

Many Patients Who Undergo Surgery for Colorectal Cancer Receive Surveillance Colonoscopies Earlier Than Recommended by Guidelines

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BACKGROUND & AIMS: Patients treated with surgery for colorectal cancer (CRC) should undergo colonoscopy examinations 1, 4, and 9 years later, to check for cancer recurrence. We investigated the use patterns of surveillance colonoscopies among Medicare patients. **METHODS:** We used the Surveillance, Epidemiology and End Results (SEER)–Medicare linked database to identify patients who underwent curative surgery for colorectal cancer from 1992 to 2005 and analyzed the timing of the first 3 colonoscopies after surgery. Early surveillance colonoscopy was defined as a colonoscopy, for no reason other than surveillance, within 3 months to 2 years after a colonoscopy examination with normal results. **RESULTS:** Approximately 32.1% and 27.3% of patients with normal results from their first and second colonoscopies, respectively, underwent subsequent surveillance colonoscopies within 2 years (earlier than recommended). Of patients who were older than 80 years at their first colonoscopy, 23.6% underwent a repeat procedure within 2 years for no clear indication. In multivariable analysis, early surveillance colonoscopy was not associated with sex, race, or patients' level of education. There was significant regional variation in early surveillance colonoscopies among the Surveillance, Epidemiology, and End Results regions. There was a significant trend toward reduced occurrence of second early surveillance colonoscopies. **CONCLUSIONS: Many Medicare enrollees who have undergone curative resection for colorectal cancer undergo surveillance colonoscopy more frequently than recommended by the guidelines. Reducing overuse could free limited resources for appropriate colonoscopy examinations of inadequately screened populations.**

Keywords: Prevention; Early Detection; Colon Cancer Screening; Cost Efficacy.

Colorectal cancer is the third most common cancer in the United States. In 2012, an estimated 143,460 patients will be diagnosed with colorectal cancer.¹ In 76% of these patients, the disease will be either localized or extending to the regional lymph nodes, qualifying them for curative resection.^{2,3} Approximately 30% to 40% of patients will develop recurrent colorectal cancer after curative surgery.^{2,4,5} Studies show that surveillance colonoscopy identifies early recurrences at a stage that allows curative treatment.^{6–11} Hence, the American Cancer Society, American Gastroenterology Association, and the US Multi-Society Task Force on Colorectal Cancer all recommend surveillance colonoscopy in patients who have undergone curative

resection of colorectal cancer.¹¹ The current guidelines call for patients to undergo their first surveillance colonoscopy at 1 year after the surgery. If the colonoscopy is normal, the next colonoscopy should be performed after 3 years, and then every 5 years.¹¹ The guidelines of gastroenterology and oncology societies for colorectal cancer surveillance have been changing during the past decade. Table 1 summarizes the guidelines recommended by various societies in the past few years.^{12–14}

Some attention has been paid to underuse of surveillance colonoscopy in the United States.^{15–19} For example, Cooper et al¹⁵ showed that only 73.6% of patients with colorectal cancer who underwent surgery with curative intent received one surveillance colonoscopy within 3 years. By contrast, data on overuse of surveillance colonoscopy are limited. Studying overuse of surveillance colonoscopy is important because colonoscopy is an invasive test with rare but potentially life-threatening complications.^{20–22} Overuse of colonoscopy can lead to increased toxicities without added benefit. Second, colonoscopy is a limited resource, in terms of facilities and practitioners.^{23,24} Identifying and decreasing overuse of surveillance colonoscopy should free up resources for greater use in inadequately screened populations.

The objective of this study was to describe the use patterns of surveillance colonoscopy in Medicare patients who underwent curative resection of colorectal cancer during 1992 to 2005. In this article, we focus on the potential overuse of surveillance colonoscopy in this setting, in particular the use of colonoscopy at shorter intervals than recommended.

Methods

Data Source

We used the Surveillance, Epidemiology and End Results (SEER)–Medicare linked database. The SEER–Medicare data links 2 large population-based sources of detailed information about Medicare beneficiaries with cancer. The data came from the SEER Program of cancer registries that collect clinical, demographic, and cause of death information for persons with cancer and the Medicare claims for covered health care services from the time of a person's Medicare eligibility until death. Since 2000, SEER programs were expanded to 16 registries that represent 28% of the US population.

Abbreviations used in this paper: PCP, primary care providers; SEER, Surveillance, Epidemiology and End Results.

