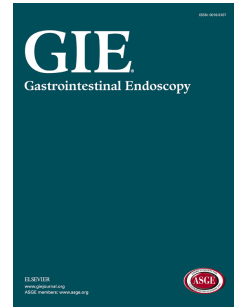


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Evaluating the practice of canceling colonoscopies for presumed inadequate bowel preparation

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ABSTRACT

Background and Aims: There are scant data describing the practice of canceling colonoscopies before colonoscope insertion for presumed inadequate bowel preparation (PIBP). We sought to better understand the ramifications of such cancellations and to characterize the nationwide practice of cancellations for PIBP.

Methods: We determined the frequency of colonoscopies canceled for PIBP at our institution, assessing practice variation and whether patients who were canceled for PIBP completed colonoscopy or fecal immunochemical testing (FIT) within 6 months. We also surveyed gastroenterology program directors to determine whether canceling colonoscopies for PIBP is commonly permitted and if such cancellations are included in calculations of bowel preparation adequacy rates.

Results: Three percent of patients were canceled for PIBP at our institution, with significant provider practice variability in cancellation rates. Only 67% of patients whose cases were canceled for PIBP completed colonoscopy or FIT within 6 months. The ability of an endoscopist to cancel a colonoscopy for PIBP was reported by 97% of survey respondents. Such cases are frequently not included in calculations of bowel preparation adequacy rates.

Conclusions: The ability to cancel colonoscopies for PIBP is near-ubiquitous, but such cases are not uniformly included in calculations of bowel preparation adequacy rates. Variation in provider practice, and resulting impact on patient care, suggests a need for standardized protocols. Colonoscopies canceled for PIBP should be included in calculations of bowel preparation adequacy rates.

Introduction and Background:

Colonoscopy is the most commonly used test for colorectal cancer screening in the United States with more than 15 million colonoscopies performed annually.¹ Despite attempts to refine bowel purgatives and improve patient education preprocedure, bowel preparation remains a significant barrier to successful colonoscopy, with reported inadequate bowel preparation rates of 10% to 25%.^{2,3,4,5} The U.S. Multi-Society Task Force on Colorectal Cancer recommends that adequate bowel preparation be achieved in at least 85% of colonoscopies on a per-physician basis, and that an assessment of bowel preparation adequacy be made when the colonoscope is in the patient's rectosigmoid colon.⁶

In our hospital-based endoscopy unit, endoscopists are permitted to cancel colonoscopies before colonoscope insertion if there is a presumed inadequate bowel preparation (PIBP) based on a patient's self-reported degree of adherence to preparation (dietary modification and purgative) and description of their last bowel movements. In an informal survey of faculty at an American Society for Gastrointestinal Endoscopy First Year Fellows' Course, we found that 6 of 7 endoscopy units, representing a mix of academic medical centers and community-based practices, followed the same triage protocol as our medical center, suggesting this may be a common practice (Audrey H. Calderwood, Kunal Jajoo, Pushpak Taunk, Kristle L. Lynch, Benjamin R. Alsop, Allen Hwang, Frank G. Gress; personal communication). Moreover, if this is a common practice, it is not clear whether colonoscopies canceled for PIBP are included in calculations of provider- and unit-

level bowel preparation adequacy rates. We therefore sought to examine the provider-level variability and clinical ramifications of such cancellations within our own institution and to better characterize the nationwide practice of colonoscopy cancellations for PIBP.

Patients and Methods:

Our hospital-based endoscopy unit is part of Boston Medical Center, a private, not-for-profit, 514-bed, safety-net academic medical center serving as the primary teaching affiliate for the Boston University School of Medicine. Approximately half of our patients scheduled for colonoscopy are referred directly by their PCP (ie, open access) with the remainder referred after evaluation in the office by a gastroenterologist. All patients are called 7 and 3 days in advance of their procedure by a patient navigator to review bowel preparation instructions. Upon arrival to the endoscopy unit, and before they are asked to change into a hospital gown, patients are interviewed by a registered nurse in a private triage room. The nurse asks about the patient's adherence to the recommended bowel preparation (1 day of a clear liquid diet and 4L of polyethylene glycol electrolyte solution [PEG-ELS] administered in a split-dose fashion) and the appearance of their most recent bowel movement. If the nurse has a concern that the bowel preparation may be inadequate (PIBP) s/he will confer with the endoscopist with whom the patient is scheduled about whether to proceed with the procedure or to reschedule with renewed emphasis on compliance with, or alteration of, the bowel preparation. If a

procedure is canceled at this stage, the nurse documents the reason for cancellation (including PIBP specifically), educates the patient, and reschedules for the next available appointment.

