



# The New Virtual Reality: Advanced Endoscopy Education in the COVID-19 Era

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## Introduction

Although the current novel Coronavirus Disease of 2019 (COVID-19) pandemic has significantly impacted all training programs throughout the country, procedure-based specialties such as gastroenterology are particularly affected. Given the initial need to limit trainee exposure to infected patients, preserve personal protective equipment (PPE), and perform only urgent procedures, gastroenterology and advanced endoscopy fellows significantly reduced their hands-on endoscopy experience [1–3]. The decreased number of procedures has been of great concern to our GI fellows regardless of their year of training and has been particularly worrisome for our advanced endoscopy fellows due to the short, one-year training period allotted to acquire these specialized skills.

Advanced endoscopy fellows are facing stress from multiple fronts during this pandemic: limited participation in advanced procedures due to the overall decrease in procedures being performed and the restricted access to patients, possible redeployment to inpatient general medical units, the feeling of isolation stemming from the small number (usually 1–2) of advanced fellows per program, and preparing to relocate to their next job during this crisis period. Due to these unique concerns, advanced endoscopy fellowship program directors have had to pivot their focus and approach these challenges with compassion, flexibility, and innovation.

Previous data have suggested that the average advanced endoscopy trainee needs at minimum 250 ERCP and 225

EUS procedures in order to achieve core competence, with approximately a 50% greater number of procedures required in some cases [4]. If competency is not achieved and procedure access is limited, alternative teaching tools must be utilized in order to achieve similar results. This particular issue highlights the importance of maximizing educational opportunities outside of the procedure suite, anticipating the experience needed to achieve competency, and how feedback is provided to maximize learning opportunities.

Although we cannot solve every issue, it is our mandate as Advanced Endoscopy Program Directors to continue providing high-quality endoscopy training despite a reduction in procedure numbers. We would like to share some immediate changes related to the COVID-19 era implemented at our centers during the advanced fellows' final months of training and other issues anticipated as incoming fellows begin their training in July in the setting of the early stages of reopening during an ongoing pandemic.

## Live Streaming and Recording of Procedures

Depending on an individual endoscopy unit's capability, there are several options for viewing procedures despite the fellow not being inside the procedure suite. There are a number of video integration and storage services available for viewing and recording procedures. Protected health information (PHI) can be removed in order to preserve confidentiality. In our center, procedures can be live-streamed to another room accompanied by discussion in real time via the use of in-room microphones. Other options include connecting an external hard drive or computer directly to the endoscope processor so as to record procedures in their entirety that can then be viewed afterward for further discussion. The added benefit for advanced fellows is that they can then archive video footage of notable cases for viewing at a later date.

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## Hands-on Models and Simulators

While nothing can replace active participation in procedures, there are other methods for maintaining the endoscopy skills and dexterity necessary for successful learning of advanced endoscopy procedures. Hands-on models and simulators have long been used as aids for surgical and endoscopic education [5–7]. Many courses throughout the world and at the ASGE Institute for Training and Technology (IT&T) Center include hands-on demonstrations aimed at teaching new skills and reinforcing previously learned techniques. Ex vivo and live models may have limited utility during the COVID period and have higher associated costs, but plastic models may be cost-effective and more widely available. If an endoscope is available, there are models that can be used to practice ERCP techniques such as biliary cannulation and sphincterotomy. Models that do not require an endoscope and could be utilized outside of the endoscopy suite may facilitate familiarity with device setup and deployment and could potentially even be used in a trainee's home. These models can be purchased directly from vendors or accessed in collaboration with industry partners that already have them available and may be especially useful for practicing stent deployment (luminal, biliary, and lumen apposing metal stents).

Simulators have historically been a costlier teaching option that are not readily available at many centers. The ASGE Technology Committee described the current experience with endoscopy simulators (mechanical and virtual reality versions) in gastroenterology in 2019 [8]. This review illustrated that simulator training may assist with gaining specific technical skills early in training although the benefits may be reduced with greater experience levels. Simulators can provide experience with upper and lower endoscopy, as well as some advanced procedures such as ERCP and EUS. Given there are typically 1–2 advanced fellows at each center, it may be feasible for faculty to provide real-time feedback by virtually observing the advanced fellow during the use of hands-on models or simulators.

## Endoscopy Video Rounds

In order to adhere to social distancing, all of our weekly conferences were switched to a virtual format, and a new endoscopy video rounds was added. This endeavor involves attendings or fellows presenting unedited video of cases, with an attending discussing important aspects of the endoscopic procedure while providing didactic teaching on case-related topics. The virtual format facilitates

direct Q&A, as well as a chat feature enabling fellows to text questions, which may be a less intimidating means of interaction than are the traditional in-person queries at conferences. This format allows a broader diversity of faculty (GI, surgery, pathology, radiology) not only from our institution but also from other centers to participate. Since access to visiting faculty is typically limited by cost and traveling time, remote access provides a chance to increase exposure for fellows to experts from around the country. Without the time constraints of an actual procedure, this format also encourages feedback in a non-stressful environment and may be of particular interest to advanced fellows.

