Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Letter to the Editor: Pandemic (COVID-19) Proctoring for eCLIPs Neurointervention

Letter:

Without question, the COVID-19 pandemic has impacted the practice of medicine in numerous ways. With rapid introduction of novel technology in the field of neurointervention, in-person case proctoring has traditionally been used for the effective and safe dissemination of the use of new endovascular devices. Unfortunately, in-person case proctoring poses numerous challenges in the COVID-19 pandemic environment with proctors needing to travel to treatment centers and work in close proximity with the local neurointerventionalists. Telemedicine has been proposed as a means of ensuring continuity of patient care without risking virus transmission to either the patient or the health care provider.[1] Online videoconferencing apps have become key to performing our tasks as physicians while maintaining proper social distancing. As a proof of concept, we present a recent endovascular repair of an aneurysm using a novel device that was proctored virtually using a videoconferencing app.

CASE

We present a case of a 56-year-old patient presenting with an incidental unruptured wide-necked carotid termination aneurysm (Figure 1). We thought conventional treatment options, such as balloon-assisted coiling or Y-stenting, would result in suboptimal coil filling and later recurrence. We decided to repair the aneurysm endovascularly using an eCLIPs device (Evasc Medical Systems Corp., Vancouver, British Columbia, Canada) that serves as a neck bridging device to ensure adequate aneurysm coiling and as a flow diverter to prevent recurrence.[2] The treatment center (University of Alberta Hospital, Edmonton, Alberta, Canada) had experience with an earlier iteration of this device, but had only completed 2 cases using the current model. It was thought that proctoring was indicated for the safe deployment of the device.

The encrypted version of the Zoom (San Jose, California, USA) platform was used for this case. A meeting was created with invites sent to the proctor located in Toronto (Ontario, Canada), company representatives in Vancouver (British Columbia, Canada), and to the 2 devices for use in the angiography suite at the treatment center. At the treatment center, one device was setup to face the control room monitors allowing remote participants to

