

# Maximizing the Effectiveness of Colonoscopy in the Prevention of Colorectal Cancer



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## KEYWORDS

- Colonoscopy • Colorectal cancer • Interval cancer • Adenoma detection rate
- Polypectomy • Assistive devices • Advanced techniques

## KEY POINTS

- Colonoscopy is the gold standard for colon cancer prevention and maximizing its efficacy leads to a decrease in interval colorectal cancer rates.
- The adenoma detection rate is the most widely accepted surrogate marker for an effective provider of screening colonoscopy, in addition to specific quality metrics identified within individual procedures.
- Methods to improve adenoma detection rate include adopting endoscopic techniques, using updated and high-definition endoscopy equipment, and using assistive devices in the appropriate clinical setting.
- Proper polypectomy technique decreases the chances for residual polyp and thus decreases interval colorectal cancer rates.
- Advanced polypectomy techniques, including endoscopic mucosal resection and endoscopic submucosal dissection, have a developing role in the nonsurgical management of large polyps.

## EFFECTIVENESS OF COLONOSCOPY FOR COLORECTAL CANCER PREVENTION

Colorectal cancer is the third most commonly diagnosed cancer and the third most common cause of death related to cancer in the United States.<sup>1</sup> Colonoscopy with polypectomy of adenomatous polyps results in a 76% to 90% reduction in the incidence of colon cancer in appropriately screened individuals.<sup>2</sup> Although colonoscopy

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is considered the gold standard test in the prevention of colorectal cancer, variations in physician performance and other technical issues limit its effectiveness. In this article, we summarize pertinent data to incorporate into practice to maximize the efficacy of screening colonoscopy and achieve the greatest benefit in terms of colorectal cancer prevention.

### **INTERVAL COLORECTAL CANCER**

Interval colorectal cancers are cancers that are diagnosed after a screening or surveillance examination in which no cancer is detected, and before the date of the next recommended examination.<sup>3</sup> Large, population-based studies have demonstrated that approximately 6% of colorectal cancers are interval cancers.<sup>4</sup> Interval cancers are more likely to be diagnosed in patients over the age of 60, in those who have a family history of colorectal cancer, in those who have an index colonoscopy with a previously detected adenoma, and to occur on the right side of the colon.<sup>4,5</sup>

The cause of interval cancers is thought to be 3-fold: undetected adenomatous polyps, incomplete resection of adenomatous polyps, and the interval growth of aggressive adenomatous lesions.<sup>6</sup> Therefore, a key to decreasing the rate of interval colorectal cancer is to maximize the effectiveness of colonoscopy with an increased rate at detecting and completely removing precancerous polyps. In addition to a sound procedural technique, proper surveillance interval recommendations will take the quality of the bowel preparation, size and number of adenomatous polyps into consideration to reduce the risk of an interval colorectal cancer.

Physicians finding or removing large polyps should consider marking the proximal and distal segment containing the lesion with carbon ink when the lesion cannot be easily identified by a normal anatomic landmark such as the cecal base or ileocecal valve. Special attention to avoid injecting into or under the base of the lesion is necessary to avoid causing scar formation by targeting a fold or two away from the lesion. Also, physicians must avoid partial polypectomy, which makes further endoscopic therapy difficult.

### **INCREASING THE ADENOMA DETECTION RATE**

The proportion of screening colonoscopy examinations performed by a physician that detect 1 or more adenomas is the adenoma detection rate (ADR). The ADR is a very simple calculation and serves as a basic quality measure in physician performance because it has been inversely correlated with the rate of interval colorectal cancer.<sup>7</sup> An ADR of 25% is considered to be an acceptable rate for the standard physician.<sup>8</sup> Based on the inverse relationship between ADR and interval colorectal cancer, it would ensue that increasing the ADR would lead to a decrease in interval colorectal cancers, with recent studies mentioned elsewhere in this article demonstrating an even higher ADR with careful procedural techniques. In fact, ADR has been validated as an independent predictor of the risk of interval cancer.<sup>9</sup> Therefore, determining techniques and methods to maximize the ADR has been at the forefront of the literature seeking to maximize the effectiveness of screening colonoscopy.

Withdrawal time is the amount of time a physician spends examining the colonic mucosa after intubation and identification and photo documentation of the cecum landmarks of appendicular orifice and ileocecal valve, until the endoscope is withdrawn from the anus. A longer withdrawal time has been shown to correlate with significantly higher ADRs. Physicians with a withdrawal time of more than 6 minutes detect a neoplastic lesion in 23.8% of colonoscopies compared with 11.8% for those with a withdrawal time of less than 6 minutes.<sup>10</sup> The authors also found a higher

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