Principles of training in GI endoscopy

This document, prepared by the American Society for Gastrointestinal Endoscopy Committee on Training, was undertaken to provide general guidelines for endoscopy training and written primarily for individuals involved in teaching endoscopic procedures to fellows/trainees. This updates the previous Principles of Training document.[1] *Research in objective evaluation of procedural skills makes revision of the guidelines at this time highly appropriate.*

OBJECTIVES

Upon completion of training in GI endoscopy, trainees should be prepared to (1) appropriately recommend endoscopic procedures as indicated by the findings of consultative evaluation, with explicit understanding of accepted specific indications, contraindications, and diagnostic/therapeutic alternatives; (2) perform procedures safely, completely, and expeditiously, including possessing a thorough understanding of the principles of conscious sedation/analgesia techniques, the use of anesthesia-assisted sedation where appropriate, and preprocedure clinical assessment and patient monitoring; (3) correctly interpret endoscopic findings and integrate them into medical or endoscopic therapy; (4) identify risk factors for each procedure, understand how to minimize each, and recognize and appropriately manage complications when they occur; (5) acknowledge the limitations of endoscopic procedures and personal skills and know when to request help; and (6) understand the principles of quality measurement and improvement.

TRAINING PROGRAMS

Institutions

Training in GI endoscopy should take place within the context of a global clinical training program in the fields of adult or pediatric gastroenterology or general surgery. These training programs must be recognized by the Accreditation Council for Graduate Medical Education or the American Osteopathic Association and should exist within institutions where they are supported by the presence of accredited training programs in internal medicine, pediatrics, general surgery, radiology (including intervention training), and pathology.

Supporting curriculum

Competence in technical skills requires the foundation of didactic learning that occurs within the comprehensive training of a specialist in GI and liver disease. In particular, the endoscopic trainee must participate in a program of directed reading and teaching conferences that conveys the following: (1) the indications, limitations, and contraindications of endoscopic procedures; (2) procedure complications and their management; (3) the principles of safe sedation/analgesia techniques and patient monitoring and when to consider alternate forms of anesthesia; (4) medical, radiological, and surgical alternatives to endoscopic therapy; (5) issues of informed consent, advanced directives, and medical ethics as pertains to GI endoscopy (as in the evaluation of gastrostomy and cancer palliation candidates); (6) skills for critical assessment of new techniques and endoscopic scientific literature; (7) incorporating endoscopic findings into overall patient management; (8) preparation of endoscopy reports and communication with referring providers and other members of the care team; and (9) quality measurement and continuous quality improvement.

The endoscopy training director

Each training program should have an expert endoscopist and teacher who is designated as the endoscopy training director and will (1) monitor on a regular basis each trainee's acquisition of appropriate technical and cognitive skills, including maintenance of personal logs/records documenting trainee's numerical procedural experience (including indications, findings, and complications) and success in achieving defined objective performance standards, as discussed in the following; (2) incorporate endoscopic teaching resources (textbooks, atlases, videotapes, electronic media) into the training program; (3) periodically review and update training methodology and quality of training within the program; (4) review evaluation forms from trainers with the trainee and allow for feedback from the trainee on the trainers and the program; and (5) review and update the training curriculum on an ongoing basis.

Endoscopic faculty

The endoscopic faculty should include experienced endoscopists and teachers with demonstrated expertise in

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the procedures being taught. Faculty should (1) have time (and institutional financial support) dedicated to teaching; (2) be responsible for didactic instruction and supervision of trainees; (3) regularly attend GI continuing medical education sessions as well as interdisciplinary meetings with surgeons, radiologists, and pathologists; (4) be of adequate number—the ratio of teachers to trainees should be approximately or greater than one; (5) communicate with the training director and/or each trainee should have a designated faculty supervisor; and (6) show active promotion of research or advancement of clinical practice that includes publications and participation in educational activities on local, regional, national, and international levels.

The training process

Successful trainees in GI endoscopy acquire their skills through a program of hands-on experiential training under the mentorship of expert endoscopic trainers that occurs over a prolonged period of time, such as that represented by a gastroenterology fellowship or surgical residency. Cognitive learning from outside reading, conferences, and instruction in the disciplines comprising the broad field of GI medicine is critical to this process and, through the efforts of both trainer and trainee, is intimately integrated with the technical aspects of procedural instruction and patient management.

Training follows a natural progression as trainees accrue more technical expertise and confidence. Initially, a trainee may observe a procedure, followed by first attempting only the diagnostic or less technically demanding aspects of a procedure. At this stage, under constant supervision, trainees will learn key principles of anatomy and scope manipulation and practice basic techniques such as esophageal and pyloric intubation and retroflexion of the scope tip. They will also practice sedation techniques, begin to learn basic recognition of normal and abnormal endoscopic findings, learn integration of findings into a plan of treatment, and develop skills for writing and appropriate documentation of endoscopic findings.

