

ADVANCES IN ENDOSCOPY

Current Developments in Diagnostic and Therapeutic Endoscopy

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Endoscopic Training: Past, Present, and Future



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G&H How has endoscopic training changed since your own training?

RK Endoscopy developed later than gastroenterology, so when I started to train in the mid-1970s, flexible fiber-optic scopes were used. These were large-diameter, short scopes, and they were being used for only a few therapeutic procedures, such as the removal of colonic polyps, dilation of esophageal strictures, and placement of stents in the esophagus. At that time, there were no endoscopic techniques or technologies available to treat gastrointestinal bleeding, so endoscopists were diagnosticians and then sent patients to either a surgeon or interventional radiologist. Therapeutic endoscopic retrograde cholangiopancreatography (ERCP) was in its ascendancy, and only a few institutions throughout the world were performing it. It was not until 1980 that Dr Nib Soehendra developed the first biliary stent that could be placed endoscopically in patients with benign or malignant obstructive jaundice, so most of the procedures that endoscopists currently perform have evolved since then. My training was modeled after an apprenticeship; trainees learned procedures from a physician who had performed endoscopy and colonoscopy but may or may not have performed ERCP. In fact, the director of my training program did not perform ERCP, so my fellow trainees and I had to either train ourselves (which would never be allowed now) or find a physician in the community who had at least some experience with diagnostic ERCP.

G&H What are the advantages and disadvantages of one-on-one training using actual patients?

RK The advantage of one-on-one training is that the trainee is under constant scrutiny and close monitoring of his or her skill sets and capabilities. On the other hand, the training is only as good as the person providing it, as well as the technology that is available. Not everyone is fortunate enough to have state-of-the-art endoscopes,

fluoroscopy equipment, and reliable single-use accessories. The training models that are currently being used have evolved from simple one-on-one training.

G&H What is the role of animal models and cadaver-based training in endoscopic education?

RK Animal models are useful and are often used for ERCP training, but, in my opinion, they are more useful for experienced endoscopists who wish to learn new or evolving techniques, such as peroral endoscopic myotomy (POEM), than for fellows. There has been an explosion of medical knowledge and technology, particularly involving the increased capability to record and subsequently review procedures. Endoscopes have video cameras that providers can interface with a computer, allowing access to still pictures and videos for both practice and education.

G&H Can you discuss any studies on simulation-/computer-based training programs?

RK Currently, many interactive devices are available for training, such as mechanical simulators, some of which are so sophisticated that they rival a flight simulator. There are considerable data showing that learning techniques and perspectives with simulation improves procedural completion rates and decreases major complications, such as bleeding and perforation. Cohen and Thompson recently published the results of a study on intellectual and procedural simulators in the *American Journal of Gastroenterology* confirming these data. Singh and colleagues recently published the results of a systematic review and meta-analysis on simulation-based training in gastrointestinal endoscopy in the *Journal of Clinical Gastroenterology*. The authors examined 21 randomized controlled trials in 39 articles involving 1180 trainees and found improved performance, in both test settings and clinical practice, after simulation-based training. The meta-analysis also found

improved patient outcomes (better procedural completion rates and a decrease in major complications).

G&H Do you foresee an expanded role for simulation-based training in the future?

RK Yes. I think that the days of just handing a scope—whether it is an endoscope, colonoscope, or duodenoscope—to a trainee with no previous experience are rapidly disappearing. There are currently many websites that show videos of various techniques and technologies. One such website is the Digital Atlas of Video Education (also known as the DAVE project). At my institution, fellows are also encouraged to review the video library in our unit, and there are a variety of simulators that both surgical residents and gastroenterology fellows can use.

G&H How is the recent focus on therapeutic endoscopy changing endoscopic training?