## Internet and Social Media

The current pandemic has highlighted the shift to online and social media options for endoscopic education that was already occurring, having been studied with mixed results in the past [9, 10]. There are Web sites from the major GI societies and journals, podcasts, apps (ASGE GI Leap), online channels (YouTube), and social media platforms (Twitter, LinkedIn, etc.) where users can post video clips of procedures with commentary [11]. Some platforms lend themselves to simultaneous, interactive discussion but most can be archived and viewed on-demand. These platforms allow users to post comments and critiques that can be discussed further for learning purposes. The main concern with some platforms that allow content to be posted without a rigorous peer review process is that they may contain faulty information or describe inappropriate techniques. It is thus important to stress to the trainees that this content should only serve as a jumping-off point for discussion and not a replacement for detailed and comprehensive teaching from the local faculty. Furthermore, as we adapt our methods of endoscopic education and clinical practice while incorporating new scientific knowledge in this COVID-19 environment, social media allow for real-time changes to be shared and discussed among peers and for studies to be carried out. Social media may enhance camaraderie among advanced fellow around the country who are undergoing similar challenges in their educational curricula and career development.

## Incorporation of the Advanced Fellow Back into the Endoscopy Room

As units begin increasing their procedure volume and testing of patients prior to endoscopy, the advanced fellows should be participating in cases virtually or hands-on with adequate PPE. Furthermore, focused assessment and feedback of the fellow's performance in anticipation of independent practice

within a few months should provide reassurance of mastered skills and highlight areas for improvement that can optimize the experience gained from procedures performed in the final months of training.

## Advanced Endoscopy Fellows in the Future

In addition to the impact on our current advanced fellows, COVID-19 will likely affect our future advanced trainees. First, there may be limitations on funding available to support some advanced endoscopy programs with a consequential reduction in the number of advanced training programs or the requirement for more income-generating activity from advanced fellows in order to offset costs. Second, the incoming advanced fellows starting on July 1, 2020, may not be performing as many procedures as in the past and may have to adapt to the changes in training curriculum as outlined above. Simulators have typically been found to be most helpful in the early training periods. More structured and comprehensive curricula may be required if less advanced procedures will be performed over the course of the advanced endoscopy fellowship. Effective performance assessment and feedback will be beneficial.

Finally, there will be a significant impact on the advanced endoscopy fellowship interview process that is currently underway for those programs participating in the ASGE match. Many centers, by converting to virtual interviews due to travel restrictions, do not benefit from an applicant visiting a unit in person and meeting with many members of the endoscopy team during a visit. For the faculty, decisions will be made upon brief virtual interviews that may not be the optimal representation of a candidate's strengths. For both applicants and faculty, virtual interviews, which may include a virtual tour of the endoscopy unit, will be relied upon to replace the in-person interactions that are key to determining compatibility. Active participation by both parties can help ensure that a virtual interview can impart knowledge that can identify the best fit for a successful interventional fellowship, career, and extended mentorship.

## Conclusions

Unique features of the typically one-year advanced endoscopy fellowship require special consideration in order to maximize advanced endoscopy education opportunities during the COVID-19 era. Due to the time constraints of their training period and decreased volumes of procedures being performed, advanced endoscopy fellows may feel their training has been compromised to a greater extent than for gastroenterology fellows. Therefore, it is imperative for advanced endoscopy program directors to adapt

to this fluid situation when concluding the training of advanced fellows who began the final third of their training during this pandemic and anticipating the needs of incoming fellows. Advanced endoscopy training programs will need to be more creative in their curriculum development, incorporating hands-on training with models and simulators, virtual and in-person observation and feedback, online learning, and social media interaction. This will require a shift in thinking of both advanced endoscopy trainees and the faculty training them to maximize successful outcomes as typically robust procedure volumes may be compromised in the future should additional restrictions in elective procedures be required.

The relationship between the advanced endoscopy fellow and faculty has special features as years or decades of procedural experience is passed on, standing side by side during often complex and stressful procedures, en route to forging an independent advanced endoscopy career and ideally a long-lasting mentorship relationship. To this year's graduating advanced endoscopy fellows, know that your mentors hear your concerns, support you, and appreciate the care that you have provided during the pandemic. The conclusion of the advanced endoscopy year and the challenges of the present moment are a reminder that endoscopic skill development continues well beyond advanced fellowship and throughout the entirety of one's career.

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