As experience grows, the trainee will progress to performing the entire procedure and attempting therapeutic interventions. Trainees must appreciate the seamless integration of diagnosis and therapy that is the hallmark of modern endoscopic practice. Examples include the delivery of hemostatic therapy during endoscopy in a bleeding patient and the performance of polypectomy during screening colonoscopy.

The trainee is expected to progress through stages of decreasing supervision, extending from the initial phase of complete supervision through a period of partial supervision, in which the trainee is deemed competent to perform a procedure with reasonable safety and patient comfort. In the latter phase, the trainer is available to view pertinent findings and assist when problems arise. The rate of skill acquisition will vary among trainees and for a single trainee between different procedures, because of differences in manual dexterity, volume of procedures, trainee judgment, and quality of instruction. Ultimately, the trainee should reach a stage in which he or she is deemed competent by the endoscopic training director to perform a specific procedure without supervision. The current economic constraints placed on most academic training institutions will, however, likely mandate that supervision be maintained for most if not all procedures regardless of the trainee's proficiency.

Standard procedures

The amount of time and experience required to learn the effective and safe performance of endoscopic examinations varies considerably among trainees and from one procedure to another. Competence in one procedure does not equate to competence in other procedures. In most centers, training begins with procedures that are easier to master and progresses to more challenging procedures. ERCP and EUS training is expected to follow experience in less complex and technically demanding examinations. The American Society for Gastrointestinal Endoscopy thus upholds a distinction between two types of procedures, standard and advanced.

Standard procedures are commonly performed and are readily available to most patients. These procedures are part of the core of diagnostic and therapeutic capability expected of physicians performing endoscopy. Most trainees can expect to master these procedures during a 3-year gastroenterology fellowship period (including a minimum core period of 18 months of clinical training). Standard procedures include EGD, flexible sigmoidoscopy, colonoscopy, capsule endoscopy, mucosal biopsy, polypectomy, dilation of peptic strictures of the esophagus, percutaneous liver biopsy, and PEG. Although the delivery of endoscopic hemostasis (injection and cautery techniques, esophageal variceal sclerotherapy, and band ligation) requires considerable endoscopic expertise, mastery of these techniques is essential for every endoscopist performing endoscopy in bleeding patients and are thus included among standard procedures.

Advanced procedures

Advanced procedures are more complex and technically demanding to perform and often carry a relatively higher risk of complications. These examinations, which often include complicated and high-risk diagnostic and therapeutic components, are required less frequently than standard procedures, and, thus, the number of individuals trained to perform them should be smaller than the number trained in standard procedures. Advanced procedures include ERCP and all associated interventions, EUS, pneumatic dilation for achalasia, dilation of complex esophageal strictures (eg, lye and radiation strictures), stent placement, Barrett's esophagus ablation therapies, EMR, deep enteroscopy, and endoscopic tumor ablation.

The learning of advanced procedures is founded on a thorough mastery of standard procedures and often requires an additional year of training beyond the standard 3-year fellowship. Guidelines for training programs in advanced endoscopy were published by the American Society for Gastrointestinal Endoscopy in 1994.[2] Not all trainees should pursue such advanced training because of variations in individual skill and the manpower needs of the health care system. Likewise, not all programs should offer advanced training; such training should be concentrated in those programs that have an adequate combination of patient volume and faculty expertise.

In certain circumstances, select advanced procedures may be mastered during a standard 3-year training program when adequate patient volume and trainee aptitude are present. In general, however, good medical practice and the current health care climate both mandate the ideal of concentrating advancing techniques in a relatively small number of highly trained individuals. Training in advanced techniques should be undertaken only if there is a reasonable expectation that the trainee will be able to achieve proficiency in the procedure and be prepared for unsupervised function by the end of the training period. Providing brief exposure to an advanced procedure such as ERCP during standard fellowship with the expectation that the trainee will subsequently complete training in practice is no longer appropriate.

Evaluation of trainee competence

The evaluation of a trainee's progress in endoscopic skill acquisition continues throughout the duration of the training program. The endoscopy training director supervises the process, but all trainers must participate. In keeping with accreditation guidelines, there must be a written evaluation policy that is known by the trainee and includes provisions for frequent and regular structured feedback as well as evaluation of the program and trainers by the trainee. Ultimate assessment of trainee achievement rests with the expert opinion of the endoscopy training director, based on both subjective and objective measures.

