Colonoscopy Surveillance After Polypectomy and Colorectal Cancer Resection

CONSENSUS GUIDELINES FROM THE U.S. MULTI-SOCIETY TASK FORCE ON COLORECTAL CANCER and THE AMERICAN CANCER SOCIETY

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This article describes a joint update of guidelines by the American Cancer Society and the U.S. Multi-Society Task Force on Colorectal Cancer delineating evidence-based surveillance recommendations for patients after polypectomy and colorectal cancer resection. Although there are some qualifying conditions, the following general guidelines apply: after colonoscopic polypectomy, patients with hyperplastic polyps should be considered to have normal colonoscopies, and subsequent colonoscopy is recommended at 10 years. Patients with one or two small (less than 1 cm) tubular adenomas, including those with only low-grade dysplasia, should have their next colonoscopy in five to 10 years. Patients with three to 10 adenomas, any adenoma 1 cm or larger, or any adenoma with villous features or high-grade dysplasia should have their next colonoscopy in three years. Following curative resection of colorectal cancer, patients should undergo a colonoscopy at one year, with subsequent follow-up intervals determined by the results of this examination. Adoption of these guidelines will have a dramatic impact on the quality of care provided to patients after a colorectal cancer diagnosis, will assist in shifting available resources from intensive surveillance to screening, and will ultimately decrease suffering and death related to colorectal cancer. (***Am Fam Physician*****. 2008;77(7):995-1002, 1003-1004.**

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▶ **See related editorial on page 924.**

▶ **Patient information:** A handout on colonoscopy surveillance, written by Uma Jayaraman, MD, Editing Fellow, is provided on page 1003.

Colorectal cancer is the third most common cancer in men and women, and the second leading cause of cancer death in the United States.[1] In 2007, an estimated 153,760 new cases of colorectal cancer will be diagnosed, and more than 52,000 Americans will die of this disease, accounting for 10 percent of all cancer deaths.[1] New cases and deaths are equally distributed between men and women.[1]

Most colorectal cancers arise from a nonmalignant lesion, the adenomatous polyp (i.e., adenoma), in a process that takes seven to 15 years.[2] The rationale for colorectal cancer screening is that detection and removal of adenomas interrupts the progression from adenoma to carcinoma and, thus, prevents cancer. Colorectal cancer incidence and mortality rates have decreased steadily for more than a decade; this change is attributed to the increase in colorectal cancer screening and adenoma removal that occurred during this period.[1,3]

The use of surveillance colonoscopy to detect new disease after initial screening has also increased significantly in the past decade.[3] Surveillance recommendations have been published by a number of organizations.[4,5] However, recent studies have documented a lack of familiarity with and adherence to these guidelines, including overuse of surveillance procedures by gastroenterologists and surgical endoscopists[6] and excessive rates of referral by primary care physicians for surveillance testing that is not indicated.[7]

Overuse of colonoscopy has significant costs. In addition to the financial waste incurred by the health care system, overtesting

SORT: KEY RECOMMENDATIONS FOR PRACTICE

Clinical recommendation	*Evidence rating*	*References*
Surveillance colonoscopy and polypectomy should be performed in patients with a history of adenomas in order to reduce their risk of future colorectal cancer.	B	14, 15, 17
Patients with typical hyperplastic polyps at screening colonoscopy should be considered to have normal colonoscopies and should have their next follow-up colonoscopy in 10 years.	C	13
Patients with one or two small (less than 1 cm) tubular adenomas, including those with only low-grade dysplasia, should have their next follow-up colonoscopy in five to 10 years.	B	16, 17
Patients with three to 10 adenomas, any adenoma 1 cm or larger, or any adenoma with villous features or high-grade dysplasia should have their next colonoscopy in three years, providing that piecemeal removal has not been done and the adenomas are completely removed.	B	17
Patients undergoing curative resection for colon or rectal cancer should undergo a colonoscopy one year after the resection (or one year after the colonoscopy to clear the colon of synchronous disease).	A	30, 31, 33, 35, 37, 47
The joint USMSTF/ACS panel recommends against the routine use of fecal occult blood testing of post-polypectomy patients.	C	11

USMSTF/ACS = U.S. Multi-Society Task Force on Colorectal Cancer/American Cancer Society.

