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The following article was printed on page 5 of the January 2010 issue of **Diseases of the Colon and Rectum**.

The article looks at the present recommendations for colon polyp and cancer surveillance using recommendations of the United States Preventative Services Task Force (USPSTF).

The current guidelines recommend that screening begin at age 50, and end at age 75.

The article points out that in a single hospital system, using the preceding guidelines, failing to screen patients younger than age 50 or older than age 75 would have missed 49% of patients requiring treatment.

Although age and coexisting medical problems should be considered when recommending screening, the article places into question the current USPSTF recommendations and suggests expanding the age criteria for colon polyp and cancer screening.

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ORIGINAL CONTRIBUTION

Evaluating the Age Distribution of Patients With Colorectal Cancer: Are the United States Preventative Services Task Force Guidelines for Colorectal Cancer Screening Appropriate?

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PURPOSE: Evaluate the appropriateness of the 2008 United States Preventative Services Task Force screening recommendations for colorectal cancer.

METHODS: Ages at diagnosis data were collected on patients with colorectal cancer from the William Beaumont Tumor Registry. The database identified 6,925 patients treated for colorectal cancer between January 1973 and December 2007. Patients were divided into 3 age groups at diagnosis categories (younger than 50 years old, those 50 to 75 years old, and those older than 75 years old) to evaluate whether there were changes in the age distribution, pathologic stage, or tumor location during the 35-year period.

RESULTS: The percent of patients with colorectal cancer older than age 75 years increased from 29% to 40% ($P < .0001$). The combined percentage of patients younger than age 50 years and older than age 75 years has increased from 36% (1973–1978) to 49% (2003–2007). The combined percentages of stage III and IV disease in patients younger than 50 years and older than 75 years were 51% and 34%, respectively ($P < .0001$). Rectal or left-sided lesions occurred in 68%, 64%, and 50% of patients younger than 50 years old, those 50 to 75 years old, and those older than 75 years old, respectively ($P < .0001$). Right-sided lesions occurred in 22%, 25%, and 37% of those younger than 50 years old, those 50 to 75 years old, and those older than 75 years old, respectively ($P < .0001$).

CONCLUSIONS: There has been a significant increase in the percentage of colorectal cancer patients older than age 75 years. Failing to screen patients younger than 50 years and older than the age of 75 years would miss 49% of patients treated at our institution from 2003 to 2007.

KEY WORDS: Screening colonoscopy; Colon cancer; Rectal cancer; Colorectal cancer screening; United States Preventative Services Task Force screening guidelines.

The purpose of this study was to evaluate the appropriateness of the current United States Preventative Services Task Force (USPSTF) screening recommendations for colorectal cancer. Evaluation of age at diagnosis data for colorectal cancer patients treated within the Beaumont Hospital System was undertaken to determine what percent of patients with colorectal cancer fall within the USPSTF guidelines for colorectal cancer screening. Pathologic stage and tumor location data were also evaluated to determine whether either variable was a function of the patient's age.

In October 2008, the USPSTF released new guidelines for colorectal cancer screening.[1] The guidelines were based on a decision analysis, which used simulation models to assess theoretical life-years gained with screening vs no screening, and the number of colonoscopies and noncolonoscopy tests required.[2] Noncolonoscopy screening tests included fecal occult blood testing (Hemoccult II, Hemoccult SENSA), fecal immunochemical tests, flexible sigmoidoscopy, and flexible sigmoidoscopy plus hemoccult testing. The guidelines recommend that for average-risk patients, colorectal cancer screening should begin at age 50 years and continue until age 75 years. The guidelines

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TABLE 1. Percent of colorectal cancer patients by age at diagnosis category per 5-year period

Age at diagnosis category	1973–1978, %	1978–1983, %	1983–1988, %	1988–1993, %	1993–1998, %	1998–2003, %	2003–2007, %	N
· 50	7.1	6.8	7.3	8.1	6.7	8.4	8.7	539
·50 ı · 75	64.1	61.2	59.5	59.3	56.3	52.1	51.1	3874
·75	28.9	32.1	33.3	32.6	37.1	39.6	40.2	2512
·85	5.7	8.6	8.0	7.0	8.0	8.9	12.0	613
· 50 ı ·75	35.9	38.8	40.6	40.7	43.8	47.9	48.9	3051

recommend against routinely screening patients 76 to 85 years old. Screening patients older than the age of 85 years is not recommended. To evaluate the appropriateness of these guidelines, a study of the Beaumont hospital system's tumor registry was undertaken. The Beaumont hospital system includes 2 tertiary referral centers with a combined 1357 beds located in Royal Oak and Troy, Michigan. The intent of the study was to evaluate what percentage of patients treated for colorectal cancer within the Beaumont system would qualify for screening based on age.

