



Variation in Aptitude of Trainees in Endoscopic Ultrasonography, Based on Cumulative Sum Analysis

Sachin Wani,* Matthew Hall,* Rajesh N. Keswani,[‡] Harry R. Aslanian,[§] Brenna Casey,^{||} Rebecca Burbridge,^{||} Amitabh Chak,[#] Ann M. Chen,^{**} Gregory Cote,^{‡‡} Steven A. Edmundowicz,^{§§} Ashley L. Faulx,[#] Thomas G. Hollander,^{§§} Linda S. Lee,^{||} Daniel Mullady,^{§§} Faris Murad,^{§§} V. Raman Muthusamy,^{||||} Patrick R. Pfau,^{¶¶} James M. Scheiman,^{##} Jeffrey Tokar,^{***} Mihir S. Wagh,^{‡‡‡} Rabindra Watson,^{||||} and Dayna Early^{§§}

*Division of Gastroenterology and Hepatology, University of Colorado Anschutz Medical Center, Aurora, Colorado; [‡]Division of Gastroenterology and Hepatology, Northwestern University, Chicago, Illinois; [§]Division of Gastroenterology and Hepatology, Yale University, New Haven, Connecticut; ^{||}Division of Gastroenterology and Hepatology, Massachusetts General Hospital and Brigham and Women's Hospital, Boston, Massachusetts; [¶]Division of Gastroenterology and Hepatology, Duke University, Durham, North Carolina; [#]Division of Gastroenterology and Hepatology, University Hospitals Case Medical Center, Cleveland, Ohio; ^{**}Division of Gastroenterology and Hepatology, Stanford University, Stanford, California; ^{‡‡}Division of Gastroenterology and Hepatology, Indiana University Hospital, Indianapolis, Indiana; ^{§§}Division of Gastroenterology and Hepatology, Washington University School of Medicine, St. Louis, Missouri; ^{||||}Division of Gastroenterology and Hepatology, David Geffen School of Medicine at University of California Los Angeles, Los Angeles, California; ^{¶¶}Division of Gastroenterology and Hepatology, University of Wisconsin School of Medicine, Madison, Wisconsin; ^{##}Division of Gastroenterology and Hepatology, University of Michigan, Ann Arbor, Michigan; ^{***}Division of Gastroenterology and Hepatology, Fox Chase Cancer Center, Philadelphia, Pennsylvania; ^{‡‡‡}Division of Gastroenterology and Hepatology, University of Florida, Gainesville, Florida

BACKGROUND & AIMS: Studies have reported substantial variation in the competency of advanced endoscopy trainees, indicating a need for more supervised training in endoscopic ultrasound (EUS). We used a standardized, validated, data collection tool to evaluate learning curves and measure competency in EUS among trainees at multiple centers.

METHODS: In a prospective study performed at 15 centers, 17 trainees with no prior EUS experience were evaluated by experienced attending endosonographers at the 25th and then every 10th upper EUS examination, over a 12-month training period. A standardized data collection form was used (using a 5-point scoring system) to grade the EUS examination. Cumulative sum analysis was applied to produce a learning curve for each trainee; it tracked the overall performance based on median scores at different stations and also at each station. Competency was defined by a median score of 1, with acceptable and unacceptable failure rates of 10% and 20%, respectively.

RESULTS: Twelve trainees were included in the final analysis. Each of the trainees performed 265 to 540 EUS examinations (total, 4257 examinations). There was a large amount of variation in their learning curves: 2 trainees crossed the threshold for acceptable performance (at cases 225 and 245), 2 trainees had a trend toward acceptable performance (after 289 and 355 cases) but required continued observation, and 8 trainees needed additional training and observation. Similar results were observed at individual stations.

CONCLUSIONS: A specific case load does not ensure competency in EUS; 225 cases should be considered the minimum caseload for training because we found that no trainee achieved competency before this point. Ongoing training should be provided for trainees until competency is confirmed using objective measures.

Keywords: RATE US Study; Training; Competency; Cumulative Sum Analysis.

See editorial on page 1326.