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, see page 896 or http://www.aafp.org/afpsort.xml.

exposes patients to unnecessary risks. Serious complications are estimated to occur in approximately one to five of every 1,000 colonoscopies.[8-10] Additionally, overuse of surveillance colonoscopy may hinder timely screening and diagnostic examinations.[3]

In response to these concerns, the American Cancer Society (ACS) and the U.S. Multi-Society Task Force on Colorectal Cancer (USMSTF, a consortium representing the American College of Gastroenterology, the American Society of Gastrointestinal Endoscopy, the American Gastroenterological Association, and the American College of Physicians) recently collaborated on an updated consensus guideline on the use of surveillance colonoscopy.[11,12] Separate recommendations were developed to address appropriate follow-up of post-polypectomy patients and patients who have undergone resection of colon or rectal cancer.

Recommendations for Post-Colorectal Polypectomy Surveillance

Table 1[11] summarizes the surveillance recommendations for post-colorectal polypectomy.

EVIDENCE AND RATIONALE

Most polyps fall into one of two broad categories—hyperplastic or adenomatous. Hyperplastic polyps are generally thought to have little or no risk of malignant transformation, with the exception of the hyperplastic polyposis syndrome.[13] In contrast with the low risk associated with typical hyperplastic polyps, adenomatous polyps have a clear propensity for transition to cancer (although most do not become malignant). When transformation occurs, the progression from adenoma to cancer usually takes several years, and detection and removal of adenomas during this premalignant phase markedly decreases the incidence of colorectal cancer.[14-16] Patients in whom adenomas are detected have an increased risk of future adenomas and colorectal cancer, and the rate of future cancers can be substantially reduced by surveillance colonoscopy and polypectomy.[14,15,17]

The initial adenoma or cancer is referred to as the index lesion. Additional neoplastic growths found during the same evaluation are termed synchronous lesions, whereas those detected at subsequent assessment are labeled metachronous.

At the time of the initial polypectomy, patients can be stratified into lower- and higher-risk groups for the development of future neoplasia, and assigned to an appropriate follow-up schedule, reserving the highest intensity follow-up (i.e., the shortest interval or highest frequency) for those at highest risk. The joint USMSTF/ACS evidence review identified several factors that are associated with the development, number, and severity of future adenomas.[12]

Quality of the Baseline Colonoscopy. Even in expert settings, colonoscopy misses a small number of adenomas and cancers.[18-20] However, this miss rate is substantially increased when the quality of the examination has been compromised by one or more factors.[21,22] The USMSTF has defined high-quality colonoscopy as a procedure in which there is little fecal residue, colonoscopy reaches the cecum, and there is a minimum withdrawal time from the cecum of six minutes.[23] Studies evaluating colonoscopies that do not meet these criteria have found consistently higher miss rates for advanced lesions compared with colonoscopies that achieve these standards.[21,22,24] In one study of colonoscopy in a community practice, colonoscopists with a mean withdrawal time of six minutes or more found nearly three times more neoplasia and more than twice as many advanced neoplasia compared with their colleagues with mean withdrawal times of less than six minutes.[22]

Incomplete Polyp Removal. Incomplete removal of large sessile adenomas from the colon and rectum is associated with an increased risk of future cancers in these sites.[16] Evidence suggests that many cancers diagnosed soon after colonoscopy are related to this phenomenon.[24,25]

Table 1. Post-Colorectal Polypectomy Surveillance Recommendations

Risk group	*Surveillance recommendation*
Patients with small colorectal hyperplastic polyps (these patients are considered to have normal colonoscopies)	Next follow-up colonoscopy in 10 years An exception is patients with the hyperplastic polyposis syndrome because they are at increased risk for adenomas and colorectal cancer and must be identified for more intensive follow-up
Patients with one or two small (< 1 cm) tubular adenomas with only low-grade dysplasia	Next follow-up colonoscopy in five to 10 years The precise timing within this interval should be based on other clinical factors (e.g., previous colonoscopy findings, family history, patient preferences, judgment of the physician)
Patients with three to 10 adenomas, any adenoma ≥ 1 cm, or any adenoma with villous features or high-grade dysplasia	Next follow-up colonoscopy in three years, provided that piecemeal removal has not been done and the adenomas are completely removed If the follow-up colonoscopy is normal or shows only one or two small (< 1 cm) tubular adenomas with low-grade dysplasia, the interval for the subsequent examination should be five years
Patients with more than 10 adenomas at one examination	Next follow-up colonoscopy at a shorter interval (three years or less) established by clinical judgment, and the physician should consider the possibility of an underlying familial syndrome
Patients with sessile adenomas that are removed piecemeal	Consider follow-up colonoscopy at two- to six-month intervals to verify complete removal Once complete removal has been established, subsequent surveillance should be individualized, based on the endoscopist's judgment; completeness of removal should be based on endoscopic and pathologic assessments
Patients suspected of having hereditary nonpolyposis colorectal cancer	More intensive surveillance than every 10 years is indicated when the family history indicates hereditary nonpolyposis colorectal cancer; recommendation for confirmed disease is colonoscopy every one to two years

