Colonoscopy utilization and outcomes 2000 to 2011

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Background: Understanding colonoscopy utilization and outcomes can help determine when the procedure is most effective.

Objective: To study trends in utilization and outcomes of colonoscopy in the United States from 2000 to 2011.

Design: Prospective collection of colonoscopy data.

Setting: A total of 84 adult diverse GI practices.

Patients: All adult patients receiving colonoscopy for any reason.

Intervention: Colonoscopy.

Main Outcome Measurements: Polyps >9 mm or suspected malignant tumor.

Results: We analyzed 1,372,838 reports. The most common reason for colonoscopy in patients aged <50 years is evaluation of symptoms such as irritable bowel syndrome (IBS) (28.7%) and bleeding or anemia (35.3%). In patients aged 50 to 74 years, colorectal cancer screening accounts for 42.9% of examinations. In patients aged >74 years, surveillance for cancer or polyps is the most common indication. The use of colonoscopy for average-risk screening increased nearly 3-fold during the study period. The prevalence of large polyps increases with age and is higher in men for every procedure indication. The prevalence of large polyps in patients with symptoms of IBS was lower than in those undergoing average-risk screening (odds ratio [OR] 0.85; 95% confidence interval [CI], 0.83-0.87). With increasing age, there was a shift from distal to proximal large polyps. The rate of proximal large polyps is higher in the black population compared with the white population (OR 1.19; 95% CI, 1.13-1.25).

Limitations: In the absence of pathology data, use of surrogate as the main outcome.

Conclusion: Colonoscopy utilization changed from 2000 to 2011, with an increase in primary screening. The proximal location of large polyps in the black population and with advancing age has implications for screening and surveillance. (Gastrointest Endosc 2014;80:133-43.)

Colonoscopy is the most commonly used endoscopic procedure in the United States, with estimates of 14 million procedures annually.[1,2] Colonoscopy is performed for primary colorectal cancer (CRC) screening; surveillance of patients with prior polyps, cancer, or colitis; and evaluation of lower GI symptoms. Understanding the outcomes

Abbreviations: CORI, Clinical Outcomes Research Initiative; CRC, colorectal cancer; FOBT, fecal occult blood test; IBS, irritable bowel syndrome; VA, Veterans Affairs.

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of colonoscopy could inform rational utilization. Our aim was to examine the utilization and outcomes of colonoscopy in the United States from 2000 to 2011.

The Clinical Outcomes Research Initiative (CORI) was established in 1995 to study endoscopy in diverse practice settings throughout the United States. We have previously reported results of utilization and outcomes from data generated from January 2000 to August 2002.[3,4] The purpose of this analysis was to examine colonoscopy use in clinical practice settings from 2000 to 2011 and measure practice trends over time. Because colon neoplasia is one of the most important endoscopic outcomes of colonoscopy, this report examines the prevalence and location of polyps >9 mm or suspected malignant tumors (large polyps), which prior studies have shown to be a robust surrogate for advanced neoplasia (defined as tubular adenoma ≥10 mm, adenoma with villous histology, or high-grade dysplasia and cancer).[5] The analysis considers the relationship of this endpoint with patient demographics, procedure indication, and location in the colon.

Take-home Message

- Primary screening with colonoscopy now dominates procedure indications. There is a significant variation in the rate of large polyps based on age, sex, and procedure indication.
- There is a marked proximal shift in location of large polyps with advancing age and in the black population, which has implications for screening and surveillance for risk reduction.

METHODS

CORI

We developed a consortium of diverse clinical practice settings. Endoscopists use a structured computerized endoscopic report generator to produce endoscopic reports. The data that are transmitted from the local site to the National Endoscopic Database does not contain most patient or provider identifiers and qualifies as a Limited Data Set under the Code of Federal Regulations (45 CFR §164.514[e][2]). This analysis of the National Endoscopic Database is approved by the Oregon Health and Science University Institutional Review Board. The repository is checked for anomalies on a daily basis. Any unusual activity prompts follow-up contact by CORI staff.

Practice sites

Complete colonoscopy reports received between January 1, 2000 and December 31, 2011 were included. We excluded reports in patients aged <18 years. The colonoscopy reports come from 84 practices, including community practices and endoscopy centers (78.6%), academic centers (8.5%), and Veterans Affairs (VA) medical centers (12.9%). Practice sites changed during the study time period; 26 practices participated during the entire time period.

We have conducted several analyses to determine the representativeness of our data. We previously reported comparisons of Centers for Medicare & Medicaid Services data with patients in CORI aged 65 years and older, demonstrating that the CORI cohort is representative of U.S. endoscopy practice in this age group.[6] All outcome data were adjusted or stratified by age, sex, race and/or ethnicity, and indications to account for the differences between stable practice sites and all practices.

Utilization measurements

We assessed age at time of endoscopy, sex, and race and/or ethnicity. The endoscopist provides the information on race and/or ethnicity by using the U.S. census methodology, which requests classification by race and then by ethnicity (Hispanic or non-Hispanic). For this analysis, race was categorized into 5 groups: white non-Hispanic (hereafter referred to as *white*), black non-Hispanic (*black*), other non-Hispanic (*other*), Hispanic of any race (*Hispanic*), and race unknown.

Procedure indications are provided by endoscopists. In many circumstances, more than one indication was noted (such as evaluation of abdominal pain and constipation). We used several hierarchical definitions to create specific procedure indication categories for analysis. Indications for screening were defined as average-risk, family history of CRC or polyps, or positive fecal occult blood test (FOBT) result, absent any indication for evaluation of symptoms or surveillance. Indications for surveillance included prior polyps, cancer, or inflammatory bowel disease. Evaluation of symptoms included 3 major categories, which were mutually exclusive: hematochezia, anemia or iron deficiency (without rectal bleeding), and irritable bowel syndrome (IBS) cluster. This cluster included patients with abdominal pain, bloating, diarrhea and/or constipation without any other symptoms such as hematochezia, anemia, or colitis.

Outcome measurement

Many possible important outcomes of colonoscopy exist. We analyzed the prevalence of polyps >9 mm and/or suspected malignant tumors (hereafter referred to as *large polyps*). This is an important outcome of screening and surveillance examinations. In non-screening procedures, other outcomes may be even more important. In this structured database, endoscopists were asked to provide detailed descriptors of every polyp, including size, location, morphology (pedunculated, sessile, or flat), and method of removal. The determination of neoplasia in a polyp requires the addition of histopathology results, which arrive days after the endoscopy. We receive