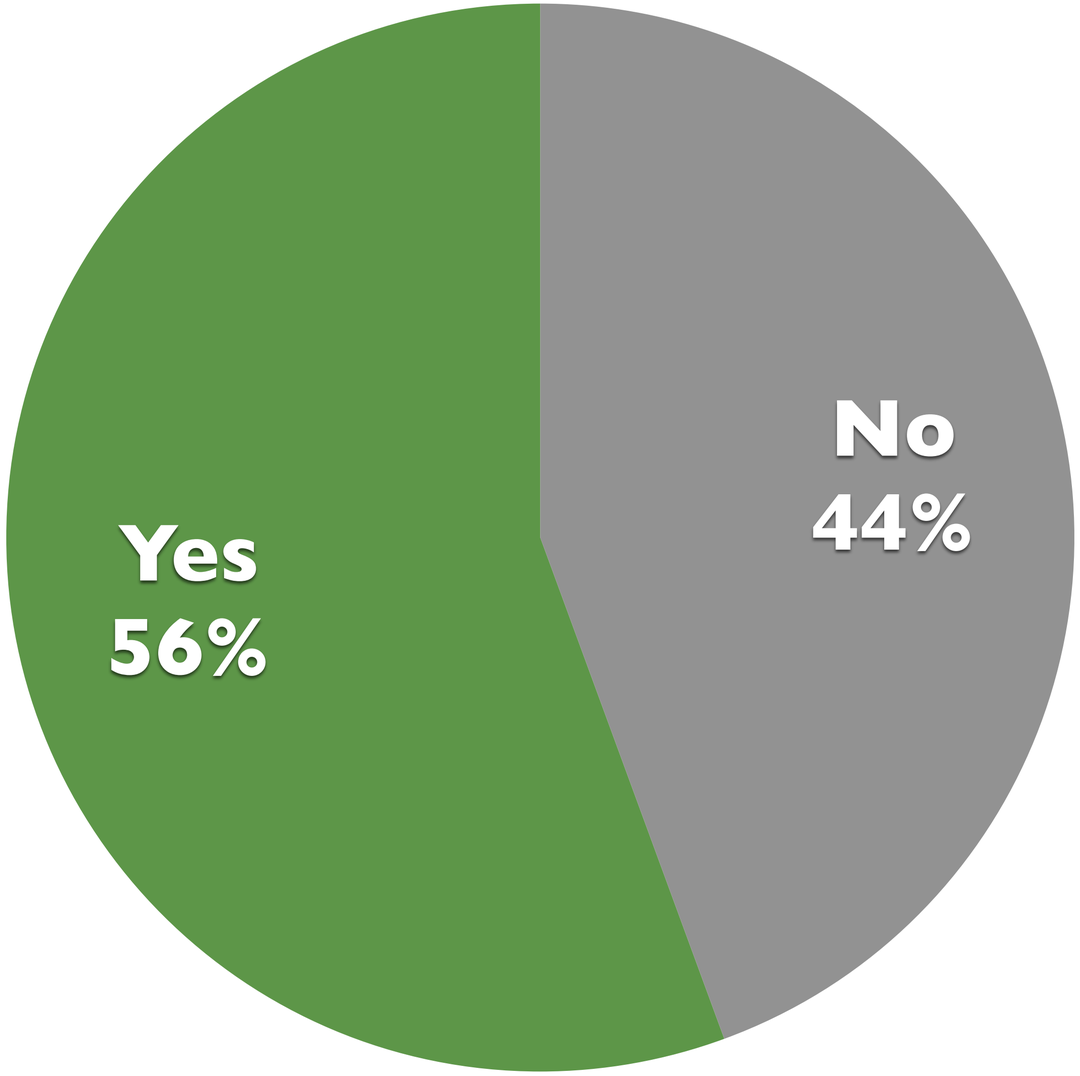


Primary Result- Endoscopic Resection

Technique of Resection (n=63)



En bloc Resection (n=63)