MATERIALS AND METHODS

After receiving approval from the hospital internal review board, age at diagnosis, pathologic stage, and tumor location data were collected on patients with colorectal cancer from the Beaumont hospital system tumor registry. The registry currently contains information on all colorectal cancer patients treated in the Beaumont system from January 1973 to December 2007. A database search of all patients being treated for colorectal cancer identified 6,925 patients treated at the 2 campuses. These data were then analyzed dividing the 35-year time period into seven 5-year increments. Patients were divided into 3 age groups at diagnosis categories (younger than 50 years, 50 to 75 years, and older than 75 years) to evaluate whether there were changes in the age distribution, pathologic stage, or tumor location during the 35-year period. To estimate the frequency in which patients had tumors that presented with symptoms vs those that were detected on routine screening within the study, the authors reviewed the operative reports, endoscopy reports, and dictated history and physical examinations of the 1510 patients in the 2003 to 2007 time period. The 2003 to 2007 time period was chosen because these patient's records were the most accessible having been recorded on the hospital system's current electronic medical records system.

The statistical analysis was performed with SAS version 9.1.3 (SAS Institute, Cary, NC). Univariate analyses were performed using Pearson's χ^2 test when the expected frequency was greater than five. The Fisher's exact probability test was used when the expected frequency was less than five. $P < .05$ was considered statistically significant. Pathologic stage data were available for 5,667 of the 6,925 (82%) patients identified by the database search. Tumor location data were recorded in the tumor registry using the International Classification of Diseases for Oncology codes for colon and rectal cancer and were available for all patients within the study.

RESULTS

The percent of patients older than the age of 75 years increased from 29% to 40% ($P < .0001$). The percent of patients younger than age 50 years with colorectal cancer, however, has not increased from 1973 to 2007 ($P = .39$). Patients older than the age of 85 years comprised 12% of all colorectal cancer patients from 2003 to 2007, which was a significant increase during the previous 5-year time periods ($P < .0001$). The combined percentage of patients who are younger than age 50 years and older than age 75 years has significantly increased from 36% (1973–1978) to 49% (2003–2008). The percentage of patients who are in the 50- to 75-age category steadily declined from 64% (1973–1978) to 51% (2003–2007; Table 1).

The pathologic stage at diagnosis varied significantly based on age category with patients younger than age 50 years being more likely to present with stage III or IV ($P < .0001$) disease than patients who were older than the age of 50 years (Table 2). Fifty-one percent of patients younger than age 50 years presented with either stage III or IV disease, whereas the 50- to 75-year-old age group and older than 75-year-old age group presented with stage III or IV disease 41% and 35% of the time, respectively ($P < .0001$). Tumor location varied significantly between age groups with patients younger than 50 years old exhibiting rectal and left-sided disease in 68% of cases. Patients 50 to 75 years old and those older than 75 years old exhibited rectal

TABLE 2. Pathologic stage distribution of colorectal cancer patients by age category (1973–2007)

Age at diagnosis category	Stage I, %	Stage II, %	Stage III, %	Stage IV, %	N
<50	27.0	21.8	33.0	18.3	449
≥50–≤75	33.4	25.2	28.1	13.3	3335
> 75	31.3	33.9	24.2	10.6	1883

TABLE 3. Tumor location distribution by age category (1973–2007)

Age at diagnosis category	Right colon, %	Transverse colon, %	Left colon, %	Rectosigmoid junction, %	Rectum, %
<50	22.1	10.2	26.7	10.9	30.1
≥50 to ≤75	24.6	11.3	28.4	9.0	26.8
> 75	37.3	13.2	24.5	6.3	18.7

and left-sided disease in 64% and 50% of cases, respectively. Right-sided lesions occurred in 22%, 25%, and 37% of those younger than 50 years old, those 50 to 75 years old, and those older than 75 years old, respectively ($P < .0001$; Table 3).

The authors' review of patient records for the 2003 to 2007 time period found that overall only 13.9% of patients had routine screening documented as the method in which their tumors were diagnosed. When the patients were divided into those younger than 50 years, those 50 to 75 years, and those older than 75 years, the frequency in which their tumors were diagnosed on routine screening was 2.3%, 17.5%, and 12.0%, respectively. The majority of patients, at 53.6%, had gastrointestinal bleeding documented as the reason for which their tumors were diagnosed. Determining which of these patients had occult blood loss vs life-threatening bleeding secondary to their tumors was not possible in a significant number of cases, with the records that were reviewed.