RK Therapeutic endoscopy has become a subspecialty in gastroenterology, like liver disease or inflammatory bowel disease, and is now a fourth-year program after a 3-year gastroenterology fellowship. This does not mean that endoscopists who have undergone a conventional 3-year fellowship cannot perform therapeutic procedures. Certainly, all endoscopists perform polypectomy and esophageal dilation, among other therapeutic procedures, and most gastroenterologists should know how to stop bleeding, both variceal and nonvariceal. However, performing specialized, high-risk procedures, such as POEM, endoscopic submucosal dissection, and ERCP, is different. It is strongly recommended that doctors who want to perform most ERCP procedures (particularly pancreatic endotherapy) first train for a minimum of an additional year to learn procedural indications, complications, and techniques.

Endoscopic ultrasound is another procedure that has evolved from a diagnostic procedure to one through which therapy can be rendered. For example, endoscopists can perform biliary decompression and transduodenal cholecystostomy via endoscopic ultrasound, and they can use endoscopic ultrasound to help define the safety of going beyond the bowel wall to perform transmural resection of submucosal tumors. There have recently been reports of performing gastroenterostomy using endoscopic ultrasound.

All of these therapeutic endoscopic procedures have been carved out of the surgical domain, so endoscopists must learn the surgical maxims that their surgical colleagues have known for a long time, like undrained pus is bad and a perforated bowel, which cannot be controlled, can be life-threatening. Now, some of these patients do not have to go to surgery because endoscopists have the ability to treat them. Nevertheless, all of these procedures require a skill set and, therefore, additional training.

G&H Should all endoscopy fellows receive training for advanced procedures?

RK There is no need for all endoscopists to be able to perform every procedure. Nontherapeutic gastroenterologists can still perform routine endoscopic procedures, such as colonoscopy and percutaneous gastrostomy, and probably 90% of gastroenterology practice should not be just procedural; it should also be cognitive. However, there are aspects of therapeutic endoscopy (eg, removal of large polyps, particularly in the right colon) that nontherapeutic endoscopists may not feel comfortable performing. If they do not have the comfort level to perform a procedure and do not have the experience, patients will be better served by a therapeutic endoscopist, even if this requires referral to a different institution. My colleagues often see patients referred by endoscopists who do not have access to or who are not comfortable with a particular technology or procedure at their own institution. We are all gradations of endoscopists, whether from the internal medicine side as gastroenterologists or from the surgical side as endoscopists.

G&H What is your perspective on endoscopic procedures being performed by surgeons?

RK This is a controversial and complicated issue. There are many superb, world-famous endoscopic surgeons, such as Dr Guido Costamagna in Rome, Dr Amit Maydeo in Mumbai, and Drs James Lau and Sydney Chung in Hong Kong. In addition, many colorectal surgeons, for instance, are extremely well trained in colonoscopy. Personally, I do not care whether a doctor comes from the medical side or the surgical side as long as he or she does a good job. The problem is not people who are well trained and who perform these types of procedures every day; the problem is people who perform these procedures only occasionally and may not do them well or may not have full training.

In my institution, surgical residents perform upper and lower endoscopy as part of their surgical residency, but they do not necessarily achieve competency with these procedures based on the 40 or 50 procedures they perform. Most general surgeons do not perform endoscopy in practice because there are endoscopists nearby. However, in rural areas, endoscopic surgeons may be the only endoscopic resource within 50 miles.

G&H How will the responsibilities of training directors change in the future?

RK The main responsibilities have already changed. The Accreditation Council for Graduate Medical Education (ACGME) has come up with entirely new rules requiring the reporting of milestones. These include competency vs time-based outcomes, which may consist of developmental outcomes, knowledge, skills, attitude, performance, patient

safety, quality initiatives, and cost consciousness. This change has been implemented not only for gastroenterology and endoscopy training, but also for all allopathic and osteopathic medical training programs in the United States. In addition, training programs have to report program attrition, program changes, board pass rates, clinical experience data, fellow surveys, faculty surveys, milestone data, and Clinical Learning Environment Review site visits, which occur on a regular basis.