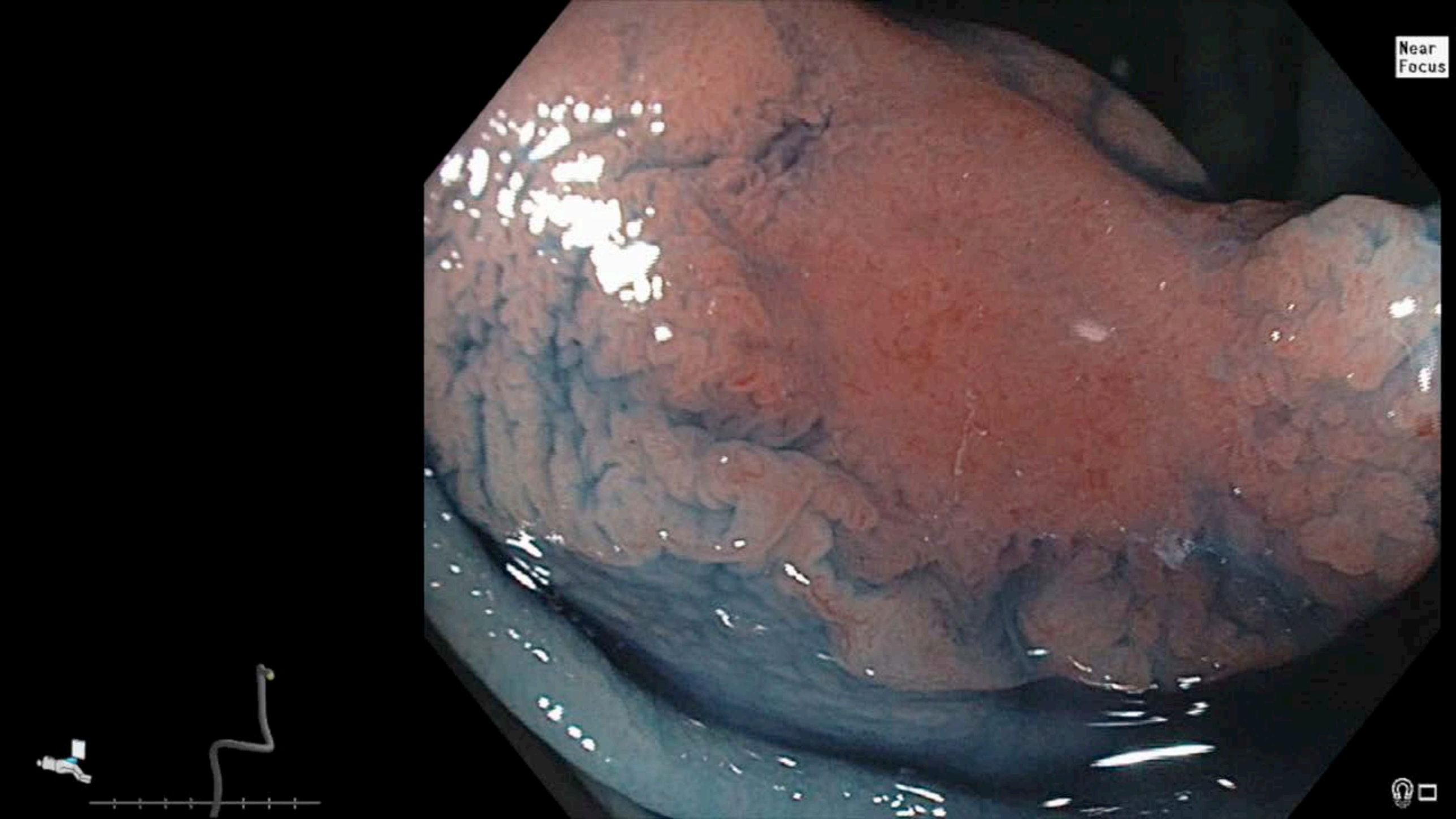
Secondary Outcomes - Complications

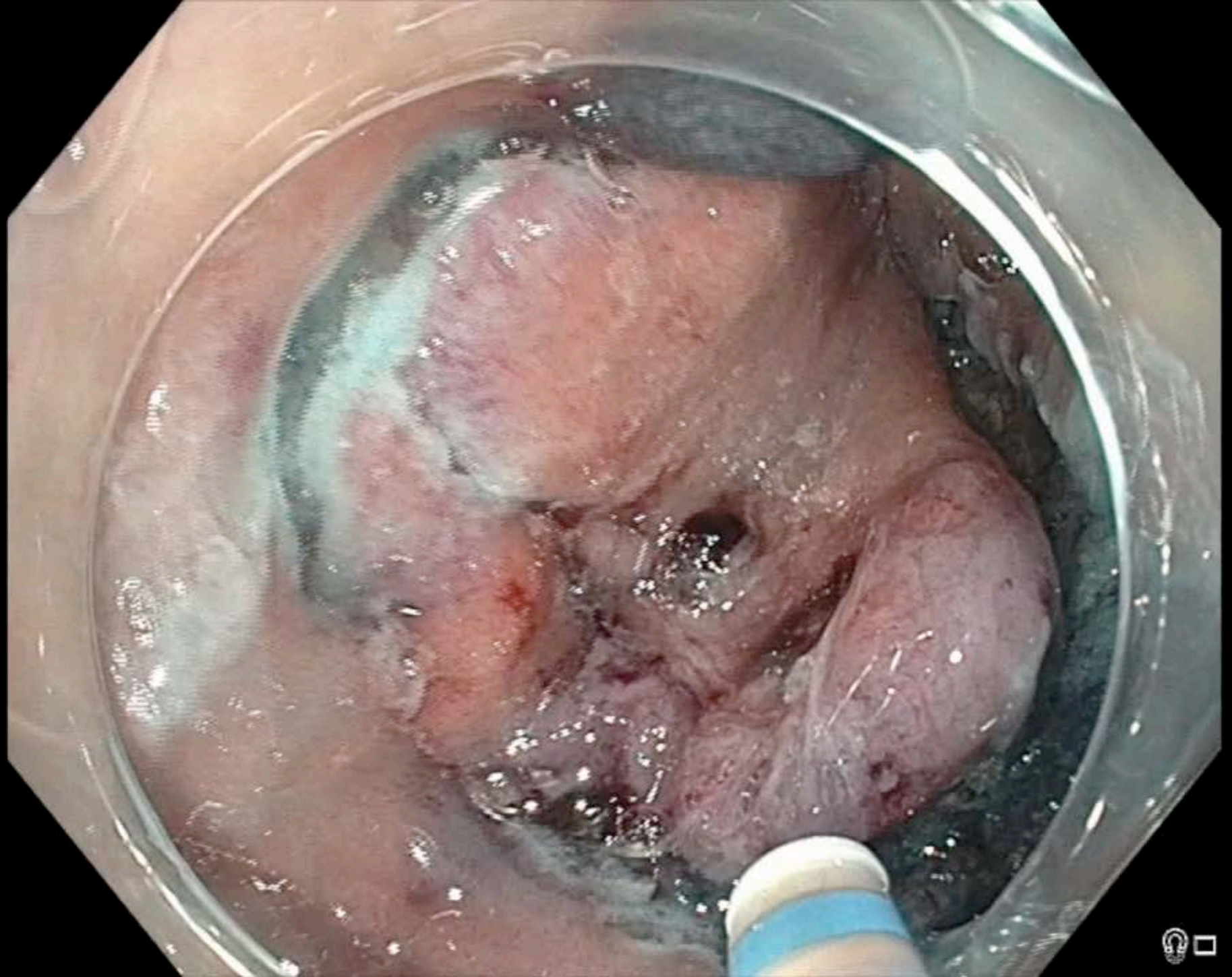
- One delayed bleeding treated with endoscopic hemostasis.
- No perforation or post coagulation syndrome.
- No interval colorectal cancer.