DISCUSSION

The recent increase of patients presenting with colorectal cancer who are older than the age of 75 years is not surprising given the ever-increasing lifespan in the United States. This finding, however, challenges the most recent USPSTF guideline of not routinely performing screening colonoscopy after age 75. Failing to screen patients older than 75 years would potentially miss 40% of patients treated for colorectal cancer within the Beaumont system. From 2003 to 2007, 49% of patients with colorectal cancer were younger than 50 years old or older than 75 years old, placing them outside the current screening recommendations. In the past 5 years, 12% of colorectal cancer patients were older than the age of 85 years at the time of diagnosis. Assuming the adenoma to carcinoma sequence requires 10 years, a negative screening colonoscopy at age 75 would be inadequate screening for 12% of patients who have colorectal cancer. The decrease in the number of colorectal cancer patients between ages 50 and 75 over time might indicate that screening has made an impact by making the disease less common in the age group at which it is targeted. The ideal goal of colonoscopy is to detect and treat polyps before malignant degeneration, and our findings may serve as a testament to the preventative capabilities of colonoscopy. Given the large number of patients older than the age of 75 years, who are treated for colon and rectal cancer at our institution, it seems that consideration should be given for extending the age range for screening.

Our study did not find an increase in the percentage of colorectal cancer patients younger than the age of 50 years. Another recent study of the Nationwide Inpatient Sample Database, however, found that the number of colorectal cancer resections in patients younger than age 50 years, in the United States, increased from 11.8% to 13.3% from 1998 to 2003.[3] Patients younger than the age of 50 years had low perioperative mortality rates, and therefore, the recommendation of the authors was to consider earlier screening. Other recent population-based studies have found both an increasing incidence of colorectal cancer in patients younger than the age of 50 years and have also found that they tend to present with higher stage disease.[4,5] Our study also found that patients younger than the age of 50 years were more likely to present with advanced disease. Failing to screen an age group that is demonstrating an increased incidence of the disease coupled with higher stage at presentation is concerning.

Tumor location varied significantly among the 3 age categories. Rectal and left-sided colon cancers were much more common in patients younger than the age of 50 years. Right-sided lesions occurred in 22% of patients younger than 50 years, although patients older than age 75 years demonstrated a 37% incidence of right-sided lesions. This finding suggests that patients older than age 75 years, who theoretically have been undergoing screening, are still developing right-sided colon cancers. Another recent study found that complete colonoscopy was strongly associated with fewer deaths from left-sided cancers but not right-sided cancers.[6] The authors speculated that detection of right-sided polyps and cancers is a limitation of colonoscopy and that screening does not necessarily protect patients from mortality related to right-sided colon cancers.

There are obvious limitations to this retrospective review of one hospital system's tumor registry. Although the study captured all patients who underwent surgery at the 2 hospitals within the 35-year period, it did not account for the patients who did not undergo resection. One possible explanation for the increase in the percentage of patients older than age 75 years being treated for colorectal cancer at our institution during the past 35 years is that more patients of advanced age are being offered surgery in recent years owing to improvement in perioperative care.

Additionally, although there were a large number of patients identified by the database, the patient demographic treated within the Beaumont system may not be a reflection of the general US population. Referral patterns to the hospital system could affect the number of colorectal cancer patients who present with advanced age or higher tumor stage. Younger patients or patients with lower stage disease may more likely be treated at smaller community hospitals, whereas patients of advanced age or with higher stage disease are more likely to be sent to referral centers, such as our institution.

Information regarding whether the patients in this study had received screening and how their diagnoses were made was not available through the tumor registry database. To evaluate the percentage of patients whose tumors were detected on routine screening, the authors performed a review of the records for all patients in the 2003 to 2007 time period. Operative reports, endoscopy reports, and dictated history and physical examinations were reviewed; however, the manner in which the patients' tumors were diagnosed could not be determined in all cases. A multiinstitutional, prospectively recorded database could potentially better define the actual demographic distribution of patients who have colon and rectal cancer to better determine which patients should be screened.

Despite these limitations, when nearly 50% of patients surgically treated for colon and rectal cancer at 2 large urban hospitals fall outside the current screening criteria, the current USPSTF guidelines are placed in question. Consideration should be given to offering screening to patients beyond age 75 who have sufficient performance status to tolerate resection, should a lesion be found. With the ever-increasing cost of healthcare, however, the cost to benefit ratio of screening a broader age range of patients must be considered before changing screening recommendations. Additionally, the increased risks of performing colonoscopy in patients of advanced age must also be carefully weighed.

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