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Understanding Gastroenterologist Adherence to Polyp Surveillance Guidelines

Tilak U. Shah, MD[1,2], **Corrine I. Voils, PhD**[1], **Rebecca McNeil, PhD**[1], **Richard Wu, MD, MPH**[2], and **Deborah A. Fisher, MD, MHS**[1,2]

[1]Durham VA HSR&D Center, Durham, NC

[2]Duke University Medical Center, Durham, NC

Background

In 2006, the US Multi-society Task Force on Colorectal Cancer and the American Cancer Society published updated guidelines for colonoscopy follow-up after polypectomy [1]. A growing body of data suggests that gastroenterologists often recommend repeat colonoscopy for colonic polyp surveillance more frequently than guidelines recommend [2–6]. Overuse of colonoscopy for polyp surveillance poses a significant economic burden, [7] may contribute to decreased colonoscopy capacity for initial screening, and increases the risk of complications [8, 9].

Incomplete knowledge of guideline recommendations among gastroenterologists likely explains some of the guideline non-adherence. In a survey of gastroenterologist's knowledge of 2003 colonoscopy surveillance guidelines, 76% who answered knowledge related questions correctly reported that their practice was to repeat colonoscopy sooner than guidelines suggested [5]. This implies that other factors such as legal risk, reimbursement, and disagreement with the evidence base supporting the guidelines may also contribute to guideline non-adherence. Better characterizing these potential determinants is the first step towards ultimately improving guideline adherence.

We conducted a survey to assess factors that may contribute to physicians' recommendations for colonoscopy intervals after polypectomy. We also sought to determine if the patterns of colonoscopy overuse observed in community-based studies were also reported in a salaried, managed-care setting, the Veterans Affairs (VA) health system, where reimbursement and legal concerns may not play as prominent a role in determining behavior.

Methods

Questionnaire development

A 57-item survey instrument was developed based on literature review, conceptual models of physician behavior, semi-structured discussions with community and academic gastroenterologists, and review by investigators with survey methodology expertise [10–12]. The survey instrument included questions testing knowledge of 2006 polyp surveillance guidelines, clinical vignettes that assessed surveillance recommendations in clinical practice after polypectomy, and questions evaluating attitudes about guidelines in general and colonoscopy guidelines in particular [12]. The vignettes specified that the hypothetical

Corresponding author: Tilak Shah, M.D., Duke University Medical Center, Box 3913, Durham, NC 27710, Telephone: 919-286-2287, Fax: 919-613-6352, Pager: 919-970-9014, tilak.shah@duke.edu.

patient was at average risk for colorectal cancer, colonoscopy was completed to the cecum, and bowel preparation was adequate to exclude polyps ≥5 mm. Factors associated with guideline adherence were collected as ordinal variables on a Likert scale. The questionnaire was piloted among gastroenterology faculty at Duke University Medical Center. Feedback from this group was used to establish face and content validity and revise the content of the survey instrument. Reported completion times ranged from 3–8 minutes. Test-retest reliability of the instrument was measured by administering the survey to a convenience sample of gastroenterology trainees at Duke twice with at least a 4-week interval in between.

Study Population

The study population comprised all gastroenterologists in the United States employed by the VA system as of April 2010. Physicians were excluded from the study if a valid email address could not be located and the physician was not listed as employed by the VA system any longer. Physicians were also excluded if they responded to the survey request with a message that they no longer worked at the VA.

Survey Administration

A link to a web-based version of the survey using the host Survey Monkey (www.surveymonkey.com) was emailed to all potential subjects. All responses were anonymous. Following established survey methodology we contacted participants multiple times and offered token incentives including a $10 Amazon gift card and the opportunity to enter in a drawing for an Apple iPad [13–18]. The web-based survey was closed after 12 weeks. Then, individuals who did not request any token incentives and had not opted out of the study were mailed a paper copy of the questionnaire along with a postage-paid return envelope and an opportunity to participate in the iPad drawing.

The study was approved by the institutional review board (IRB) at the Durham VA medical center. The test-retest reliability portion of the study was approved by the IRB at Duke University Medical Center.

Statistical Analysis

Test-retest reliability of the survey instrument was measured by calculating test-retest correlation (tetrachoric or polychoric) using MPlus software. SAS Enterprise Guide version 4.2 (Cary, NC) was used for all of the remaining analyses. Gastroenterologists who responded that they did not perform colonoscopy were included in the calculation of overall sample size and response rate, but excluded from all other analyses. Descriptive statistics were used to summarize socio-demographic characteristics. Knowledge and actual practice variables were categorized as guideline concordant or discordant, and summarized using frequencies and percentages. Relationships between knowledge and actual practice were expressed using contingency tables and phi correlations. Among the subset of physicians who answered knowledge questions for a specific guideline recommendation correctly, the Cochrane-Armitage trend test was used to compare responses to each attitude related question between physicians whose self-reported practice was guideline concordant and those whose practice deviated from the guideline recommendation.

