EUS core curriculum

This is one of a series of documents prepared by the American Society for Gastrointestinal Endoscopy (ASGE) Training Committee. This curriculum document contains recommendations for training, intended for use by endoscopy training directors, endoscopists involved in teaching endoscopy, and trainees in endoscopy. It was developed as an overview of techniques currently favored for the performance and training of EUS and to serve as a guide to published references, videotapes, and other resources available to the trainer. By providing information to endoscopy trainers about the common practices used by experts in performing the technical aspects of the procedure, the ASGE hopes to improve the teaching and performance of EUS.

INTRODUCTION/IMPORTANCE

EUS is a minimally invasive endoscopic modality that allows the acquisition of real-time, high-resolution images of luminal and extraluminal structures. EUS-guided FNA (EUS-FNA) allows the endoscopist to safely and effectively access regions in proximity of the GI tract that were only previously accessible by percutaneous or surgical means. The ability to provide accurate tumor staging and rapid tissue acquisition has led to physician reliance on EUS services throughout the world and has brought this technology to the forefront at most academic and nonacademic centers. In addition, EUS is evolving as a conduit for therapeutic interventions, such as tumor ablation and duct access.

Because EUS expands the endoscopist's armamentarium of diagnostic and therapeutic tools, proficiency in EUS has become a highly sought-after skill. For most trainees, the amount of EUS exposure and training is highly variable and often program dependent. Some GI training programs incorporate EUS training into the traditional 3-year fellowship. On the other hand, many fellowship programs do not provide this opportunity, and trainees must pursue a dedicated fourth year to learn EUS. The combination of increased demand for acquiring skills in EUS and heterogeneity in learning opportunities makes a curriculum-based training experience essential. This will allow the trainee to achieve procedural competence leading to optimal patient outcomes.

0016-5107/$36.00
http://dx.doi.org/10.1016/j.gie.2012.04.437

GOALS OF TRAINING

Trainee

Before initiating training in EUS, fellows are expected to have completed at least 18 months of a standard GI training program and should have already achieved expertise in basic endoscopy, including diagnostic and therapeutic EGD and colonoscopy.

All GI trainees require some exposure to EUS during their training to develop an understanding of the diagnostic and therapeutic role of the procedure. However, procedural exposure should not be equated with procedural competence. Achieving competence in performing EUS is not a standard part of general GI fellowship. As such, fellows should pursue additional training in EUS only if they intend to have a sufficient case volume in practice to maintain their skills.

Faculty

Programs dedicated to teaching EUS should have at least 1 expert faculty member in EUS who is well experienced in performing diagnostic EUS (with both radial and linear echoendoscopes) and FNA. It is expected that the EUS faculty will have a sufficient case volume and breadth to allow for a well-rounded training environment. Involved faculty should have a track record of effective endoscopic teaching and must be willing to provide the trainee access to their patients and EUS cases. Regular didactic education should also be provided to the trainee by the EUS faculty.

The ideal environment would also provide the trainee in EUS with interaction with a multidisciplinary team including surgeons, oncologists, pathologists, radiologists, and radiation oncologists. This approach will provide a framework to understand how the endosonographer can play a vital role in patient management.

Facilities

EUS is typically an outpatient procedure and can be performed in either a hospital-based endoscopy unit or an ambulatory surgery/endoscopy center. An EUS processor, radial and linear echoendoscopes, catheter-based EUS probes (optional), and EUS needles are the basic equipment necessary to perform the procedure. In addition, knowledge of proper processing of tissue specimens, by either endoscopy staff or cytopathology staff, is necessary to ensure quality outcomes.

Endoscopic experience

The training program should be able to provide a breadth of cases, including, but not limited to, staging of luminal GI malignancies (esophageal, gastric, rectal), evaluation of benign and malignant pancreaticobiliary disease, and the evaluation of subepithelial GI lesions.

