

ADVANCES IN ENDOSCOPY

Current Developments in Diagnostic and Therapeutic Endoscopy

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Remote Teaching of Gastrointestinal Endoscopy



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G&H How did you become involved in remote training of gastrointestinal endoscopy?

JW In 2020, Dr Michael Marin, the Surgeon-in-Chief of the Mount Sinai Health System, asked me to teach a course on flexible endoscopy at a surgical center in a remote section of Uganda. Dr Marin led the development of the surgical center as part of a Global Surgical Initiative and had looked at many places before deciding on Kyabirwa. This area in Africa did not previously have surgical capability, was in a relatively stable country where English was spoken, and was near a medical facility. Approximately a 4-hour drive from the airport in Kampala, Kyabirwa has no paved roads nor running water, but it has electricity. The Kyabirwa surgical facility is incredible in that it has its own solar panel supply for power, waste disposal system, and water treatment system for purification.

At that time in 2020, which was 2 months after I retired, I had plans to go to Ethiopia where the World Endoscopy Organization had been establishing a training center for endoscopy. After Ethiopia, I traveled to Uganda where Dr Marin had arranged to have 6 surgeons attend an endoscopy camp with me. It turned out to be a little challenging to get endoscopic equipment into Uganda and into this newly built surgical center, with only a 3-month notice. Fortunately, I have a long-standing relationship with Olympus Corporation, which not only supplied the endoscopy equipment but also resolved a few last-minute difficulties with customs. The company also sent a technician from Kenya to oversee the set-up and to train the staff in disinfection and proper care, which was invaluable. After I completed teaching the course, Dr Marin asked if I would continue the training remotely.

G&H How important is an endoscopy camp to the success of remote endoscopy training?

JW Dr Marin had set up a 1-week endoscopy camp at the surgical center in Uganda where I taught 6 surgeons the procedure. Every day started with a 1-hour lecture on endoscopy and included videos I made while teaching at the New York Society for Gastrointestinal Endoscopy over the past 35 years. The lectures covered many aspects of endoscopy, including how to perform polypectomy. After the lecture, we evaluated patients under close supervision. Every surgeon had the opportunity to hold an endoscope in his or her hand, and I trained the surgeons on how to stand at the table, what twisting the endoscope does, and what all the buttons do.

Endoscopy camp was an important first step because these surgeons had no experience with endoscopy and had never touched an endoscope before. Without side-by-side introduction, it would have been very difficult to show how to perform the procedures (eg, how to go around a bend in the colon). For this type of training, having a mentor who evaluates and explains each step is key. As novices, they needed to learn all aspects of the procedure, including the safe handling and disinfection of the equipment. That instruction was an essential part of the camp, along with the one-on-one training and hands-on practice.

G&H What are the design prerequisites and key technical aspects for remote endoscopy training?

JW The Ugandan surgical facility has 2 separate operating rooms, an endoscopy tower, a gastroscope, and a

colonoscope. The main technical person who was instrumental in setting up Dr Marin's original unit was Ivan Lumala, who was a technology officer at Microsoft. He laid out what was necessary for remote training, part of which was a high-speed Internet connection. Dr Marin paid for workers to dig by hand a ditch in a dirt road from the nearest big city, Jinja, approximately 10 miles away, to Kyabirwa, into which they laid a high-speed Internet cable.

Once they were connected, Mr Lumala supplied the facility with the Logitech Rally System, comprised of a camera that records a video of the room, a microphone, and connections to a laptop that captures the virtual meeting (ie, Zoom) output. Once connected to the endoscope processor, the system shows a split-screen view of the operator's hands and the endoscope output simultaneously. Because there is no perceptible lag time in both directions between audio and video transmission, I can

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see exactly what the surgeons are doing and can provide direction (eg, to twist a little more to the right). Immediately, I can see how they respond and whether their response is correct. The system enables us to communicate in real time. Being able to provide instantaneous feedback to the surgeons is just like being beside one of my fellows in the endoscopy suite at Mount Sinai. Clearly, it helps having the experience of teaching endoscopy in knowing exactly how to impart the skill of endoscopy navigation to a person who has never handled an endoscope.

G&H What are the limitations and benefits to teaching endoscopy remotely?