Results

A total of 16 trainees participated in the test-retest reliability assessment. The test-retest reliability of the individual survey questions in the survey instrument ranged from −0.09 to 0.97, with a mean correlation of 0.54. One hundred and forty-four (144) gastroenterologists responded to the web-based survey, and an additional 55 gastroenterologists responded to the mailed questionnaire. The overall response rate was 40% (199/498). Of the 192

physicians who responded that they performed colonoscopy, 93% indicated they were familiar with colonoscopy guidelines (Table 1)

For the scenario of a single hyperplastic polyp, 49/190 (26%) incorrectly answered that guidelines recommend repeat colonoscopy sooner than 10 years. In contrast, 21% and 18% incorrectly stated that guidelines recommend a longer interval than 3 years for surveillance of a single tubular adenoma > 1 cm and three 5–8 mm tubular adenomas respectively. Similarly, 76/189 (40%) incorrectly reported that guidelines recommend surveillance colonoscopy at an interval longer than 2–6 months after piecemeal resection of a sessile adenoma (Table 2).

For the scenario of three small (<1 cm) hyperplastic polyps, 37/190 (19%) reported that they repeated colonoscopy sooner than every 10 years (Table 3). One the other hand, 48/190 (25%) responded that for three 5–8 mm adenomas, they would repeat colonoscopy later than every 3 years (Table 3). Knowledge and practice were correlated for all scenarios, with phi correlation ranging from 0.3–0.7.

Among the 158 subjects who correctly identified 10 years as the recommended interval for surveillance of 3 small hyperplastic polyps and also provided a response for self-reported practice, 11 (7%) stated that they would repeat colonoscopy sooner. Among respondents who correctly identified 3 years as the recommended surveillance interval for three small tubular adenomas, 12% reported that they would repeat colonoscopy later. Among gastroenterologists who knew the guideline recommendation for multiple small (<1 cm) hyperplastic polyps, those who reported their practice was to repeat colonoscopy more frequently were less likely to agree that guidelines are a convenient source of advice or that current clinical research justifies recommended post-polypectomy intervals. They were also more likely to agree that colonoscopy guidelines did not apply to many of their patients, colonoscopy guidelines increase risk of a missed cancer diagnosis, and that there are benefits to early repeat colonoscopy not captured in the guidelines (Table 4). Among respondents who knew the guidelines for multiple adenomas, physicians who reported that they repeated colonoscopy at a longer interval were less likely to agree that guidelines are likely to be used in physician discipline, colonoscopy guidelines are likely to decrease physician reimbursement, and that there are benefits to early repeat colonoscopy not captured in the guidelines (Table 5).

Discussion

Multiple studies describe overutilization of screening and surveillance colonoscopy in the fee for service and Medicare population [4, 6]. However, patterns of repeat colonoscopy recommendation among US gastroenterologists are not as well described in an integrated healthcare network such as the VA system. Similar to studies in other US populations, almost 20% of VA gastroenterologists participating in our survey recommended more frequent surveillance for hyperplastic polyps. On the other hand, we noted underuse of surveillance colonoscopy for adenomatous polyps, even among physicians who knew the guideline recommendations.

Our survey suggests substantial gaps in knowledge of guideline recommendations for polyp surveillance. Even if all non-respondents had answered knowledge questions correctly, up to 10% of gastroenterologists in the VA system would not know the guideline recommendations for hyperplastic and adenomatous polyps, and 15% would not know the recommendation for follow-up after piecemeal removal of a sessile adenoma.

Although incomplete knowledge clearly contributes to non-adherence, 7% of physicians who correctly identified 10 years as the recommended surveillance interval for hyperplastic

polyps chose to repeat colonoscopy more frequently. Given that our study was conducted amongst gastroenterologists employed in a salaried setting, our findings highlight that overuse is not solely related to financial incentive. Gastroenterologists who knew the guideline recommendation for hyperplastic polyps but recommended more frequent surveillance were less likely to agree that current clinical research justifies post-polypectomy intervals.