To explain the significance of this change, here is an example. When I was trained, colonoscopy skill was assessed by the number of colons an endoscopist examined, which would allow the endoscopist to obtain privileges at hospitals. That number used to be 50. In 1992, the American Society for Gastrointestinal Endoscopy made that number 100. In 1993, Cass and colleagues set up a multicenter trial looking at 14 fellowship programs and 135 fellows. The authors reported that 140 colonoscopies were required to achieve competence, which they defined as a cecal intubation rate of 90%. A study by Steele reported an even higher number (500). What is the right number?

What the ACGME and gastroenterology boards are now saying is that procedural competency in colonoscopy means a good cecal intubation rate (reaching the cecum 90% of the time), but it also includes the adenoma detection rate, cecal withdrawal time, and completion rate—the last of which does not just mean putting the colonoscope in and pulling it out, but completion of whatever the endoscopist set out to do (ie, treat bleeding or take out a large polyp). Complication rates are also now required in the assessment of procedural competency as well as patient satisfaction data. No patients can leave our unit without receiving a patient satisfaction form to fill out after being treated. It might not matter if we have a 99% completion rate if patients are unhappy.

G&H What do you see as the major challenges facing endoscopic training?

RK Worldwide, the main challenge is access to procedures because of limited resources and variable screening/surveillance guidelines. In the United States, however, the main challenges involve resource allocation and declining reimbursements. As a result, it may not be cost-effective to train people; I already know of several practices that have dropped their fellowship affiliations because of the difficulties of maintaining productivity in a time of decreasing reimbursement. It takes a lot of time to train fellows, and if endoscopists are trying to maintain productivity, training fellows may get in the way. I do not necessarily agree with this thinking because I feel that fellows give as much as they get, but I think that the ongoing pressure on productivity is going to be problematic in endoscopic training in the future.

Fortunately, there are some ways to circumvent this potential problem. For instance, the use of patient-directed

propofol (via the Sedasys System) for colonoscopy and, in some patients, upper endoscopy has cut the time from admission to discharge by half in my institution. Although this system costs a bit more than giving a patient midazolam and fentanyl for a procedure, it is dramatically cheaper than having a nurse anesthetist or an anesthesiologist administer propofol. There is potential for using a system such as this one while increasing throughput and still being able to train fellows. Unfortunately, this anesthesia system is in place in only a few institutions in the United States right now. It will be interesting to see what happens as this system, as well as other time-saving systems, become more widely adopted.

G&H What do you foresee as the next steps for the advancement of endoscopic training?

RK Endoscopic techniques and technologies will continue to evolve, and there will be further dissemination of procedures that most endoscopists are not currently performing. For example, endoscopic submucosal dissection has been available for almost 20 years in Japan, but only a few institutions in the United States are performing this procedure. This will change because we now know that superficial gastric cancers, esophageal cancers, and colorectal cancers can be treated using this procedure, with outcomes that are comparable to those of surgical resection. We are also learning that the sanctity of the bowel wall does not always have to be respected. There are some institutions where doctors are performing transmural resection of gut stromal tumors, leiomyomas, and carcinoids and then are closing those defects with clips, bear claws, or endoscopic sewing machines. We are learning that we are going to be able to make anastomoses in the future. We are doing that now with dumbbell-shaped self-expandable metal stents and are anastomosing the duodenum to the bile duct, or the gallbladder to the duodenum. That same technology is currently being looked at to reconfigure the esophagogastric junction for reflux. I already mentioned the possibility of performing a gastroduodenostomy using endoscopic ultrasound; endoscopic ultrasound, which lets us look outside the gut wall, will be a major tool for therapeutic endoscopists in the future. When I first saw endoscopic ultrasound in the mid-1980s, I could not imagine all of the therapeutic procedures for which it is currently being used, and I think that we will continue using this technology to carve out additional parts of the surgical domain.

Dr Kozarek has no relevant conflicts of interest to disclose.

Suggested Reading

Cohen J, Thompson CC. The next generation of endoscopic simulation. *Am J Gastroenterol.* 2013;108(7):1036-1039.

Singh S, Sedlack RE, Cook DA. Effects of simulation-based training in gastrointestinal endoscopy: a systematic review and meta-analysis. *Clin Gastroenterol Hepatol.* 2014;12(10):1611-1623.e4.