Competency-based medical education (CBME) represents a shift in medical education in which competency is assessed by trainees achieving milestones rather than a prerequisite number of required procedures. Although all gastroenterology training programs will be required to move toward CBME, there is a paucity of data supporting its use in basic and complex endoscopy. Endoscopic ultrasound (EUS) has become integral to the diagnosis and staging of gastrointestinal (GI) malignancy and lesions adjacent to the GI lumen.¹ This procedure is operator dependent and training in EUS requires the development of technical, cognitive, and integrative skills beyond that required for standard endoscopic procedures. Unfortunately, the intensity and length of training, the requisite curriculum and extent of theoretical learning, and the minimum number of procedures required to ensure competency are not well defined.² With the expanding indications and applications of EUS and the growing number of third tier training programs, standardization of the performance of EUS and the definition of competency and training is of paramount importance.

The American Society for Gastrointestinal Endoscopy recommends a minimum of 150 total supervised procedures, 75 of which have a pancreatobiliary indication and 50 cases of fine-needle aspiration (FNA) (25 of which should be pancreatic FNA) before competency can be determined.³ The European Society of Gastrointestinal Endoscopy guidelines recommend a minimum of 20 and 30 supervised EUS-FNA on nonpancreatic and pancreatic lesions, respectively.⁴ However, these guidelines are based on limited data and expert opinion. These numbers have not been validated with regard to competency and feasibility and outcome of training. Guidelines do not account for the different rates at which people learn⁵ and, in fact, many experts believe that the majority of trainees will require double the number of proposed procedures to achieve competency in EUS.⁶ Thus, a specific case load or a set number of procedures performed during training does not ensure competence in EUS.² In addition, a survey of GI fellowship directors suggested that most 3-year and many advanced endoscopy trainees (AETs) receive insufficient EUS training.⁷ In a recent prospective pilot study, using a novel comprehensive EUS competency tool using cumulative sum analysis (CUSUM), we showed that there was substantial variability in achieving competency and a consistent need for more supervision among AETs than the current American Society for Gastrointestinal Endoscopy recommendation of 150 cases.²

Given the increasing emphasis on quality metrics and competency in health care, the Accreditation Council for Graduate Medical Education (ACGME) recently announced plans to replace their current reporting system in 2014 with the Next Accreditation System (NAS). Within the realm of advanced endoscopy training, GI societies need to respond to these needs by adopting

CBME and an outcomes-based approach to evaluate AETs. Thus, using a standardized data collection tool, the aim of this multicenter study was to prospectively define learning curves and measure competency in EUS in a large cohort of AETs across multiple US training programs using CUSUM analysis.

Methods

Study Design

This was a prospective multicenter trial conducted at 15 tertiary referral centers. This study was approved by the Human Research Protection Office at each participating center. All authors had access to the study data and reviewed and approved the final manuscript.

Study Subjects and Data Collection

AETs from these centers participated in this study from July 2012 to June 2013. The baseline EUS training level of trainees was assessed at all participating centers. All trainees had completed a 3-year gastroenterology fellowship in the United States and none had any prior experience or training in EUS (<25 hands-on EUS examinations and no prior experience with EUS-FNA during the standard gastroenterology fellowship). All trainees consented to be evaluated for the study and were introduced to both the cognitive and technical aspects of EUS procedures at the onset of their training. Experienced attending endosonographers at each of these centers were responsible for EUS training.

The study methodology was similar to our previously described pilot study.² Starting with the 25th hands-on EUS examination, each trainee was graded on every 10th upper EUS examination. Grading involved the ability to perform endoscopic intubation and clear identification of important landmarks at various EUS stations. These included the aortopulmonary window and subcarina, celiac axis, body of pancreas, tail of pancreas, portosplenic confluence, head and neck of pancreas, common bile and hepatic duct, gallbladder, uncinate process, and ampulla. When applicable, the trainee also was graded on the ability to identify the lesion of interest, assign an appropriate TNM stage in suspected malignancy, characterize the wall layer of subepithelial lesions, and technical success with FNA.

A 5-point scoring system was used to grade the earlier-described end points: 1, no assistance needed; 2, minimal assistance (one verbal instruction needed); 3, moderate assistance (multiple verbal instructions); 4, significant assistance (hands-on assistance); and 5, unable to achieve. The process of systematically categorizing evaluation was explained, discussed, and clarified by the principal investigator and all participating centers individually. This grading system was discussed and standardized among all attending endosonographers (Figure 1). All trainees had at least 1 minute per station before any instructions were

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