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Adenoma Characteristics. Detection of future neoplasia has been associated with a variety of index lesion characteristics. These factors are outlined in *Table 2*.[16]

Patient Characteristics. Various patient-related features may affect the likelihood of metachronous neoplasia. Generally, a higher risk for colorectal cancer is associated with male sex, older age, and a personal or family history of polyps or cancer. Although there is some evidence supporting a role for each of these,[14,17,26,27] the degree of risk conferred by these factors (alone or in combination) is unclear. Thus, in the current recommendations, stratification does not vary based on these features.

An important exception is the patient with a family history suggestive of hereditary nonpolyposis colorectal cancer, familial adenomatous polyposis, or other known genetic syndromes associated with colorectal cancer. Physicians should suspect the presence of one of these genetic syndromes in patients with multiple relatives with polyps or cancers, particularly if they were diagnosed before the age of 50 years. Such patients require special screening and surveillance, which may also include the use of genetic testing.[5,28,29]

Table 2. Summary of Predictive Factors at Index Colorectal Polypectomy for the Development of Subsequent Advanced Adenomas

Factors associated with increased risk
Three or more adenomas
Adenoma ≥ 1 cm
Villous features or high-grade dysplasia
Factors associated with lower risk*
High-quality baseline examination
One or two adenomas < 1 cm
Adenomas removed completely
All lesions < 1 cm
No villous features or high-grade dysplasia

**—Based on at least one long-term study, the risk of a colorectal cancer diagnosis after polypectomy among persons with lower-risk features is similar to that in the average-risk population.*

Information from reference 16.

SURVEILLANCE INTERVALS

Studies of post-polypectomy colonoscopy evaluated in the USMSTF/ACS evidence review were limited to five to six years' duration.[17,27] Based on the available data, the joint panel projected that patients in the lower-risk group can safely wait five years, and possibly as long as 10 years, for a follow-up colonoscopy. However, the panel recognized that, in the absence of definitive long-term data, some patients and physicians will be uncomfortable with the longer surveillance interval. For this reason, the interval recommendations for this group are flexible.

Appropriate stratification based on the characteristics delineated in *Table 2*,[16] coupled with adherence to the surveillance recommendations outlined in *Table 1*,[11] allows patients at a higher risk of disease to receive more intensive surveillance and decreases or eliminates the overuse of scarce colonoscopy resources among the much larger low-risk group.

Recommendations for Post-Colorectal Cancer Resection Surveillance

Table 3[12] addresses the surveillance recommendations for patients with a post-colorectal cancer resection.

EVIDENCE AND RATIONALE

Post-colorectal cancer resection surveillance has the potential to achieve two goals. The first is to detect recurrence of the primary cancer at an early stage, increasing the possibility of curative treatment and long-term survival. The second, equally significant aim is the detection of metachronous colorectal adenomas or cancers.

Prevention or Early Detection of Local Recurrence. Available studies have not demonstrated a survival benefit as a result of annual surveillance colonoscopy following colorectal cancer resection. This lack of benefit is most likely a result of the low rates of anastomotic and intraluminal recurrence (2 to 4 percent in most modern series), and of the fact that, when such recurrences occur, they are usually associated with advanced intra-abdominal and pelvic invasive diseases.[30-37]

Table 3. Post-Colorectal Cancer Resection Surveillance Recommendations

Patients with colorectal cancer should undergo high-quality perioperative clearing
In patients with nonobstructing tumors, this can be done by preoperative colonoscopy
In patients with obstructing tumors, computed tomography colonography with intravenous contrast or double contrast barium enema can be used to detect neoplasms in the proximal colon
In these cases, a colonoscopy to clear the colon of synchronous disease should be considered three to six months after the resection if no unresectable metastases are found during surgery; alternatively, colonoscopy can be performed intraoperatively
Patients undergoing curative resection for colon or rectal cancer should undergo colonoscopy one year after the resection (or one year after the colonoscopy to clear the colon of synchronous disease); this colonoscopy should be performed in addition to perioperative colonoscopy for synchronous tumors
If the one-year colonoscopy is normal, the next colonoscopy should be performed in three years; if those results are normal, the next colonoscopy should be performed in five years
After the one-year colonoscopy, the intervals between subsequent examinations may be shortened if there is evidence of hereditary nonpolyposis colorectal cancer or if adenoma findings (i.e., histology, size, and number) warrant earlier colonoscopy
Periodic examination of the rectum to identify local recurrence, usually performed by rigid proctoscopy, flexible proctoscopy, or rectal endoscopic ultrasonography at three- to six-month intervals for the first two to three years, may be considered after low anterior resection of rectal cancer; these examinations are independent of the colonoscopic examinations described above for detection of metachronous disease