In 2001, the ASGE published a guideline for credentialing and granting privileges for EUS and suggested 2 levels of competence: one for mucosal and submucosal lesions and a second more comprehensive competence to include pancreaticobiliary EUS. This document suggested a minimum number for each type of EUS procedure that should be performed during training: 75 mucosal tumors, 75 pancreaticobiliary cases, 40 submucosal abnormalities, and 50 EUS-FNA. The document emphasized that competency was not to be evaluated before the attainment of these benchmarks. This guideline also made it clear that training was not simply to focus on technical issues, but should include study of the indications and contraindications to performing EUS, as well as how to create an accurate procedure report with appropriate descriptions of endosonographic findings. The EUS Core Curriculum represents guidelines for comprehensive training in EUS, including pancreaticobiliary EUS and FNA.

A growing number of therapeutic applications for EUS have emerged (eg, celiac plexus neurolysis, biliary access, tumor ablation). Exposure to these newer modalities may be program dependent. Thus, trainees wishing to enhance their training may need to seek out other opportunities for hands-on experience if their program does not offer exposure to these interventional EUS techniques.

TRAINING PROCESS

Equipment

Basic principles. As with any endoscopic procedure, it is essential to understand the basic tenets of how the relevant equipment works and how images are obtained. Trainees are expected to understand the process through which US images are generated via sound waves. In addition, it is essential that they comprehend the relationship between sound-wave frequency, depth of penetration, and implications on EUS imaging. Trainees should also understand the principles of Doppler imaging because this is used in the majority of studies in which vascular structures need to be defined.

Processors. EUS processors from various manufacturers offer similar capabilities; however, not all processors can perform equal functions. Thus, trainees should gain knowledge in the differences between an electronic EUS system and a mechanical system. In particular, the trainee should understand which type of imaging device is compatible with each processor and what the limitations are when using a mechanical system. To help understand the requisites systems necessary for equipping an EUS unit, it is important for the trainee to understand and evaluate the features, strengths, costs, and compatible imaging devices that can be used with the processor.

Imaging devices and accessories. Echoendoscopes are available in 2 major designs: radial array and curvilinear array. Trainees should develop proficiency in the use of both types of echoendoscopes in identifying normal anatomic structures as well as luminal and extraluminal pathology in the mediastinum, abdomen, and pelvis. In addition, trainees must understand how imaging differs with respect to each modality, the limitations of each, and which imaging modality to choose when proceeding with an EUS evaluation.

Trainees should have the opportunity to gain proficiency in the use of EUS catheter probes (mini-probes) and how they can help guide endoscopic resection of small mucosal or submucosal lesions. Furthermore, trainees should have a firm understanding of the limitations of this modality. Proficiency in the use of catheter probes for ERCP-based intraductal US should only be sought by those trainees with previous or concurrent training in ERCP.

EUS trainees must learn the principle of acoustic coupling and how the presence of a fluid medium is often necessary to optimize the image. They should have an appreciation of the focal length of the instrument and the need to image from an appropriate distance. Trainees are expected to learn how to use a disposable balloon to this effect. They should be able to identify the appropriate balloon to be used for their selected endoscope, be able to place it accordingly, and learn techniques to appropriately de-aerate the balloon.

The timing of introduction of EUS-FNA is at the discretion of the endosonography trainer. Some endosonographers prefer that their trainees have proficiency in EUS anatomy before teaching FNA, whereas some programs allow trainees to perform FNA at the onset of training. Trainees are expected to understand the various mechanical aspects of the EUS needle, including how to advance and withdraw the needle and the sheath, appropriate use of stylet and suction, and proper safe handling. In addition, the trainee should be aware that various types of EUS needles are available. Indications, contraindications, and technique in use may require additional exposure and training.

Basic techniques

Passage of the echoendoscope. Maneuvering both the radial and linear echoendoscope through the GI tract is much more challenging than a standard forward-viewing endoscope. The trainee should have a detailed understanding of the construction of the tip of the echoendoscope and relation of the location of the optics to the transducer.

When training in EUS, an emphasis should be placed on the safe passage of the echoendoscope across vital structures in the oropharynx and upper GI tract. Trainees are expected to gain proficiency in safely intubating and traversing the esophagus, traversing the gastroesophageal junction, and intubating and maneuvering through the pylorus and duodenal sweep. Trainees should become familiar with techniques in rectal and sigmoid intubation and should appreciate the risks associated with FNA in this region.