JW One limitation of teaching endoscopy remotely is, of course, the instructor not being able to hold the endoscope when the student becomes stuck somewhere. In the endoscopy suite, I could take the endoscope, get around that difficult corner, and then give the endoscope back to the trainee. It is impossible to do that when the trainee is in Uganda, 7000 miles away. To teach remotely,

the endoscopist requires a high level of expertise; he or she must be a real expert in endoscopy to know exactly how to explain the necessary maneuvers to perform when teaching a very difficult procedure online. I think that one must be a good teacher to begin with to even consider doing remote training in endoscopy. That probably holds true everywhere, but I think that this remote training is a unique opportunity.

One problem that the American Society for Gastrointestinal Endoscopy grapples with is how to train the doctor in practice (who is trained in endoscopy but is no longer a fellow) when a new procedure comes out. The doctor wants to learn the new procedure but perhaps lives far away from the nearest training center or cannot be reinserted into a teaching center. Here is an opportunity and an advantage of this technology to train doctors in endoscopy remotely. This doctor could purchase a system that will do the exact same thing as the Ugandan doctors are doing and be able to acquire new skills without leaving his or her location. The system and the equipment that is used in Uganda costs approximately \$3000 of US currency. By acquiring the equipment, the doctor could learn this new procedure from an expert who watches from a home computer and takes the doctor through each step, one by one.

Once a remotely proctored doctor is sufficiently trained in endoscopy handling, that doctor can then begin to perform other endoscopic procedures. In Uganda, once I became confident that the main doctor at the Kyabirwa Surgical Center was capable of performing an upper endoscopy effectively, we introduced him to a new procedure, esophageal variceal banding. One of the gastrointestinal (GI) fellows at Mount Sinai, Dr Yakira David, guided the doctor in Uganda through the procedure, knowing that the surgeon had never previously seen varices through an endoscope.

In preparation for the procedure, the fellow in New York and the doctor in Uganda practiced together by Zoom, each having an identical banding kit. Once they had assembled the equipment, the Ugandan doctor then used it to put an esophageal band on a blown-up rubber glove. When the patient came the next week, the Ugandan doctor was already familiar with the equipment and assembled it by himself. He performed the endoscope examination, and with the GI fellow talking him through each step, he was able to successfully place several bands on the esophageal varices. Again, I think that this is an opportunity for doctors to learn new procedures relatively easily if they are already familiar with the basic techniques of endoscopy.

G&H Has any research examined the safety and efficacy of remote endoscopy training?

JW Aside from the few reports I coauthored on my experience with remote training of doctors in GI endoscopy, I am not aware of any literature on the topic. However, one-to-one online training has been used by surgeons in other areas, especially laparoscopy, for the past several years. Reports from surgeons who provided remote training of laparoscopy have shown that the outcomes were equivalent to those of live side-by-side training.

G&H How easy would it be to expand remote endoscopy training in other areas?

JW It would be remarkably easy for a hospital to develop a remote endoscopy training initiative, like what has been done in Uganda. The remote institution needs the

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equipment, and all the trainer needs is a computer. The equipment is available at a reasonable cost.

The African Esophageal Cancer Consortium, which is concerned with the prevalence of esophageal cancer in the lower eastern part of Africa, is interested in our remote endoscopy experience to help manage this condition. Esophageal cancer is commonly seen in the unit in Kyabirwa, where it is a tremendous public health problem.

A colleague in Australia developed his own camera system to teach endoscopy in remote areas and is now able to communicate with his colleague in Papua New Guinea. Remote endoscopy training is being done successfully and is being expanded upon for other needs, but cost is a factor. It is important to train not only doctors but also other personnel. All staff members need to know how to assist in the procedures and take care of the instruments.

G&H Do you have any recommendations for colleagues who want to become involved in remote teaching?

JW I think GI fellows in their third year of training are experts in endoscopy and could easily be conscripted throughout the world to help in remote training of endoscopy. They have been trained to do the procedure and to teach it. Imparting basic endoscopic techniques to a trainee remotely in online sessions is a labor-intensive task that requires the trainer to commit the necessary time to do it well.

Having remote training in Kyabirwa, Uganda, works well for me because I am on the East Coast. Kyabirwa Surgical Center schedules cases at 2 PM, and I am online at 7 AM. If the remote training is to take place in East Africa, I would recommend having the trainer on the East Coast, or in Europe, because being near the same time zone is important.

Suggested Reading

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