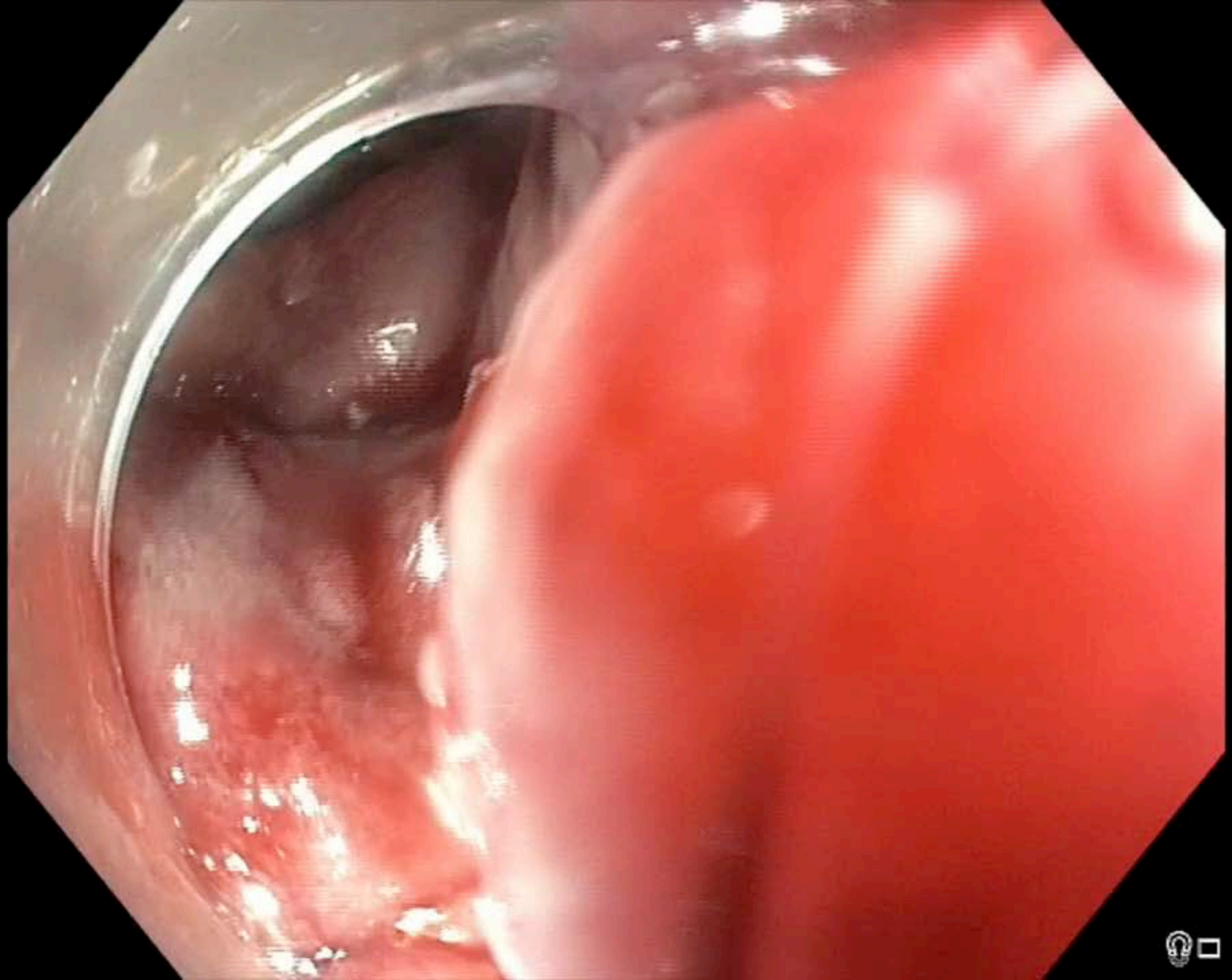
Secondary Outcomes- Longitudinal Follow Up