We determined the frequency of, and documented reasons for, procedures canceled in triage between January 1, 2017 and March 31, 2018 through a retrospective review of our electronic medical record (EPIC, Verona, Wisc, USA). Charts were also reviewed to determine whether patients whose procedures were canceled in triage underwent a subsequent colonoscopy or fecal immunohistochemical test [FIT] (when the indication was screening) within 6 months of the cancellation. To better understand the degree of provider practice variation, we also determined the PIBP-related cancellation rate of each endoscopist in our unit.

We next administered a survey of all ACGME-certified general gastroenterology fellowship programs identified by the American College of Gastroenterology and the Association of American Medical Colleges. We excluded any fellowship program for which we could not obtain a verified email address for a program director. In 2 instances, a program administrator conveyed the survey directly to the program director. Surveys were administered between August 16, 2019 and January 8, 2020 using Research Electronic Data Capture (REDCap 9.3.0, Vanderbilt University). We made a total of 5 follow-up contacts to nonresponders. We asked survey recipients whether their primary endoscopy unit had a policy permitting cancellation of colonoscopies for PIBP, whether bowel preparation adequacy rates were routinely

measured (at the provider- and the unit-level), what those adequacy rates were (if available), and whether calculated adequacy rates included patients whose procedures were canceled for PIBP.

Our Institutional Review Board determined that our study qualified for an exemption determination.

Statistical analysis:

Descriptive statistics were used to characterize patients' flow through our endoscopy unit, individual provider PIBP-related cancellation rates, and survey responses. We used 95% confidence intervals to determine whether an individual endoscopist's cancellation rate was significantly higher or lower than the group median.

Results:

Frequency and ramification of cancellations for PIBP

Among 10,898 patients who presented to our endoscopy unit for colonoscopy over a 15-month period, 345 (3%; 5.3 per week) were canceled in triage due to PIBP (Figure 1). Among the patients who proceeded through triage and underwent colonoscopy, 542 (5% of all arrivals) were found to have an inadequate bowel preparation, leading to a bowel preparation inadequacy rate of 8% of all arrived patients. Among those who were canceled for PIBP, 114 (33%) failed to complete

colonoscopy or FIT (if original indication was screening) within 6 months, despite a system in place to reschedule their examination before leaving our unit.

Variability in endoscopist cancellation rates for PIBP

We found significant variability in individual endoscopist's cancellation rates due to PIBP. Among 19 endoscopists, the median PIBP-related cancellation rate was 3.9% (range 0%-6%; IQR 3.3%-5.3%). Two providers had cancellation rates statistically significantly lower than the remainder of the group.

Nationwide Survey of Gastroenterology Training Programs

Electronic surveys were sent to each of 177 unique gastroenterology training programs for which we could obtain contact information. We received survey responses from 78 programs (44% response rate). Among respondents, 76 (97%) indicated that their endoscopy unit permits colonoscopy cancellations for PIBP. Only 32 (41%) routinely measure bowel preparation adequacy rates at the provider-level and only 32 (41%) routinely measure bowel preparation adequacy rates at the endoscopy unit level, but only some of these facilities measured both provider- and unit-level adequacy rates. Twenty-one (27%) respondents reported that their unit does not routinely measure bowel preparation adequacy rates at either the provider- or unit-level. Provider-level bowel preparation adequacy rates, when available (n=18), ranged from 75% to 99% (mean 91%; SD, 6.4%). Most respondents (46%) did not know whether their primary endoscopy unit included cancellations for PIBP in calculations of bowel adequacy rates. Among those who did

know, 12 (16% of all respondents whose units allow cancellations for PIBP) reported that such cancellations were included in adequacy rate calculations, and 28 (37% of all respondents whose units allow cancellations for PIBP) reported that such cancellations were not included in adequacy rate calculations. Among 9 respondents who knew their own provider-level bowel preparation adequacy rate and whose endoscopy unit does not include PIBP rates in those calculations, the mean bowel preparation adequacy rate was 88% (SD, 7.7%).

