Nonneoplastic polypectomy during screening colonoscopy: the impact on polyp detection rate, adenoma detection rate, and overall cost

Mary A. Atia, MD, Neal C. Patel, MD, Shiva K. Ratuapli, MBBS, Erika S. Boroff, MD, Michael D. Crowell, PhD, Suryakanth R. Gurudu, MD, Douglas O. Faigel, MD, Jonathan A. Leighton, MD, Francisco C. Ramirez, MD

Scottsdale, Arizona, USA

Background: The frequency of nonneoplastic polypectomy (NNP) and its impact on the polyp detection rate (PDR) is unknown. The correlation between NNP and adenoma detection rate (ADR) and its impact on the cost of colonoscopy has not been investigated.

Objective: To determine the rate of NNP in screening colonoscopy, the impact of NNP on the PDR, and the correlation of NNP with ADR. The increased cost of NNP during screening colonoscopy also was calculated.

Design: We reviewed all screening colonoscopies. PDR and ADR were calculated. We then calculated a nonneoplastic polyp detection rate (patients with ≥ 1 nonneoplastic polyp).

Setting: Tertiary-care referral center.

Patients: Patients who underwent screening colonoscopies from 2010 to 2011.

Interventions: Colonoscopy.

Main Outcome Measurements: ADR, PDR, NNP rate.

Results: A total of 1797 colonoscopies were reviewed. Mean ($\pm$ standard deviation) PDR was 47.7% $\pm$ 12.0%, and mean ADR was 27.3% $\pm$ 6.9%. The overall NNP rate was 10.4% $\pm$ 7.1%, with a range of 2.4% to 28.4%. Among all polypectomies (n = 2061), 276 were for nonneoplastic polyps (13.4%). Endoscopists with a higher rate of nonneoplastic polyp detection were more likely to detect an adenoma (odds ratio 1.58; 95% confidence interval, 1.1-1.2). With one outlier excluded, there was a strong correlation between ADR and NNP ($r = 0.825$; $P < .001$). The increased cost of removal of nonneoplastic polyps was $32,963.

Limitations: Retrospective study.

Conclusion: There is a strong correlation between adenoma detection and nonneoplastic polyp detection. The etiology is unclear, but nonneoplastic polyp detection rate may inflate the PDR for some endoscopists. NNP also adds an increased cost. Increasing the awareness of endoscopic appearances through advanced imaging techniques of normal versus neoplastic tissue may be an area to improve cost containment in screening colonoscopy. (Gastrointest Endosc 2015;82:370-5.)

Abbreviations: ADR, adenoma detection rate; ASGE, American Society for Gastrointestinal Endoscopy; NNP, nonneoplastic polypectomy; PDR, polyp detection rate.

DISCLOSURE: *All authors disclosed no financial relationships relevant to this article.*

Use your mobile device to scan this QR code and watch the author interview. Download a free QR code scanner by searching "QR Scanner" in your mobile device's app store.

0016-5107/$36.00
http://dx.doi.org/10.1016/j.gie.2015.01.016

Received July 3, 2014. Accepted January 4, 2015.

Current affiliations: Department of Medicine, Division of Gastroenterology, Mayo Clinic Arizona, Scottsdale, Arizona.

Reprint requests: Francisco C. Ramirez, MD, Division of Gastroenterology and Hepatology, Mayo Clinic Arizona, 13400 East Shea Blvd, Scottsdale, AZ 85259.

If you would like to chat with an author of this article, you may contact Dr Ramirez at ramirez.francisco@mayo.edu.

Colonoscopy is the principal modality for detection and removal of precancerous lesions and subsequent prevention of colorectal cancer[1,2]—the third leading etiology of cancer-related mortality in the United States in men and women.[3] Although it represents a cost-effective means of screening for colorectal neoplasia,[4] colonoscopy still constitutes an invasive examination with inherent costs and risks. Additionally, the quality of the procedure is variable and depends on many factors at both the patient[5,6] and endoscopist[7-10] levels. As a result, it is imperative to focus on both the quality as well as cost-effectiveness of colonoscopy, which is a major point of emphasis for organizations such as the American Society for Gastrointestinal Endoscopy (ASGE) and the American College of Gastroenterology.[11,12]

The adenoma detection rate (ADR) has been validated as an independent predictor of risk for interval colorectal cancer.[13,14] Developing medical literature also discusses the role of sessile serrated adenoma detection, further emphasizing a meticulous examination.[15-17] However, given the increasing pressure to find adenomatous polyps to meet accepted standards (ADR $\geq$25% in men, 15% in women), endoscopists may be tempted to remove polypoid, nonneoplastic lesions (normal mucosa, lymphoid aggregates).