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Local recurrence rates for rectal cancer may be up to 10 times greater than those for colon cancer,[38-41] largely because of lack of adherence to recommended surgical, chemotherapeutic, and radiotherapeutic interventions in many parts of the United States. These high rates of local recurrence provide a rationale for the use of surveillance sigmoidoscopy or endoscopic ultrasonography after resection of rectal cancer.

Surveillance colonoscopy and biopsy of the resection site three to six months after removal of a sessile malignant polyp by piecemeal resection is recommended. These procedures also are reasonable in patients with other cancers that are resected endoscopically and for which no surgical resection is planned.

Detection of Metachronous Neoplasia. In addition to evaluating the possible recurrence of a primary tumor, post-colorectal cancer resection surveillance also has the potential to prevent metachronous cancers (through adenoma detection and removal) or to find such cancers at an early, curable stage. Data supporting post-colorectal cancer resection surveillance for this purpose are much more robust than evidence for its use to detect local recurrence.

For post-colorectal cancer resection surveillance to achieve optimal value, careful clearing of synchronous neoplasia must take place in the perioperative period. Published series indicate that careful endoscopic evaluation of patients with colorectal cancer will detect synchronous cancers in the colon or rectum in up to 7 percent of patients at the time of initial diagnosis.[37,42-45] If appropriate colonoscopic clearing is performed at the time of the original diagnosis, any lesions found at subsequent endoscopy are categorized as metachronous, although it is conceivable that some of these are synchronous lesions that were missed at the initial endoscopy.

Based on the available research, it seems that one metachronous cancer is found for

Table 4. Additional Surveillance Considerations for Patients with Colorectal Cancer

The current recommendations assume that colonoscopy is complete to the cecum and that bowel preparation is adequate; a repeat examination should be performed before planning a long-term surveillance program if the bowel preparation was not adequate
There is clear evidence that the quality of examinations is highly variable; a continuous quality-improvement process is critical to the effective application of colonoscopy in colorectal cancer prevention
A repeat examination is warranted if there is a concern that the polyp is incompletely removed, particularly if it shows high-grade dysplasia
Endoscopists should make clear recommendations to primary care physicians about when the next colonoscopy is indicated
Given the evolving nature of guidelines, it is important that physicians and patients remain in contact so that surveillance recommendations reflect changes in guidelines
Pending further investigation, performance of fecal occult blood testing is discouraged in patients undergoing colonoscopic surveillance
Discontinuation of surveillance colonoscopy should be considered in patients with serious comorbidities who have life expectancies of less than 10 years, according to the physician's judgment
Surveillance guidelines are intended for asymptomatic patients; those with new symptoms may need diagnostic work-up
The application of evolving technologies such as chromoendoscopy, magnification endoscopy, narrow-band imaging, and computed tomography colonography are not yet established for postpolypectomy surveillance

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every 157 post-resection surveillance colonoscopies performed.[42] Many of these cancers are found within the first two years after resection.[46] Up to 65 percent of metachronous lesions detected at surveillance are stage A or B cancers, and patients with such lesions are likely to be candidates for repeat surgery.[30-32,37,45,47] Most metachronous lesions are asymptomatic at the time of diagnosis and may elude detection for a significant time without routine surveillance.

Additional Considerations

Other factors that require consideration because of their potential impact on surveillance decisions and outcomes are outlined in *Table 4*.[11]

An area that raises many questions among physicians and the public is the possible use of other colorectal cancer screening tests as surveillance measures. In particular, fecal occult blood testing (FOBT) is commonly performed in post-polypectomy patients, despite the absence of convincing evidence of effectiveness in this setting. Although no positive impact on cancer outcomes has been proven, it has been shown that the use of routine FOBT after colonoscopy yields a significant number of false-positive results, leading to additional colonoscopies (and their attendant costs and risks) with minimal apparent benefit.[48-50] Based on this evidence, the joint USMSTF/ACS panel recommends against the routine use of FOBT in post-polypectomy patients.

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