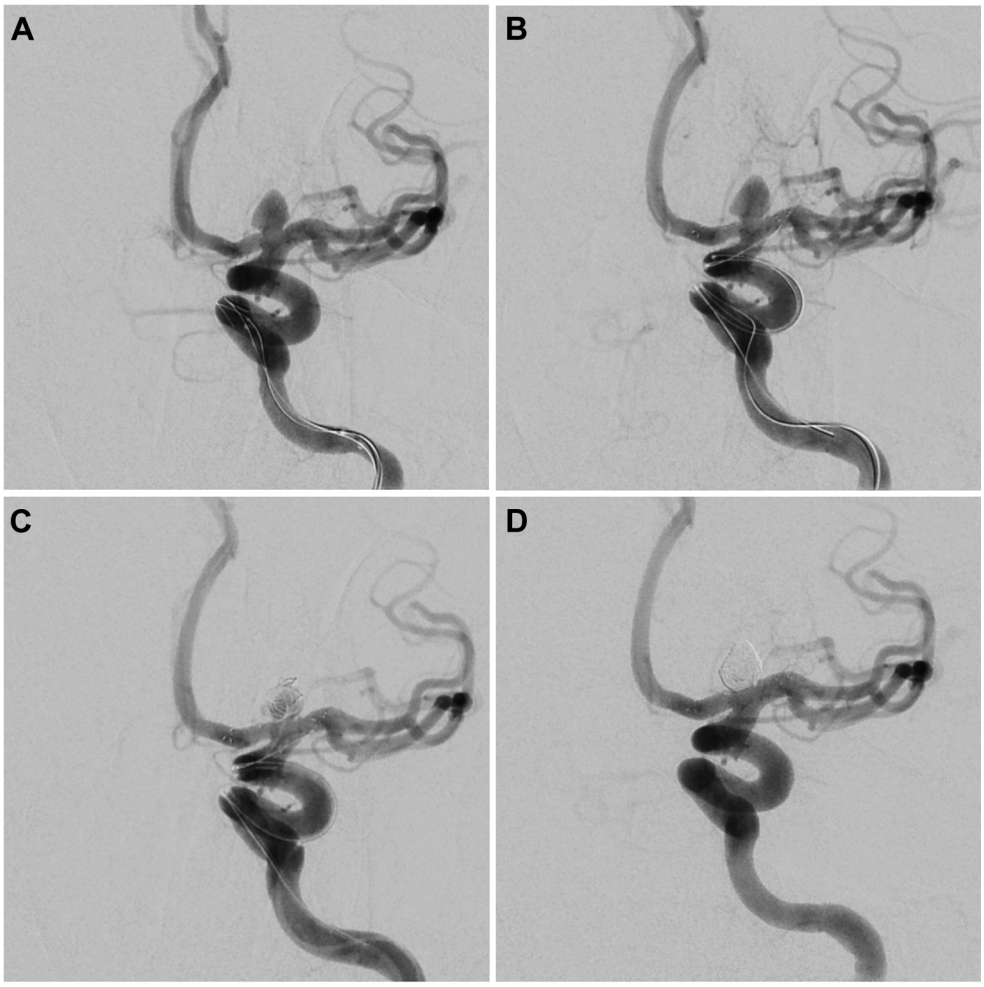

Figure 1. Treatment of left carotid termination aneurysm with the eCLIPS device, showing antero-posterior views at baseline (**A**), after deployment of the eCLIPS device (**B**), after the initial coil deployment (**C**), and after complete coiling and eCLIPS device detachment (**D**).

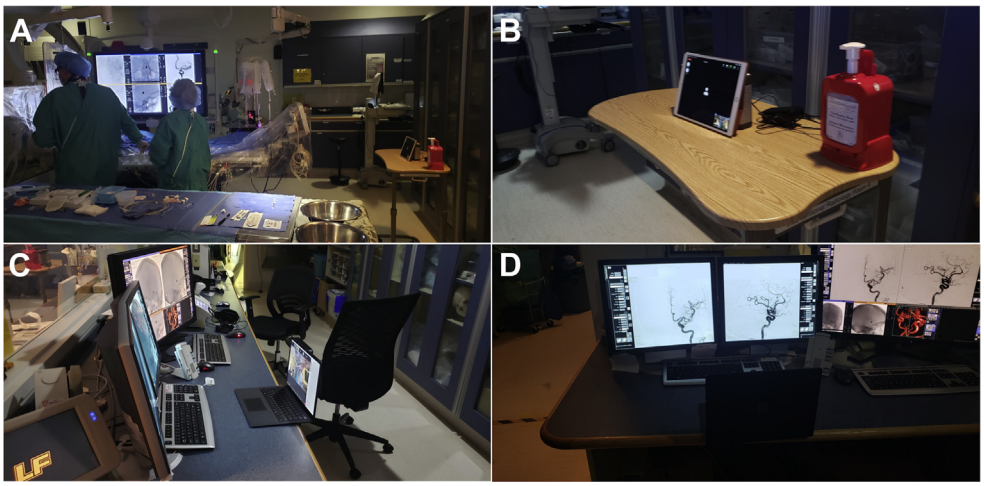

Figure 2. Setup of Zoom-connected devices in the control room (**A** and **B**) and angiosuite (**C** and **D**).

view the live fluoroscopic images. A second device was used in the suite itself, allowing remote participants to see and interact with the local neurointerventionalists. This second device could also be used to view the devices and setup on the operative and side tables (Figure 2). Only the device in the suite had active audio to prevent reverberation and feedback.

The procedure progressed uneventfully with successful deployment of the device to assist coiling of the aneurysm (Figure 1). The proctor was able to provide real-time advice during access to the aneurysm, delivery and deployment of the eCLIPS device, crossing of the device for coiling, and detachment of the device. Image transmission was adequate to view the device and radiopaque markers, assisted by toggling between road map fluoroscopy and live fluoroscopy images. Audio communication was clear and without delays.

DISCUSSION

We present a case of successful virtual proctoring of a neuroendovascular case, thereby circumventing the challenges posed by pandemic-related restrictions on travel and physical distancing. No special equipment was required; however, an encrypted version of the videoconferencing application was used to ensure patient confidentiality. The quality of the transmitted images was sufficient for the case performed. A proctor can also be given multiple image displays and views of the procedure tables by inviting more devices to the meeting.

Telemedicine has also been previously used to support a variety of surgical paradigms such as telerobotics, telementoring, teleeducation, and teleconsultations.[3] The analyzed systems used wearable cameras and microphones and required teleconferencing equipment, limiting ease of use and generalizability. More recently, Bechstein et al.[4] assessed the feasibility of remote proctoring for acute stroke intervention by connecting to an endovascular simulator for training purposes. Similarly, remote proctoring for the eCLIPs device has been done before, but with the device specialist still present in-person.[5]

CONCLUSIONS

We have demonstrated successful virtual proctoring of a remote endovascular procedure without the need for specialized videoconferencing equipment. This approach allows proctoring to continue during current pandemic restrictions, but also has implications for supporting training and cases in remote and disadvantaged environments.

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Conflict of interest statement: T. R. Marotta is a principal of eVasc Neurovascular, manufacturer of the eCLIPs device.

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