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Study Subjects and Outcome

We formed a cohort of patients aged 66 years and older diagnosed with colorectal cancer during 1992 to 2005. We included those diagnosed with American Joint Committee on Cancer stages 1 to 3 colorectal cancer. Patients with a history of inflammatory bowel disease were excluded. We studied the pattern of receipt of the first 3 colonoscopies after curative surgery in this cohort. To ensure complete information, we excluded patients who were not enrolled in both Medicare Part A and B and were members of a health maintenance organization for the period under observation. In the analyses of surveillance colonoscopy, we limited our study cohorts to patients diagnosed in 1992 to 2003 for the second colonoscopy and in 1992 to 2002 for the third colonoscopy. We examined the indications for colonoscopy using the diagnosis on the colonoscopy claim (provided in the Appendix). We considered the colonoscopies as indicated if the diagnosis was anemia, gastrointestinal bleeding, or other relevant diagnosis such as change in bowel habits, weight loss, abdominal pain, or colostomy problems. If a barium enema or computed tomography of the abdomen or pelvis was performed in the 3 months before the colonoscopy, we also considered the colonoscopy as indicated. A *diagnostic colonoscopy* was defined as one performed to evaluate a clinical indication or performed after radiology. We used the term *surveillance colonoscopy* to refer to procedures performed with no clinical indication or evidence of prior radiology. We used the term *any colonoscopy* to refer collectively to both diagnostic and surveillance colonoscopies.

Table 1 summarizes the guidelines of various authorities of the optimal time between surveillance colonoscopies in patients who had undergone curative resection of colorectal cancer.¹²⁻¹⁴ Some of the recommendations changed during the study period (1992-2005). The minimum duration for the second surveillance colonoscopy in all these guidelines is 3 years after a normal first colonoscopy, and the minimum duration for a third surveillance colonoscopy was 3 to 5 years after a normal second colonoscopy. Hence, we defined any second or third surveillance colonoscopy performed any time from 3 months to 2 years after the previous normal colonoscopy as early surveillance colonoscopy. We defined a normal colonoscopy as one not associated with any procedure such as polyp removal, biopsy, or any other procedure.

Table 1. Guidelines for Duration Between Surveillance Colonoscopy

Society	Recommendation ^a
American Gastroenterological Association (1997)	1 y, then every 3 y
American Society of Clinical Oncology (2000)	Every 3-5 y
American Society of Colon and Rectal Surgeons (2004)	Every 3 y
US Multi-Society Task Force on Colorectal Cancer (2006)	1 y, after 3 y, and then every 5 y

^aIn these recommendations, the intervals between the colonoscopy procedures are based on the assumption that the previous procedure was normal.

Table 2. Characteristics of Patients Who Underwent Curative Surgery for Colorectal Cancer During 1992-2005

Characteristics	Category	N	%
Overall		70,419	100.0
Age, y	67-69	10,754	15.3
	70-74	16,465	23.4
	75-79	17,713	25.2
	≥80	25,487	36.2
Sex	Male	31,895	45.3
	Female	38,524	54.7
Ethnicity	White	59,860	85.0
	Black	4541	6.4
	Hispanic	2663	3.8
	Other	3355	4.8
SEER regions	Connecticut	7178	10.2
	Detroit	7444	10.6
	Hawaii	1213	1.7
	Iowa	8706	12.4
	New Mexico	1867	2.7
	Seattle	4624	6.6
	Utah	1873	2.7
	Atlanta/rural Georgia	2567	3.6
	Kentucky	4015	5.7
	Louisiana	3210	4.6
	New Jersey	8305	11.8
	California	19,417	27.6
Marital status	Married	36,345	51.6
	Not married	34,074	48.4
Census track education (% of adults with <12 y education)	<9.1%	16,246	23.4
	9.1% to <15.3%	17,032	24.5
	15.3% to <23.4%	16,712	24.0
	≥23.4%	19,580	28.1
Census track poverty (% of adults below the poverty line)	<4.1%	15,389	22.1
	4.1% to <7.7%	16,442	23.6
	7.7% to <15.1%	17,168	24.7
Comorbidity	≥15.1%	20,571	29.6
	0	61,982	88.0
	1	5209	7.4
	2	1865	2.6
Year of diagnosis	≥3	1363	1.9
	1992	3839	5.5
	1993	3500	5.0
	1994	3581	5.1
	1995	3421	4.9
	1996	3435	4.9
	1997	3413	4.8
AJCC stage	1998	3569	5.1
	1999	3333	4.7
	2000	7295	10.4
	2001	7247	10.3
	2002	7198	10.2
	2003	7213	10.2
	2004	6774	9.6
	2005	6601	9.4
Grade	1	21,052	29.9
	2	27,680	39.3
	3	21,687	30.8
Well	Well	6604	9.4
	Moderate	47,510	67.5
	Poor	12,678	18.0
	Unknown	3627	5.2

AJCC, American Joint Committee on Cancer.

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