Discussion:

We examined the practice of canceling patients' colonoscopies for PIBP, that is, without inserting a colonoscope to visually confirm bowel preparation adequacy. We found that 3% of ambulatory patients arriving to our endoscopy unit for colonoscopy were canceled for PIBP. Approximately one-third of patients canceled in this manner did not return within 6 months for a repeat procedure, despite having a system in place to reschedule colonoscopies before the patients' departure. We also demonstrated significant provider practice variation in rates of cancellation for PIBP. Finally, through use of a nationwide survey of gastroenterology training programs, we found that policies permitting cancellations for PIBP are nearly ubiquitous, with significant variability in whether such cancellations are included in calculations of provider- and unit-level bowel preparation adequacy rates.

There are few data on the practice or incidence of colonoscopy cancellation for PIBP. The vast majority of studies addressing inadequate bowel preparation have considered preparation adequacy only as encountered during the colonoscopy itself. This suggests that the published frequency of inadequate bowel preparation may actually be an underestimation if endoscopy units are canceling additional cases before colonoscope insertion due to PIBP. When one considers that many of our patients whose colonoscopies were canceled in this manner did not return for a repeat procedure, our findings highlight a significant source of concern for any colonoscopy-based colorectal cancer screening program.

Others have demonstrated that bowel preparation adequacy is difficult to predict before colonoscope insertion owing to a weak correlation between patient-reported bowel effluent characteristics and actual bowel preparation adequacy.⁷ Photographic examples of clear and opaque effluent shown to patients in triage only modestly improved the accuracy in predicting preparation adequacy.⁸ Our study did not require an attempt at colonoscopy when a patient was to be rescheduled for PIBP. We are therefore unable to determine how accurate the triage-based assessments were. Future studies should identify more reliable predictors of inadequate bowel preparation that may be used to better justify cancellations for PIBP. For example, there may be a highly reliable combination of bowel effluent characteristics and clinical factors, such as diagnoses (eg, diabetes, constipation, etc) and medication use (eg, opioids, tricyclic antidepressants) that predicts an inadequate bowel preparation. Until such predictors are available, and because

provider practice variation exists, it may be prudent to standardize triage decision-making, perhaps erring on the side of colonoscopy insertion (possibly before the administration of sedation), as suggested by the U.S. Multi-Society Task Force on Colorectal Cancer⁶, for all but the most obviously unprepared patients. The administration of enemas in triage to patients with PIBP may represent another option to further improve the overall rate of adequate bowel preparation.⁹ Where there is flexibility in the endoscopy unit schedule, willing patients may be able to consume more purgative and wait for its effects, thus enabling same-day colonoscopy.

We found, through a nationwide survey, that colonoscopies canceled for PIBP are not uniformly included in provider- and unit-level calculations of bowel preparation adequacy rates. The U.S. Multi-Society Task Force on Colorectal Cancer has suggested that provider-level bowel preparation adequacy rates should be measured, and should be at least 85%.⁶ The lack of a standardized method for calculating this value (ie, with or without the inclusion of cases cancelled for PIBP) makes it difficult to compare provider- and unit-level rates. We therefore suggest that all endoscopy units track the frequency with which colonoscopies are canceled for PIBP and classify such cases as inadequate bowel preparations when calculating adequacy rates. In our own institution, our unit-level rate of inadequate bowel preparation rose from 5% to 8% (a 60% increase) when we included those cases canceled for PIBP. Our nationwide survey found a mean provider-level bowel preparation adequacy rate of 88% when cases with PIBP were not included in the

calculation. This suggests that there may be providers whose actual bowel preparation adequacy rates fall below the recommended minimum rate of 85%.