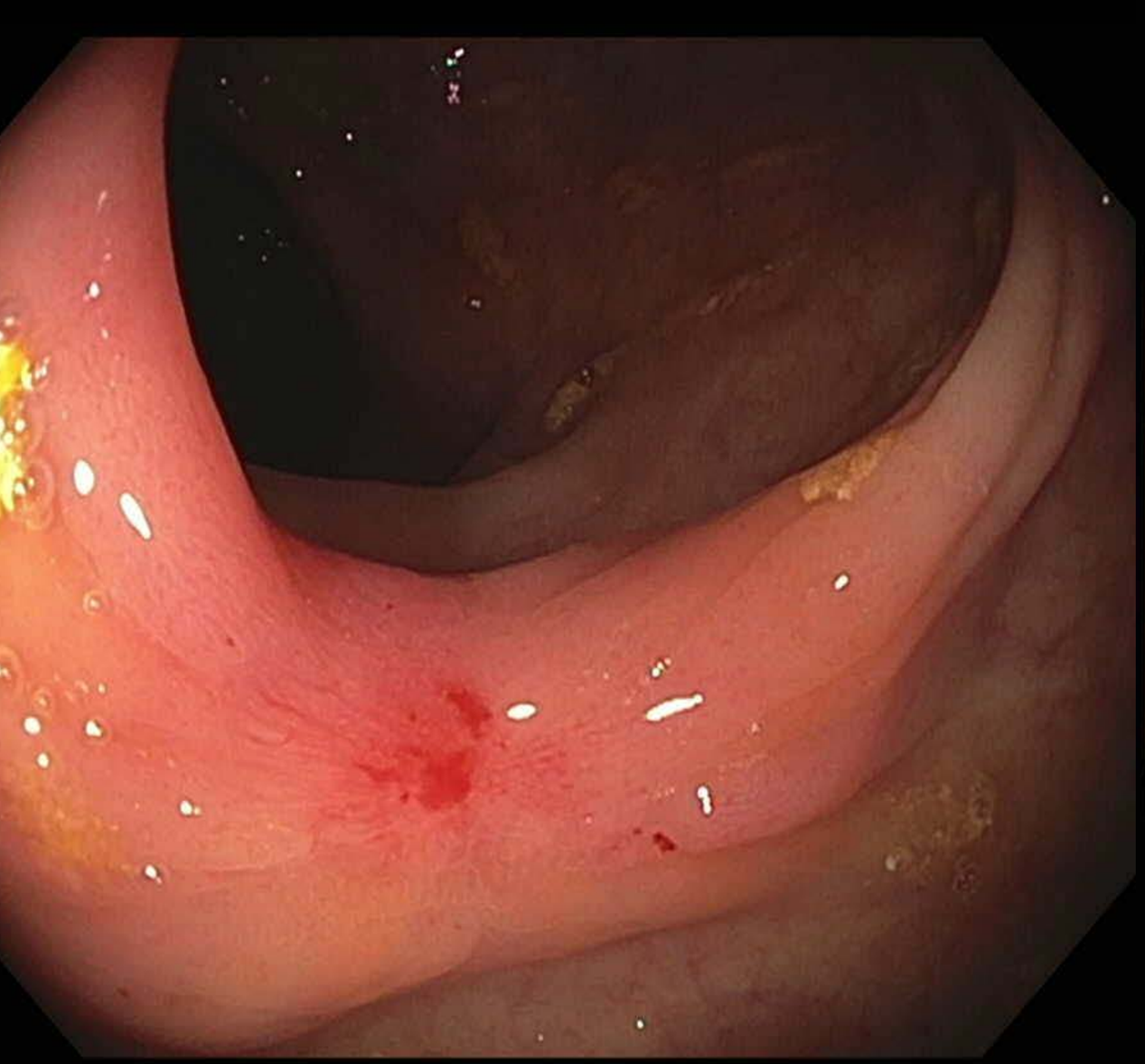
Total Follow Up	1208 patient-years
Follow Up Time	14.1 ± 26.1, range 0-12, months
Local Recurrence Rate*	6.3% (95%CI=1.8-15.5%)