In recent years, a growing body of evidence has implicated a serrated polyp pathway of colorectal cancer. In contrast to the traditional adenoma-carcinoma sequence, the serrated pathway implicates hyperplastic polyps, particularly those in the proximal colon. Transformation of hyperplastic to sessile serrated adenomas with malignant potential represents a continuum of histologic abnormality without sharp boundaries, so distinguishing between the two can be challenging [20–22][23, 24]. While it is possible that responses to the hyperplastic polyp scenarios may have differed if we specified the polyps were located in the rectum, the emerging literature on sessile serrated adenomas suggests that they tend to be larger than typical hyperplastic polyps [25]. Disagreement with guidelines was observed even for the scenario of small hyperplastic polyps (<1 cm). As our understanding continues to evolve, future revisions of guidelines may need to be more specific regarding management of large hyperplastic polyps in the right colon.

Bivariate analyses suggest that gastroenterologists who knew the guideline for repeating colonoscopy after removal of multiple adenomas was 3 years but reported their practice was to recommend a longer interval were less concerned about legal and financial ramifications of less frequent surveillance compared to physicians who knew and followed the guidelines [3, 5]. Although these findings support the influence of practice setting on behavior, further investigation is necessary to confirm whether this reported underutilization is truly occurring in a salaried, federally employed setting.

We elected not to evaluate the impact of bowel prep quality on guideline adherence because current guidelines explicitly assume an adequate prep, and consider inadequate bowel prep a reason to repeat colonoscopy before making long-term surveillance recommendations. Nonetheless, the common occurrence of inadequate bowel prep in practice offers one potential explanation for why gastroenterologists who knew the guidelines but reported their practice was different were more likely to report that “colonoscopy guidelines do not apply to many of my patients.”

Our study has several strengths. For one, questionnaire development was informed by a theory-based conceptual model as well as discussions with academic and community gastroenterologists [10, 11]. Moreover, we surveyed the entire well-defined population (VA gastroenterologists); thus, the survey provides information from 40% of all VA-based gastroenterologists.

The study results also need to be interpreted in the context of the potential limitations. Survey respondents may differ from non-respondents, but the actual presence, magnitude, and direction of non-response bias is difficult to assess at any response rate [26]. We used a number of evidence-based strategies to maximize response including short survey length, multiple contacts, token incentives, and sequential administration of mixed mode surveys. Since we limited the study population to gastroenterologists, the results may not generalize to non-gastroenterologists who perform colonoscopy. We opted to restrict our study to this specialty because gastroenterologists perform the bulk of colonoscopy in the United States, and therefore represent a high yield target to study. Since the population was limited to salaried VA gastroenterologists who may be less susceptible to legal action due to the federal tort claims act, the observed underutilization of surveillance colonoscopy for

adenomas may not generalize to other settings. Finally, we conducted a number of bivariate analyses in our sample to assess potential determinants of non-adherence. These analyses are, therefore, best interpreted as exploratory, and suggest areas for further investigation and targeted intervention.

In summary, our results suggest that potential targets for intervention to improve the appropriateness of colonoscopy utilization include strategies to improve education of gastroenterologists about colon polyp surveillance guidelines, improve distinction of serrated from typical hyperplastic polyps, and clarify the management of hyperplastic polyps in the proximal colon.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Socio-demographics of survey respondents who perform colonoscopy (n=192)

Years since completion of colonoscopy training	Median	17.5 years
	Range	2 – 48 years
Number of colonoscopies performed per month	1–10	8 (4%)
	11–25	29 (15%)
	26–50	62 (32%)
	51–100	70 (36%)
	>100	22 (11%)
Gender	Male	147 (77%)
	Female	45 (3%)
Familiarity with guidelines	1 (not familiar)	0 (0%)
	2	1 (1%)
	3	9 (5%)
	4	54 (28%)
	5 (very familiar)	125 (65%)

Of the 199 respondents, 7 responded that they did not perform colonoscopy and were therefore excluded from characterization of socio-demographics. Among the 192 eligible subjects, 1 physician did not provide a response to the question on number of colonoscopies per month, and 3 physicians did not respond to the question on familiarity with guidelines.

Percentages are calculated using denominator of 192, and rounded to nearest whole number

Table 2

Knowledge of 2006 Multi-society polyp surveillance guidelines (n=192)

Scenario	Guideline recommendation	Guideline concordant response Number (%)	Shorter interval than guideline recommendation Number (%)	Longer interval than guideline recommendation Number (%)
No polyps	10 years	187 (98%)	3 (2%)	0
Single 12 mm hyperplastic polyp	10 years	141 (74%)	49 (26%)	0
Three 5–8 mm hyperplastic polyps	10 years	159 (83%)	32 (17%)	0
Single 8 mm tubular adenoma	5–10 years	182 (97%)	5 (3%)	1 (1%)
Single 12 mm tubular adenoma	3 years	149 (78%)	2 (1%)	40 (21%)
Three 5–8 mm tubular adenomas	3 years	156 (82%)	1 (1%)	34 (18%)
Three 5–12 mm tubular adenomas	3 years	171 (90%)	7 (4%)	13 (7%)
Piecemeal resection of sessile polyp	2–6 months	110 (58%)	3 (2%)	76 (40%)

Among the 192 eligible gastroenterologists, the range of non-respondents to knowledge related questions were 1 to 4 gastroenterologists.

