

If Surgeons Embrace Adenoma Detection Rate Measurement and Improvement, Cancers Will Be Prevented and Lives Will Be Saved

Douglas K. Rex, M.D.

Division of Gastroenterology/Hepatology, Indiana University School of Medicine, Indianapolis, Indiana

See “Quality of colonoscopy: a comparison between gastroenterologists and nongastroenterologists,” by Muthukuru et al. on page 980.

In this issue of *Diseases of the Colon & Rectum*, investigators at a single US center report that the adenoma detection rate (ADR) for screening colonoscopies was 28.6% for gastroenterologists, 24.3% for colorectal surgeons, and 18.4% for general surgeons.¹ The implication is that gastroenterologists are more effective at detection during colonoscopy compared to colorectal surgeons, and particularly compared to general surgeons. In this editorial, I will briefly address what is understood about optimal detection at colonoscopy, variability in detection between colonoscopists in different specialties and within specialty, and the impact of suboptimal detection on important outcomes including colorectal cancer (CRC) and cancer death.

WHAT IS THE ADR?

The ADR was initially proposed by the US Multi-Society Task Force on Colorectal Cancer in 2002 as a measure of the quality of mucosal inspection during colonoscopy.²

Funding/Support: This work was supported by a gift from Scott Schurz of Bloomington, Indiana and his children to the Indiana University Foundation in the name of Douglas K. Rex.

Financial Disclosures: Dr. Rex is a consultant for Olympus Corporation, Boston Scientific, Medtronic, Aries Pharmaceutical, Braintree Laboratories, Lumendi, Ltd., Norgine, Endokey, GI Supply, and Covidian/Medtronic. Research support received from EndoAid, Olympus Corporation, Medivators, and Erbe USA Inc. Ownership: Satisfai Health.

Correspondence: Douglas K. Rex, M.D., 550 N University Blvd, Suite 4100, Indianapolis, IN 46202. E-mail: drex@iu.edu

Dis Colon Rectum 2020; 63: 867–869
DOI: 10.1097/DCR.0000000000001703
© The ASCRS 2020

DISEASES OF THE COLON & RECTUM VOLUME 63: 7 (2020)

The most recent refinement of ADR targets was made in 2015.³ Adenoma detection rate is the percentage of a colonoscopist's patients who are age ≥ 50 years and undergoing first-time screening colonoscopy who have one or more conventional adenomas pathologically identified. Adenoma detection rate does not include patients with only sessile serrated lesions (SSLs; also called sessile serrated adenomas or sessile serrated polyps). Interobserver variation among pathologists for distinguishing SSLs from hyperplastic polyps is too great to use SSL as a measure of endoscopist performance. Certainly, everyone agrees that SSL detection is important. Fortunately, there is a good correlation within individual endoscopists in detection of conventional adenomas and SSLs, so that ADR is generally a good surrogate of SSL detection.⁴

DOES ADR PREDICT CANCER PREVENTION BY COLONOSCOPY?

Yes, higher ADR predicts a lower risk of CRC after colonoscopy. Adenoma detection rate is a surrogate of missing lesions at colonoscopy, and missing (which requires 2 colonoscopies on the same day to measure) is a surrogate of cancer prevention.⁴ The strengths of ADR are that it can be measured within a narrow confidence interval using a reasonable number of colonoscopies, it measures endoscopist performance rather than pathologist performance, and it cannot be corrupted by endoscopist size measurements of polyp, or by pathologist interpretation of villous elements or dysplasia grade. Adenoma detection rate is minimally affected by patient factors other than age and sex.⁵ Thus, populations with variable rates of cigarette smoking, obesity, diabetes mellitus, etc, have almost no bearing on ADR and conclusions about ADR performance.⁵

In 2010, a large Polish study demonstrated that the patients of physicians with ADRs less than 20% had a

10-fold or higher risk of developing CRC before their next colonoscopy compared with the patients of physicians with ADRs above 20%.⁶ In 2014, a much larger study from California showed a strong relationship between ADR and subsequent CRC occurrence, and estimated that, for each 1% increase in ADR, there was a 3% decline in the risk of incident CRC and a 5% decline in incident fatal CRC.⁷

HOW IS ADR MEASURED?

Because ADR depends on pathologically documented conventional adenomas, and most endoscopy and pathology databases are not electronically linked, ADR measurement often requires manual entry of pathology findings into endoscopy databases. This effort can be averted by either electronic linking of endoscopy and pathology databases, or natural language processing of endoscopy and pathology reports, although neither is currently in widespread use. Whether ADR measurement is undertaken depends on whether endoscopists recognize its critical relationship to the fundamental goal of most colonoscopies (preventing CRC), and are therefore willing to commit resources to the measurement. These resources are typically a tiny fraction of the typical income of an endoscopy unit, but there is an expense to measure ADR.