Components of trainee competence

Evaluation encompasses both cognitive and technical abilities. In-service evaluations in both areas should be used. Trainee log books and records of procedural numbers should be provided by the trainee to the training director as a raw record of trainee experience. The utility of objective performance standards is discussed in the following. Careful subjective evaluation also must be made of trainees' endoscopic interpretive skills, abilities to incorporate endoscopic findings into overall patient care, responses to incorporate endoscopic findings into overall patient care, responses to complications, adherence to safe patient monitoring and sedation practices, and the quality of their preprocedure and postprocedure patient teaching.

Technical evaluation/performance standards

The use of threshold procedure numbers at which competence may be globally assessed provides only a rough benchmark for guiding trainee evaluation. Few studies of the rate at which proficiency is attained have been performed, but available data suggest that at least 25 to 30 flexible sigmoidoscopies,[3] 130 upper endoscopies, and 200 colonoscopies are required at a minimum before the trainee can be assessed for competence.[4] Similarly, 180 to 200 ERCPs are needed before trainees can routinely achieve selective duct cannulation.[5] Available data on competency in EUS suggest that 100 examinations are needed for acceptable accuracy in the T-staging of esophageal carcinoma[6]; most experts agree that pancreatobiliary EUS demands more experience than esophageal EUS,[7] whereas 40 to 50 cases may provide adequate preparation for the accurate evaluation of submucosal lesions.[8] It should be stressed that these minimal threshold numbers represent a benchmark before which a trainee's competency should not even be assessed. Most trainees will achieve competence much later. Training programs must be able to meet and exceed these procedural volumes for each trainee.

For colonoscopy, 140 procedures had been previously cited as a minimum experience before competency could be assessed. This number was based on data limited to cecal intubation rates and based on expert opinion of competency thresholds (>90%) for this metric. However, using these same limited metrics, Spier et al[9] found that even after 140 colonoscopies, no trainee exhibited procedural competency, yet by 500 procedures, all fellows had achieved procedural competency benchmarks.[10] To better define where within this range competency occurs, a more comprehensive definition of competency was required. A recently reported colonoscopy skills assessment form by Sedlack[11] provides a means to assess a broader range of both cognitive and motor skills for colonoscopy. With the use of this form, learning curves and competency thresholds for each of these core skills have been defined, and they suggest that competence is not achieved by the average trainee until she or he has performed roughly 275 colonoscopies.[4,12] Trainees, however, develop skills at widely varying rates. Data from studies by Sedlack[11] and Chung et al[12] show that a fraction of trainees can achieve competency as early as 175 to 200 procedures, whereas others achieve competency as late as 400 procedures. Absolute or threshold numbers may thus be misleading and should be used with caution in the evaluation of individual trainees. What this illustrates is that the recommended threshold numbers mentioned earlier for each type of procedure should be used only as a guide in curricula planning. The achievement of competence should be based on a separate assessment, either on a periodic or continuous basis, of a broad range of defined skills. It also should be stressed that the rate of skill

acquisition for a given trainee may vary among different procedures; hence, competence in one procedure does not imply competence in other procedures.[13]

To enhance the quality of trainee evaluation and endoscopic training through the use of experience-based criteria, the American Society for Gastrointestinal Endoscopy recommends that program directors also incorporate the monitoring of specific technical skills (such as independent cecal intubation) and interpretive/diagnostic skill (polyp or adenoma detection) into the global assessment of trainees in a continuous manner or on a periodic basis at specified intervals of training. Such monitoring may be achieved through a variety of methods, including the following: (1) incorporating the reporting of performance data into electronic endoscopic report generation, (2) recording of performance data by supervising endoscopic trainers, (3) selective observation of trainees by a designated evaluator, and (4) self-reporting of performance parameters in trainee logs. Performance data for each trainee should be collected and tracked by the training director, who can then observe and document trends in each trainee's development. Programs may elect, for example, to monitor a few performance metrics on a continuous basis or multiple parameters intermittently.

Although this monitoring effort entails an additional time investment by the faculty trainers, it will enhance the accurate measurement of each trainee's progress and readiness for successively more complex procedures and levels of training. Expert endoscopists are generally expected to perform at a 95% to 100% technical success level, and current research supports establishing a standard of 80% to 90% technical success before trainees are deemed competent in a specific skill.[14-17] In a given program, small variations in the standard of expected proficiency that is set from one procedure to the next may be appropriate, especially among procedures of varying complexity; however, the expected performance level should be uniform among all trainees.

For any given procedure, training institutions should be able to provide trainees with a sufficient volume of procedures to achieve technical competence as defined by these standards. Adherence to objective assessment will help to guide programs in deciding which trainees are good candidates for advanced endoscopic training, how many trainees should be instructed in a given procedure, and for which procedures the program can provide a sufficient volume of cases to ensure adequate training.

