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Missed Opportunities in Colorectal Cancer Prevention in Patients with Inadequate Bowel Preparations

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Introduction

Panel management using electronic health records (EHRs) improves patient tracking for various health conditions and health maintenance metrics;[1] altogether, this should improve care quality. Panel management for colorectal cancer (CRC) screening typically creates registries of patients who have not had a stool test within 365 days or colonoscopy within 10 years. In addition, registries identify high-risk patient pools, such as those with an abnormal stool test, who carry a ~3% risk of carcinoma,[2] and yet have not completed a colonoscopy. Because patients who undergo colonoscopy with an inadequate bowel preparation are invisible when queried by the panel management protocols, we aimed to determine the carcinoma rate and advanced neoplasms among fecal immunochemical test (FIT) positive

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patients who rescheduled and completed a colonoscopy following an initial inadequate bowel preparation.

Methods

We performed a cohort study of patients aged 50 to 75, with a positive FIT that had completed a diagnostic colonoscopy from August 2010 through September 2015. Colonoscopy data was extracted from ProVation® (ProVation Medical Inc., Minneapolis, MN) and linked to pathology data using the CoPathPlus® platform (Cerner, Canada). The quality of bowel preparation was described using the Aronchick scale that categorizes bowel cleansing as follows: excellent: >95% of mucosa visualized; good: 90–95% of mucosa visualized, fair: 80–90% of mucosa visualized, and poor: <80%.[3] In some instances, bowel preparation quality was described using the 2012 multisociety CRC guidelines which emphasizes “adequate” preparations as identifying polyps >5mm vs. “inadequate.”[4] The rates of rescheduled procedures after initial poor or inadequate bowel preparations, carcinomas, and advanced neoplasms identified during the follow-up exam were determined. Risk factors associated with an increased risk of CRC were extracted and described as proportions or medians and univariate logistic regression was performed with repeat colonoscopy completion as the outcome.

Results

Of 1,558 diagnostic colonoscopy procedures completed after a positive FIT, bowel preparation was adequate in 91.5% (n=1425) and inadequate in 8.5% (n=133). Among patients with an adequate bowel preparation, carcinoma was found in 3.0% (n=43), high-grade dysplasia in 5.5% (n=79), and tubulovillous adenomas in 7.6% (n=109). After an initial inadequate bowel preparation, repeat colonoscopy was completed in 52.6% (n=70), with adequate preparation achieved in 90% (n=63). Median time to repeat colonoscopy was 92.5 days (IQR 70–141). Of the 70 patients who repeated a colonoscopy after inadequate bowel preparation, carcinoma was found in 2.8% (n=2), high-grade dysplasia in 2.8% (n=2), and tubulovillous adenomas in 4.3% (n=3). One patient with carcinoma also had high-grade dysplasia; other findings were in unique patients. There was a non-statistically significant trend towards more active smoking in the cohort that never completed a repeat colonoscopy, (31.7% vs. 18.6%, p=0.09). Additionally, 62.9% (n=44) of the patients who repeated a colonoscopy denied a history of smoking compared to 52.4% (n=33) of the cohort that did not return. Median body mass index and A1C was similar across the cohorts (Table 1).

Discussion

Our study revealed 47.4% of FIT positive patients with an inadequate bowel preparation at index colonoscopy never returned for a repeat procedure. Of the 52.6% patients that returned for a repeat colonoscopy, carcinoma was found in 2.8% and advanced neoplasms identified in 7.1%. The carcinoma rates from our study is consistent with reported CRC rates in all FIT positive patients.[2] All were identified on repeat colonoscopy after initial extremely poor bowel preparations limited mucosal visualization and led to aborted procedures; underscoring current knowledge that suboptimal bowel preparation greatly decreases the

effectiveness of any colonoscopy.[5] Since patients with inadequate bowel preparation at index colonoscopy may not be captured by the traditional methods of panel management and given their higher risk of CRC,[6] all efforts to minimize loss to follow-up should be employed. Flagging incomplete colonoscopy procedures so they are searchable, clearly communicating the bowel preparation in the procedure impression and recommendation, and instituting protocols to generate lists and reminders of individuals with an inadequate bowel preparation as the last procedure on record should help track patients overdue for CRC screening through panel management tools and reduce losses to follow-up. Given the nature of patients utilizing safety-net systems, out-of-network utilization, especially in patients over 65 years who qualify for Medicare, may not have been completely captured. While our findings represent a single-center experience, this is an under examined area in CRC screening which warrants further exploration. Quality improvement initiatives in this population should focus on harnessing the full potential of the EHR to improve tracking and communication paired with health education and messages that addresses the sustained susceptibility to colorectal carcinoma when bowel preparation is inadequate.

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Abbreviations

CRC	colorectal cancer
EHR	electronic health record
FIT	fecal immunochemical test

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Table 1

CRC risk factors among FIT positive patients with inadequate bowel preparation at index colonoscopy

CRC Risk Factor	Repeat Colonoscopy (n=70)	No Repeat Colonoscopy (n=63)	OR	p-value
Smoking, n (%)				
Never	44 (62.9%)	33 (52.4%)	Ref	-
Current	13 (18.6%)	20 (31.7%)	0.49	0.09
Past	12 (17.1%)	9 (14.3%)	1	1.00
Passive	1 (1.4%)	1 (1.6%)	0.75	0.84
BMI, median (IQR)	27.9 (24.4–31.6)	25.8 (21.6–32.5)	1.00	0.76
A1C, median (IQR)	5.8 (5.6–6.3)	6.0 (5.5–6.7)	0.92	0.52