With the increasing scrutiny regarding the rising costs in healthcare, it is critical to deliver high-quality screening colonoscopy in a cost-effective manner. Although much of the current medical literature has centered on increasing polyp detection and ADR as a sign of quality, little research has focused on reducing the cost of colonoscopy. In order to decrease the overall cost, it is important to identify opportunities for cost containment during screening colonoscopy.

The frequency of nonneoplastic polypectomy (NNP) of tissue constituting normal colon mucosa or lymphoid aggregates and its impact on PDR (a proposed surrogate of ADR)[18] is unknown. The correlation between NNP rate and ADR has not been investigated.

The aim of this study was to determine the rate of NNP in screening colonoscopy, the impact of NNP on PDR, and the correlation of NNP with ADR. The subsequent associated increased cost of NNP during screening colonoscopy also was calculated.

MATERIALS AND METHODS

Endoscopy and pathology reports were reviewed at a single, tertiary-care referral center for all patients undergoing screening colonoscopy from October 1, 2010 to September 30, 2011. Our institutional review board granted permission for this minimal risk study to retrospectively review our endoscopic database, analyze de-identified patient data, and report our findings. The procedure was classified as screening if patients were asymptomatic and without a history of polyps. Either a board certified gastroenterologist or gastroenterology fellow under the direct supervision of an attending physician was included; colorectal surgeons were excluded. Historical data of our endoscopists from 2009 indicated that the PDR range was 27% to 55%, and the ADR range was 16% to 38%.[18] All physicians are salaried and without incentive for number of procedures completed and/or polypectomy. All patients received polyethylene glycol–based bowel preparations and were provided printed instructions on the split-dose preparation.[19] Informed consent was obtained, and patients received conscious sedation with a combination of midazolam and either fentanyl or meperidine, per performing endoscopist preference. Only high-definition colonoscopes were used (Olympus PCF-Q180AL, CF-Q180AL; Olympus America).

For each procedure, data on patient demographics, quality of bowel preparation, completion of colonoscopy, and polyp characteristics (location, number, size, type of polyp) were abstracted. The relevant polyp details as mentioned earlier are according to the American and European guidelines for quality assurance in colorectal screening[20,21] The number of specimen bottles sent to pathology from each colon segment was recorded. Pathology data were obtained by retrospective review of electronic medical records. The histology of polyps contained in each specimen bottle was recorded manually by location. Experienced GI pathologists reviewed all biopsy specimens. Adenomas included pathology findings of tubular adenoma, tubulovillous adenoma, high-grade dysplasia, and traditional and sessile serrated adenoma. Hyperplastic polyps were categorized separately. NNP was defined as histology indicating normal colon tissue or lymphoid aggregate. If the pathologist did not identify an adenomatous or serrated lesion within the polyp initially, then examination of additional levels was requested to ensure the absence of neoplastic tissue.

PDR and ADR were calculated for each endoscopist individually and for the entire group. We then calculated a nonneoplastic polyp detection rate (proportion of patients with $\geq$1 nonneoplastic polyp). A subgroup of patients with only nonneoplastic polyps (no concomitant adenoma or hyperplastic polyps) was evaluated to assess the impact on overall PDR.

Colonoscopies meeting criteria for NNP were reviewed again for method of polypectomy and number of specimen bottles sent to pathology containing only nonneoplastic tissue. Procedures with polypectomy of both nonneoplastic and neoplastic lesions with the same method were excluded from the increased method of polypectomy cost calculation. Cost analysis was calculated by using the 2010 Medicare fee schedule for each specimen bottle ($114.26) as well as for Current Procedural Terminology codes with screening colonoscopy ($794.04), colonoscopy with forceps polypectomy ($847.97), and colonoscopy with snare polypectomy ($885.33). Pathology costs were estimated by multiplying the number of specimen bottles sent to pathology by $114.26 (the 2010 Medicare fee schedule for our institution).