A limitation of our study is that our survey was not sent to every endoscopy unit across the United States. Rather, it was directed only to accredited gastroenterology fellowship training programs. This made the study more feasible, owing to readily available contact information. In addition, this decision was based on an assumption that such a cohort would reasonably represent the gastroenterology community at-large. For example, because community-based gastroenterologists receive their initial training in fellowship, we suspect that at least some will have adopted practices followed by the endoscopy unit(s) where they trained. It is possible, however, that endoscopists in community-based practices are more inclined to attempt colonoscopy regardless of PIBP. If so, our results may not be broadly generalizable. Nonetheless, given the large number of programs surveyed, our findings would still support the need for standardizing decision-making and inclusion of cases canceled for PIBP in calculations of bowel preparation adequacy rates. In addition, our survey did not ask for frequencies of cancellations for PIBP at each program, so we can only report our own institution's rate of 3%. Future efforts should be made to track and report such cancellation rates to better quantify the magnitude of this issue. Finally, our academic medical center is an urban safety net institution, with approximately 75% of patients receiving care through Medicaid. Such populations typically have poor health literacy, which likely explains our high cancellation rate for nonpreparation-related issues, despite the use of navigators.

Because this may also be a factor associated with our high rate of patients who failed to complete colonoscopy by 6 months after a cancellation for PIBP, this particular finding may not be broadly generalizable.

In conclusion, we found that many endoscopy units allow for canceling colonoscopies based on PIBP and that such cases are not uniformly included in calculations of bowel preparation adequacy rates. Variation in provider practice suggests a need for standardized protocols, particular given our finding that patients whose colonoscopies are cancelled for PIBP may fail to return for timely colonoscopy. Until more reliable predictors of inadequate bowel preparation are identified, a protocol requiring colon inspection before cancellation may result in greater numbers of patients completing a timely colonoscopy. Cases canceled for PIBP before colonoscope insertion should be included in calculations of bowel preparation adequacy rates.

FIGURE LEGEND

Figure 1: Flow of ambulatory patients arriving at our endoscopy unit for colonoscopy.

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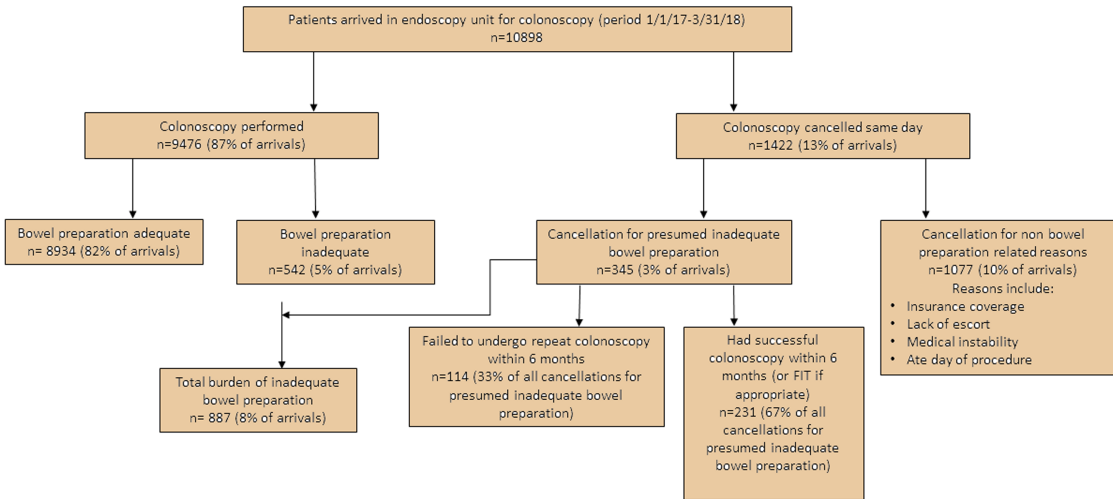
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Abbreviations:

PIBP – Presumed inadequate bowel preparation

BBPS - Boston Bowel Preparation Scale

FIT - fecal immunohistochemical test

PEG-ELS - Polyethylene glycol electrolyte solution

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