Some surgeons may not have enough first-time screening colonoscopies to allow ADR measurement with a narrow confidence interval. In these circumstances, it is reasonable to include all colonoscopies in persons aged ≥ 50 years that are not performed for IBD or polyposis syndromes. Thus, surveillance ADR is 7% to 12% higher than screening ADR, and screening ADR runs higher than diagnostic colonoscopy ADR. When screening, surveillance, and diagnostic ADRs are averaged, they often approximate the screening ADR.⁴ Furthermore, second-time screening ADRs performed 10 years after a negative colonoscopy resulted in ADR that is only slightly lower than first-time screening ADR,⁴ so that second screenings could be reasonably included for physicians who perform lower numbers of colonoscopies.

WHAT IS AN APPROPRIATE ADR TARGET?

In 2015, US recommendations for the minimum acceptable threshold for ADR were raised to 30% for men, 20% for women, or 25% for a typical mixed-gender patient population.² These thresholds are recommended *minimum* thresholds, below which colonoscopists should undertake remedial work. Recent evidence indicates that cancer protection improves as ADR improves up to 50%.⁸ Thus, in many endoscopy units, the mean ADR of the gastroenterologists in the current study reported in this Journal of 28% would be viewed as just adequate, and improvement would be strongly encouraged.

TABLE 1. Basics of high-level detection and techniques and devices for improving the ADR

Basics of high-level detection
• Endoscopist knows full spectrum of endoscopic appearances of precancerous colorectal lesions
• Split- or same-day bowel preparation
• High-definition colonoscope
• Meticulous inspection technique <ul style="list-style-type: none"> ▪ Thorough probing of proximal sides of all folds, flexures, valves ▪ Complete clearing of residual debris ▪ Adequate distention
• Measurement and reporting of ADR
Nondevice maneuvers that increase detection
• Double colon examination (especially in right colon ^a) in either forward view or retroflexion
• Maintain distention during withdrawal (eg, patient rotation)
• Water exchange insertion
Devices to increase mucosal exposure
• Endocuff Vision ^b (AmplifEYE, cap-assisted)
• EndoRings
Tools that highlight flat lesions
• Chromoendoscopy (pan-colonic dye spraying)
• Methylene blue-MMX ^c
• Electronic chromoendoscopy ^d <ul style="list-style-type: none"> ▪ Narrow band imaging (Olympus Corporation) ▪ Blue light imaging (Fujinon) ▪ Linked color imaging (Fujinon) ▪ i-scan (Pentax)
• Artificial intelligence ^c

ADR = adenoma detection rate.

^aRoutine examination of the right colon twice is advocated because colonoscopy protects less well against right-colon than left-colon cancer.

^bEndocuff Vision has the largest body of supporting evidence.

^cNot yet available in the United States.

^dNewer, brighter forms of electronic chromoendoscopy increase ADR.

CAN COLONOSCOPISTS IMPROVE THEIR ADR?

Table 1 lists practices that have been associated with high-level detection, as well as adjunctive techniques and devices that either improve mucosal exposure during colonoscopy or highlight flat lesions. Colonoscopists with ADRs of 50% approach colonoscopy with a detailed understanding of the endoscopic appearance of the full spectrum of precancerous colorectal lesions, and, in particular, the marked subtlety of many flat adenomas and SSLs. Furthermore, they use split-dose or same-day bowel preparations, high-definition colonoscopes, and meticulous technique to achieve maximum mucosal exposure.

Education in lesion appearance and technique improve ADR, as does just the process of ADR monitoring and reporting. Physicians who improved their ADRs lowered their patients' risk of interval cancer compared with before the improvement.⁹ This observation completes the validation of ADR as the central quality measurement in colonoscopy.⁹

ARE SURGEONS AS EFFECTIVE AS GASTROENTEROLOGISTS IN DETECTION?

On average, gastroenterologists are more effective than nongastroenterologists at finding polyps, finding adenomas, and preventing CRC.^{10–13} Although some single-center studies found that detection performance by gastroenterologists and nongastroenterologists was comparable, including a study from the same center reporting in this issue,¹⁰ large multicenter and population-based studies, including from the United States, have largely shown that gastroenterologists have higher ADRs^{11,12} and lower rates of interval cancer after colonoscopy.¹³

However, variations in ADR between gastroenterologists in the same group are typically 3- to 6-fold,^{3,6,7} which is much larger than the differences documented between specialties. Given that cancer protection appears to improve up to ADRs near 50%, the central goal must be for all colonoscopists, regardless of specialty, to embrace ADR measurement and to strive to improve ADR.

IS WITHDRAWAL TIME AN ACCEPTABLE SUBSTITUTE FOR ADR?