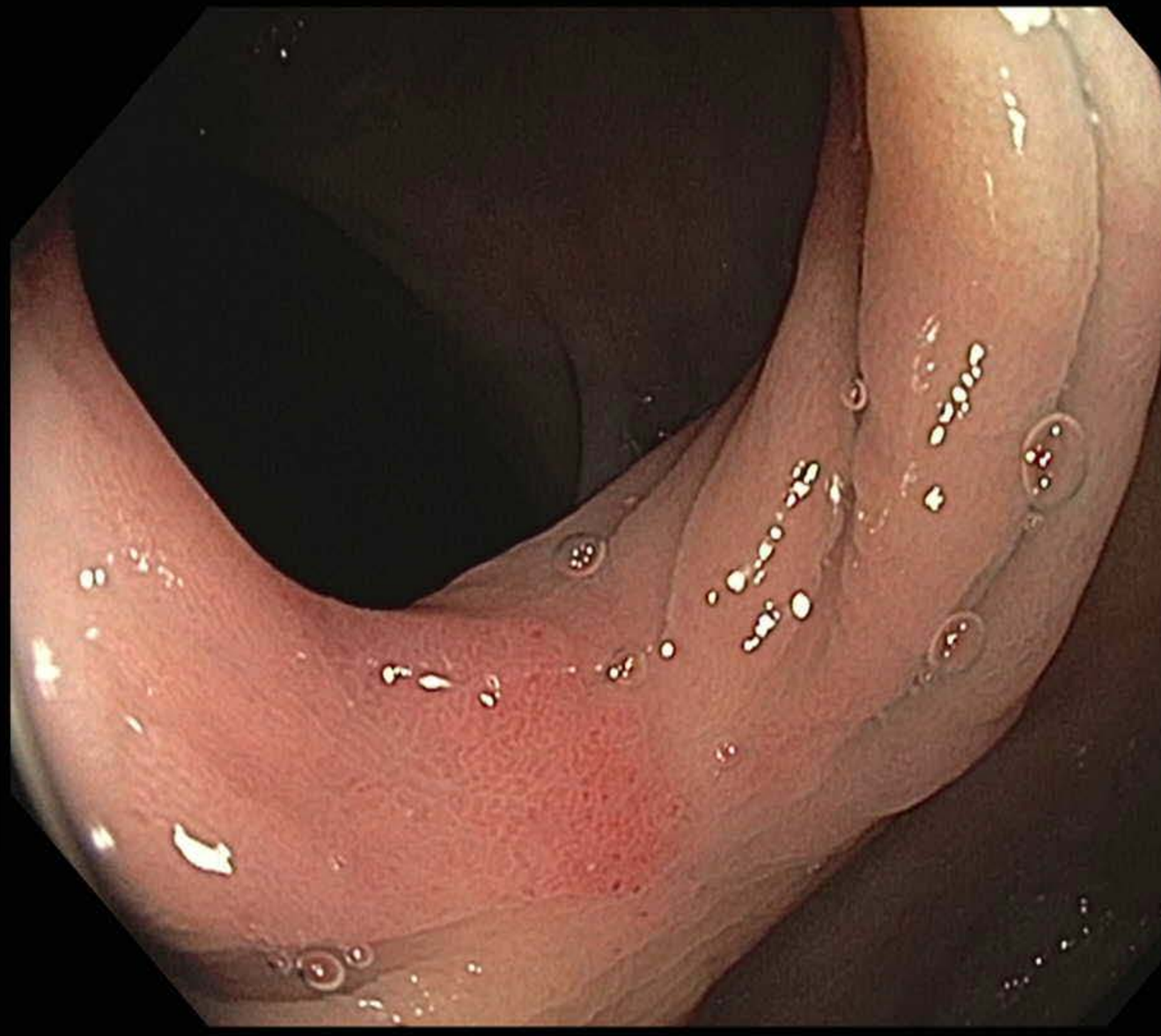
* All Recurrence Endoscopically Treated


Near
Focus









3 months Bx=no dysplasia 12 months

Summary

- The prevalence of nonpolypoid colorectal dysplasia in a male IBD surveillance cohort was 7.1%.
- Endoscopic resection of nonpolypoid colorectal dysplastic lesions is feasible (96.8% success), with rare complication rate.
- In a mean 14 months fu, there was a 6.3% rate of local recurrence, which could be successfully retreated with endoscopic therapy.
- No significant complications, colorectal cancer incidence or death.

Conclusion

In our IBD cohort of patients with nonpolypoid colorectal dysplasia after undergoing endoscopic resection, surveillance colonoscopy rather than colectomy, is safe and effective.

Overall Summary

- Increasing incidence data to support the cost-effectiveness of average risk screening starting age 45 years. Currently, only ACS recommendation.
- Engagement in quality improvement program with training and feedback is associated with improvements in ADR, and reductions in interval colorectal cancer.
- Artificial intelligence facilitates colonoscopy lesion detection and characterization/
- Endoscopic resection is first line therapy strategy for benign colorectal lesions. Surgical morbidity and mortality is significantly higher compared to endoscopic resection..
- Colonoscopy surveillance, in lieu of colectomy, is a safe and effective strategy in IBD patients with nonpolypoid colorectal dysplasia who have had complete endoscopic resection.


Thank You