Assessment of competency in endoscopy: establishing and validating generalizable competency benchmarks for colonoscopy

Robert E. Sedlack, MD, MHPE,[1] Walter J. Coyle, MD,[2] ACE Research Group

Rochester, Minnesota; La Jolla, California, USA

Background and Aims: The Mayo Colonoscopy Skills Assessment Tool (MCSAT) has previously been used to describe learning curves and competency benchmarks for colonoscopy; however, these data were limited to a single training center. The newer Assessment of Competency in Endoscopy (ACE) tool is a refinement of the MCSAT tool put forth by the Training Committee of the American Society for Gastrointestinal Endoscopy, intended to include additional important quality metrics. The goal of this study is to validate the changes made by updating this tool and establish more generalizable and reliable learning curves and competency benchmarks for colonoscopy by examining a larger national cohort of trainees.

Methods: In a prospective, multicenter trial, gastroenterology fellows at all stages of training had their core cognitive and motor skills in colonoscopy assessed by staff. Evaluations occurred at set intervals of every 50 procedures throughout the 2013 to 2014 academic year. Skills were graded by using the ACE tool, which uses a 4-point grading scale defining the continuum from novice to competent. Average learning curves for each skill were established at each interval in training and competency benchmarks for each skill were established using the contrasting groups method.

Results: Ninety-three gastroenterology fellows at 10 U.S. academic institutions had 1061 colonoscopies assessed by using the ACE tool. Average scores of 3.5 were found to be inclusive of all minimal competency thresholds identified for each core skill. Cecal intubation times of less than 15 minutes and independent cecal intubation rates of 90% were also identified as additional competency thresholds during analysis. The average fellow achieved all cognitive and motor skill endpoints by 250 procedures, with >90% surpassing these thresholds by 300 procedures.

Conclusions: Nationally generalizable learning curves for colonoscopy skills in gastroenterology fellows are described. Average ACE scores of 3.5, cecal intubation rates of 90%, and intubation times less than 15 minutes are recommended as minimal competency criteria. On average, it takes 250 procedures to achieve competence in colonoscopy. The thresholds found in this multicenter cohort by using the ACE tool are nearly identical to the previously established MCSAT benchmarks and are consistent with recent gastroenterology training recommendations but far higher than current training requirements in other specialties. (Gastrointest Endosc 2016;83:516-23.)

In 2011, data defining the learning curves and competency benchmarks of gastroenterology fellows learning the procedure of colonoscopy were reported by using the Mayo Colonoscopy Skills Assessment Tool (MCSAT).[1] The use of this tool and the established benchmarks allow for continuous assessment of the trainee's progression toward competence along the entire training continuum from novice to competence.

Abbreviations: ACE, Assessment of Competency in Endoscopy; ASGE, American Society for Gastrointestinal Endoscopy; CI, confidence interval; MCSAT, Mayo Colonoscopy Skills Assessment Tool; NAS, Next Accreditation System.

DISCLOSURE: *This project was funded by an unrestricted grant from the Division of Gastroenterology and Hepatology, Mayo Clinic, Rochester, Minnesota. The Mayo Clinic holds the rights to the Assessment of Competency in Endoscopy tool and the Mayo Colonoscopy Skills Assessment Tool (© Mayo Foundation for Medical Education and Research). Dr Sedlack has partial interest in the tools mentioned. Dr Coyle disclosed no financial relationships relevant to this publication.*

0016-5107/$36.00
http://dx.doi.org/10.1016/j.gie.2015.04.041

Received February 12, 2015. Accepted April 26, 2015.

Current affiliations: Mayo Clinic, Rochester, Minnesota (1), Scripps Clinic, La Jolla, California (2), USA.

Reprint requests: Robert Sedlack, MD, MHPE, Mayo Clinic, 200 First Street SW, Mayo 9-E, Rochester, MN 55905.

Despite the strengths of the MCSAT, refinements were needed, such as a metric assessing fine tip control and a means to calculate polyp detection rates. The Training Committee of the American Society for Gastrointestinal Endoscopy (ASGE) took up the task of making these additions to this tool with the results being the Assessment of Competency in Endoscopy (ACE) tool for colonoscopy reported in a recent white paper published in 2014.[2] Additionally, the MCSAT learning curves previously reported are based on data from a single training program. Whether these same trends are applicable to other fellowship centers has not been studied. The goals of this study are to validate the newly added metrics of the ACE tool and revalidate the tool as a whole. Additionally, this study should define generalizable national learning curves and competency thresholds for colonoscopy by using the ACE scoring system.

METHODS

Study design

This was a prospective, multicenter study validating the ACE tool and assessment of trainee learning curves and competency endpoints in colonoscopy. This study was performed across 10 gastroenterology training centers across the United States, during the academic year July 2013 through June 2014. Cases were performed as part of routine training without restriction to procedure indication. This study was reviewed by the institutional review board at each participating site and either approved or granted a waiver from the local boards and required only verbal consent from each trainee in accordance with federal regulations [45 C.F.R. 46.117 (c) (2)].[3] Verbal consent was obtained from all participants by their respective site coordinators.

Participants

The participants included all gastroenterology fellows involved in colonoscopy training at each site during the study period. Evaluators were the staff routinely scheduled for teaching on the days when assessment was indicated. All evaluators were credentialed staff GI endoscopists. The site coordinators were tasked with ensuring each participating staff received brief instructions on how to interpret assessment questions and complete the ACE forms.

Assessment tool

The ACE tool consists of 14 questions measuring specific core cognitive and motor skills followed by 2 questions providing an overall assessment of both motor and cognitive skills to act as comparative standards (Table 1). In addition, the form also captures simple demographic data of the procedure (staff and fellow's name) and procedure completion times (time of procedure start, time at which the cecum is reached, and time of procedure completion). The time these events occurred were recorded by the staff (ie, procedure started at 1:30, cecum reached at 1:43, and colonoscope withdrawn at 1:51). From these time marks, cecal intubation times and withdrawal times were calculated (13 and 8 minutes, respectively, from the example).

TABLE 1. Assessment items on the assessment of competency in endoscopy tool

Motor skills
Effective use of air, water, and suction
Scope steering technique
Fine tip control
Loop reduction techniques
Depth of independent scope advancement
Visualization of mucosa
Ability to apply therapeutic tools
Overall motor skills
Cognitive skills
Lumen identification
Knowledge of indication and medical issues
Management of patient discomfort
Pathology identification and interpretation
Identifying location of pathology
Polyp detection
Knowledge of therapeutic tool
Overall cognitive skills

A copy of the colonoscopy ACE assessment tool and detailed description of the scoring metrics can be found in the previously mentioned ASGE white paper.[2] In brief, virtually all of the skills were graded by using a 4-point scale with scores of 1, 2, or 3 (1 = novice, 2 = intermediate, 3 = advanced) demonstrating progression of skills toward, but not yet achieving, minimal competence. A score of 4 (superior) indicated that the fellow demonstrated skills deemed competent to operate independently for that skill during that specific procedure. The 2 exceptions to this were for the metric of depth of independent colonoscope advancement in which a scale of 1 to 8 was used (1 = rectum, 2 = sigmoid, 3 = splenic flexure, 4 = hepatic flexure, 5 = cecum—no terminal ileal attempt, 6 = cecum —failed terminal ileal attempt, 7 = terminal ileum, 8 = other) and independent polyp detection for which a 3-point scale was used (N/A = no polyps present, 1 = none, 2 = some, 3 = all). This metric is used to calculate the polyp detection rate and polyp miss rate for fellows.

Intervention

Before a fellow's participation in the study, the fellow's total number of colonoscopies previously performed was