Ongoing competence, credentialing, and certification

A certification of procedural competence will be provided by the endoscopy training director. Privileging to perform procedures in the clinical setting after training occurs falls under the purview of individual hospital credentialing committees. There are no established standards for monitoring ongoing procedural competence after the completion of training. Although most trainees will become more adept with additional experience after training, maintenance of expert performance cannot be assumed. The objective performance criteria applied here as minimum standards for trainees should serve as useful benchmarks for hospital credentialing authorities addressing this issue, in conjunction with evaluation of other factors such as case complexity, complications, and outcome. Acquisition and maintenance of documented levels of competency in the skills conveyed through a global training program in gastroenterology and GI endoscopy have important and positive implications for both the cost and quality of patient care.[18]

Retraining and alternative pathway training

As new technologies and techniques emerge, there is a natural desire among established practitioners to enhance and expand their own capabilities. It is rarely feasible for training programs to accommodate the retraining needs of past trainees. Such individuals may need to consider the option of pursuing advanced endoscopic training fellowship positions. Although most endoscopic training occurs in gastroenterology fellowships or surgical residency training programs, some practitioners may seek training in other settings. In previous position statements, the American Society for Gastrointestinal Endoscopy has defined the criteria that such alternative pathway endoscopic training programs must fulfill, emphasizing that training should be comprehensive and provide a working knowledge of the pathophysiology, diagnosis, and management of digestive diseases for which endoscopic procedures are indicated.[19]

DISCLOSURE

All authors disclosed no financial relationships relevant to this publication.

REFERENCES

1. Principles of training in gastrointestinal endoscopy. Manchester (Mass): The American Society for Gastrointestinal Endoscopy; 1991.
2. Guidelines for advanced endoscopic training. Manchester (Mass): The American Society for Gastrointestinal Endoscopy; 1994.
3. Hawes R, Lehman GA, Hast J, et al. Training resident physicians in fiberoptic flexible sigmoidoscopy: How many supervised examinations are required to achieve competence? Am J Med 1986;80:465-70.
4. Sedlack RE. Training to competency in colonoscopy: assessing and defining competency standards. Gastrointest Endosc 2011;74:355-66.
5. Jowell PS, Baillie J, Branch MS, et al. Quantitative assessment of procedural competence: a prospective study of training in endoscopic retrograde cholangiopancreatography. Ann Intern Med 1996;125:983-9.
6. Fockens P, Vanden Brande JH, Van Dullemen HM, et al. Endosonographic T-staging of esophageal carcinoma: a learning curve. Gastrointest Endosc 1996;44:58-62.
7. Hoffman BJ, Hawes RH. Endoscopic ultrasound and clinical competence. Gastrointest Endosc Clin North Am 1995;5:879-84.

8. Van Dam J, Brady PG, Freeman M, et al. Guidelines for training in electronic ultrasound: guidelines for clinical application. Gastrointest Endosc 1999;49:829-33.
9. Spier BJ, Benson M, Pfau PR, et al. Colonoscopy training in gastroenterology fellowships: determining competence. Gastrointest Endosc 2010; 71:319-24.
10. Vargo JJ. North of 100 and south of 500: where does the "sweet spot" of colonoscopy competence lie? Gastrointest Endosc 2010;71:325-6.
11. Sedlack RE. The Mayo Colonoscopy Skills Assessment Tool: validation of a unique instrument to assess colonoscopy skills in trainees. Gastrointest Endosc 2010;72:1125-33.
12. Chung JI, Kim N, Um MS, et al. Learning curves for colonoscopy: a prospective evaluation of gastroenterology fellows at a single center. Gut 2010;4:31-5.
13. Wigton RS. Measuring procedural skills (editorial). Ann Intern Med 1996; 125:1003-4.
14. Cass OW, Freeman ML, Peine CJ, et al. Objective evaluation of endoscopy skills during training. Ann Intern Med 1993;118:40-4.
15. Alternative pathways to training in gastrointestinal endoscopy. Manchester (Mass): The American Society for Gastrointestinal Endoscopy; 1995.
16. Rex K, Cutler CS, Lemmel GT, et al. Colonoscopic miss rates of adenomas determined by back-to-back colonoscopies. Gastroenterology 1997; 112:24-8.
17. Chak A, Cooper GS, Blades EW, et al. Prospective assessment of colonoscopic intubation skills in trainees. Gastrointest Endosc 1996;44:54-7.
18. Zeroske JR, Wadsworth TM, Sargant M, et al. Comparison of GI hemorrhage (DRG 174) cost per case and length of stay when performed by gastroenterology vs. internal medicine departments. Am J Gastroenterol 1995;90:1669A.
19. Joint Statement. Principles of privileging and credentialing for endoscopy and colonoscopy. Gastrointest Endosc 2002;55:145-8.

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