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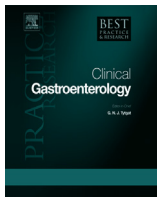

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Training for advanced endoscopic procedures

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A B S T R A C T

Advanced endoscopy has evolved from diagnostic ERCP to an ever-increasing array of therapeutic procedures including EUS with FNA, ablative therapies, deep enteroscopy, luminal stenting, endoscopic suturing and endoscopic mucosal resection among others. As these procedures have become increasingly more complex, the risk of potential complications has also risen. Training in advanced endoscopy involves more than obtaining a minimum number of therapeutic procedures. The means of assessing a trainee's competence level and ability to practice independently continues to be a matter of debate. The use of quality indicators to measure performance levels may be beneficial as more advanced techniques and procedures become available.

Introduction

Advanced endoscopy, traditionally associated with endoscopic retrograde cholangiopancreatography (ERCP) and endoscopic ultrasound (EUS), continues to evolve in both breadth and depth as new technology and techniques become available. Advanced endoscopists now perform a variety of recognized procedures including ablation of Barrett's dysplasia, removal of large polyps or malignant lesions via endoscopic mucosal resection (EMR) or endoscopic submucosal dissection (ESD), deep enteroscopy, endoscopic suturing and stenting of the gastrointestinal tract. As these procedures have become increasingly more complex, combined with a shift towards more therapeutic interventions with a higher chance for complications, there has been an increased emphasis on ensuring adequate training and competence. In this chapter, we will examine the varying degrees of technical difficulty

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involved in different advanced procedures, and the means by which competence has historically been determined. We will also discuss the current trends in training in advanced endoscopy and predictions for the field moving forward. We will focus the discussion to advanced endoscopic procedures that are currently established and more widely accepted in practice, yet it is worth noticing that there has been an explosion of new endoscopic procedures that continue to expand the frontier of therapeutic endoscopy.

Development of advanced endoscopy

The field of advanced endoscopy had its roots in attempts to find non-surgical means to improve visualization of the pancreato-biliary system. It is almost impossible for physicians today to even grasp the world of pancreato-biliary medicine in the late 60's and early 70's. Pancreatic cancer was diagnosed by palpation or change in contour of the duodenal sweep on barium study but most commonly at the time of laparotomy or autopsy and chronic pancreatitis was recognized only if dense calcifications were seen on abdominal radiograph. There was a great clinical need for means to image the bile and the pancreatic ducts and the first successful cannulation was reported in 1968 by McCune, who then achieved a 25% cannulation rate in 50 patients [1]. Cannulation rates improved significantly over the next several years, and the first therapeutic application of ERCP occurred in 1974 with the advent of biliary spincterotomy, and the term ERCP was approved the same year at the World Congress in Mexico [2,3]. The use of ERCP began to proliferate rapidly with the development of the computed tomography (CT) scan, however the ability to instruct trainees was limited by the fiberoptic endoscopes in use at the time [4]. Once the charge-coupled device enabled videoendoscopy in the 1980s, both the operating and learning experience was greatly enhanced for the endoscopist and trainee [5,6].

Further imaging advances in the form of magnetic resonance imaging (MRI) and magnetic resonance cholangiopancreatography (MRCP) permitted non-invasive means to visualize the pancreatic and bile ducts. By the 1980s, endoscopic ultrasound (EUS) was available, which was later enhanced by fine-needle aspiration in the 1990s [7]. These developments significantly reduced the need for diagnostic ERCP, and it has transitioned to a primarily therapeutic procedure. The increased complexity of these therapeutic interventions brought to light concerns over the higher complications rates of ERCP. Although many gastroenterology training programs were providing instruction in ERCP due to the increased demand, there was little consensus on what constituted adequate training. An obvious surrogate marker for competency became the number of ERCPs performed during training. The initial number required for credentialing was published in the Gastroenterology Core Curriculum in 1996, which established a threshold of 100 ERCPs that included 25 therapeutic cases consisting of 20 sphincterotomies and five stent placements [8]. This number was later challenged, however, with the study by Jowell et al. recommending a minimum number of 180–200 procedures before competence could be obtained [9].

The emergence of EUS as a tool for the diagnosis of a wide variety of gastrointestinal disorders has added a layer of complexity in training to perform advanced procedures. Applications for EUS continue to grow from the traditional indications for the diagnosis and staging of gastrointestinal (GI) malignancies to a versatile therapeutic platform. The use of EUS to stage cancer of the pancreas, esophagus or stomach is now well established and has been demonstrated to be complimentary and in many aspects superior to CT [10]. EUS-guided fine-needle aspiration (FNA) also provides a means to directly sample lesions as opposed to a percutaneous approach, and has been proven to be superior to other methods [11]. As with ERCP, concerns have been raised whether current guidelines endorse a sufficient number of procedures to ensure competency in EUS given the complex anatomic relationships that are required to be mastered.

While the focus of many dedicated advanced endoscopy training programs is on ERCP and EUS, trainees are also gaining exposure to a number of other techniques. Originating in Japan in the 1990s, EMR was developed as a means to treat early gastric cancers without surgical intervention [12]. This technique is now well established in the West and allows resection of dysplastic and early cancer lesions throughout the GI tract, but the resection of larger lesions can only be achieved in piecemeal fashion. ESD was later devised to overcome this limitation in size, and involves submucosal fluid injection, mucosal incisions surrounding the lesion, followed by submucosal dissection beneath the