Since 2002, US recommendations have been for withdrawal time (WT) during normal colonoscopies not involving biopsy or polypectomy to average at least 6 minutes.² In retrospective studies, WT correlates well with ADR and even with CRC prevention.⁸ However, when applied prospectively as a primary quality indicator, WT fails.¹⁴ This is almost certainly because WT can be so easily gamed. Efforts to improve ADR should focus on lesion recognition and optimal technique (Table 1). Applying effective technique takes time, and recent evidence indicates that cancer prevention and detection of serrated lesions are optimized at WTs of about 9 minutes rather than 6 minutes.^{8,15} Withdrawal time should be measured in clinical practice, but its utility is only to signal that an endoscopist with a low ADR is likely applying ineffective inspection technique. Currently, there is no good substitute for measuring ADR.

CONCLUSIONS

Given that the fundamental purpose of screening, surveillance, and diagnostic colonoscopies is to prevent patients from developing CRC and dying of CRC, and that ADR has been tightly linked to this outcome, there is an ethical mandate for colonoscopists to measure and improve ADR, regardless of specialty. Although many colonoscopy quality indicators are recommended,³ and the field of quality improvement is expanding toward the assessment of polypectomy technique,¹⁶ there is widespread agreement that colonoscopy quality improvement begins with ADR. If surgeons performing colonoscopy embrace ADR measurement and improvement, cancers will be prevented. Lives will be saved.

REFERENCES

1. Muthukuru S, Alomari M, Bisen R, et al. Quality of colonoscopy: a comparison between gastroenterologists and nongastroenterologists. *Dis Colon Rectum* 2020;63:980–987.
2. Rex DK, Bond JH, Winawer S, et al; U.S. Multi-Society Task Force on Colorectal Cancer. Quality in the technical performance of colonoscopy and the continuous quality improvement process for colonoscopy: recommendations of the U.S. Multi-Society Task Force on Colorectal Cancer. *Am J Gastroenterol*. 2002;97:1296–1308.
3. Rex DK, Schoenfeld PS, Cohen J, et al. Quality indicators for colonoscopy. *Gastrointest Endosc*. 2015;81:31–53.
4. Rex DK. Detection measures for colonoscopy: considerations on the adenoma detection rate, recommended detection thresholds, withdrawal times, and potential updates to measures. *J Clin Gastroenterol*. 2020;54:130–135.
5. Jensen CD, Doubeni CA, Quinn VP, et al. Adjusting for patient demographics has minimal effects on rates of adenoma detection in a large, community-based setting. *Clin Gastroenterol Hepatol*. 2015;13:739–746.
6. Kaminski MF, Regula J, Kraszewska E, et al. Quality indicators for colonoscopy and the risk of interval cancer. *N Engl J Med*. 2010;362:1795–1803.
7. Corley DA, Jensen CD, Marks AR, et al. Adenoma detection rate and risk of colorectal cancer and death. *N Engl J Med*. 2014;370:1298–1306.
8. Shaikat A, Rector TS, Church TR, et al. Longer withdrawal time is associated with a reduced incidence of interval cancer after screening colonoscopy. *Gastroenterology*. 2015;149:952–957.
9. Kaminski MF, Wieszczy P, Rupinski M, et al. Increased rate of adenoma detection associates with reduced risk of colorectal cancer and death. *Gastroenterology*. 2017;153:98–105.
10. Sarvepalli S, Garber A, Rothberg MB, et al. Association of adenoma and proximal sessile serrated polyp detection rates with endoscopist characteristics. *JAMA Surg*. 2019;154:627–635.
11. Ko CW, Dominitz JA, Green P, Kreuter W, Baldwin LM. Specialty differences in polyp detection, removal, and biopsy during colonoscopy. *Am J Med*. 2010;123:528–535.
12. Zorzi M, Senore C, Da Re F, et al; Equipe Working Group. Quality of colonoscopy in an organised colorectal cancer screening programme with immunochemical faecal occult blood test: the EQuIPE study (Evaluating Quality Indicators of the Performance of Endoscopy). *Gut*. 2015;64:1389–1396.
13. Cooper GS, Xu F, Barnholtz Sloan JS, Schluchter MD, Koroukian SM. Prevalence and predictors of interval colorectal cancers in Medicare beneficiaries. *Cancer*. 2012;118:3044–3052.
14. Sawhney MS, Cury MS, Neeman N, et al. Effect of institution-wide policy of colonoscopy withdrawal time > or = 7 minutes on polyp detection. *Gastroenterology*. 2008;135:1892–1898.
15. Butterly L, Robinson CM, Anderson JC, et al. Serrated and adenomatous polyp detection increases with longer withdrawal time: results from the New Hampshire Colonoscopy Registry. *Am J Gastroenterol*. 2014;109:417–426.
16. Duloy AM, Kaltenebach TR, Keswani RN. Assessing colon polypectomy competency and its association with established quality metrics. *Gastrointest Endosc*. 2018;87:635–644.