Percentages are rounded to nearest whole number

Table 3

Self-reported practice patterns among VA gastroenterologists (n=192)

Scenario	Guideline recommendation	Guideline concordant response Number (%)	Shorter interval than guideline recommendation Number (%)	Longer interval than guideline recommendation Number (%)
Normal colonoscopy	10 years	182 (96%)	8 (4%)	0
Diverticulosis	10 years	184 (97%)	6 (3%)	0
Single 8mm hyperplastic polyp	10 years	173 (91%)	17 (9%)	0
Three 5–8 mm hyperplastic polyps	10 years	153 (81%)	37 (19%)	0
Single 8 mm tubular tubular adenoma	5–10 years	180 (95%)	9 (5%)	0
Three 5–8 mm tubular adenomas	3 years	142 (75%)	0	48 (25%)

Each patient assumed to be at average risk for colorectal cancer with colonoscopy complete to the cecum and bowel preparation adequate to exclude polyps <5 mm. For each patient, this is the first colonoscopy

Among the 192 eligible gastroenterologists, the range of non-respondents to self-reported practice related questions were 2 to 3 gastroenterologists.

Percentages are rounded to nearest whole number

Table 4

Among the 159 physicians who knew guideline recommendation for three 5–8 mm hyperplastic polyps, Cochrane Armitage Trend test of differences in predictors between gastroenterologists who follow the guidelines (n=147) vs. deviate from guidelines (n=11) in their clinical practice

Attitude	Follow guideline N (%)	Deviate from guideline N (%)
Guidelines are a convenient source of advice (p=0.02)		
Agree	142 (97%)	9 (82%)
Neutral	4 (3%)	0 (0%)
Disagree	1 (1%)	2 (18%)
Current clinical research justifies recommendations for post-polypectomy intervals (p=0.03)		
Agree	115 (78%)	6 (55%)
Neutral	24 (16%)	1 (9%)
Disagree	8 (5.4)	4 (36%)
Colonoscopy guidelines increase the risk of a missed cancer diagnosis (p=0.008)		
Agree	13 (9%)	4 (36%)
Neutral	29 (20%)	1 (9%)
Disagree	103 (71%)	6 (55%)
Colonoscopy guidelines do not apply to many of my patients (p=0.02)		
Agree	7 (5%)	2 (18%)
Neutral	9 (6%)	4 (36%)
Disagree	131 (89%)	5 (45%)
There are benefits of repeat colonoscopy not captured in the guidelines (p=0.04)		
Agree	52 (35%)	7 (64%)
Neutral	44 (30%)	2 (18%)
Disagree	51 (35%)	2 (18%)

Among the 159 physicians, one subject did not respond to self-reported practice for scenario of three 5–8 mm hyperplastic polyps. Range of non-respondents to questions that assessed factors associated with guideline adherence were 1 to 3 gastroenterologists

All physicians who deviated from guidelines chose to survey at shorter intervals than guideline recommendations

Percentages are rounded to nearest whole number

Table 5

Among the 156 physicians who knew guideline recommendation for three 5–8 mm tubular adenomas, Cochrane Armitage Trend Test of differences in predictors between gastroenterologists who follow the guidelines (n=138) vs. deviate from guidelines (n=18) in their clinical practice

Attitude	Follow guideline (%)	Deviate from guideline (%)
Guidelines are likely to be used in physician discipline (p=0.01)		
Agree	80 (58%)	5 (29%)
Neutral	44 (32%)	8 (47%)
Disagree	13 (9%)	4 (24%)
There are benefits of repeat colonoscopy not captured in the guidelines (p=0.02)		
Agree	62 (45%)	2 (11%)
Neutral	39 (28%)	7 (39%)
Disagree	37 (27%)	9 (50%)
Colonoscopy guidelines are likely to decrease physician reimbursement (p=0.04)		
Agree	31 (22%)	2 (12%)
Neutral	66 (48%)	5 (29%)
Disagree	41 (30%)	10 (59%)

Among the 159 physicians, range of non-respondents to questions that assessed factors associated with guideline adherence were 0 to 3 gastroenterologists

All physicians who deviated from guidelines chose to survey at longer intervals than guideline recommendations

Percentages are rounded to nearest whole number