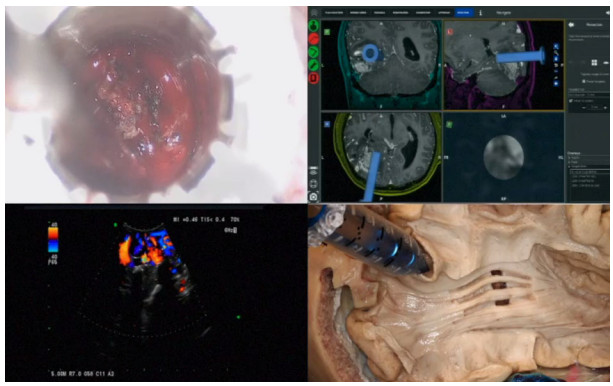
Robotically Operated Video Optical Telescopic-microscopy Resection of an Arteriovenous Malformation With Port-Assisted Intraoperative Surgical Devascularization: 2-Dimensional Operative Video



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Watch now at https://academic.oup.com/ons/article-lookup/doi/10.1093/ons/opx267

Surgical management of cerebral arteriovenous malformations (AVMs) remains challenging carrying significant postoperative neurological morbidities. Advancements in visualization together with minimally invasive techniques have the promise of reducing this morbidity. In this video, grounded on a series of purpose-built cadaveric dissections, the integration of preoperative 3-dimensional diffusion tensor imaging rendering/planning, and a port-based transsulcal/para-fascicular approach coupled with a robotically operated video optical telescopic-microscopy system (ROVOT-m; Synaptive Medical, Toronto, Canada) and intraoperative neuronavigation for the resection of a deep-seated AVM, was demonstrated. The authors present the case of a 30-yr-old right-handed male with nausea, vomiting, dizziness, visual field deficits, and conductive aphasia. Informed consent was obtained from the patient for publication of this surgical video. CTA/Angiograms revealed a 6-cm Spetzler-Martin Grade-V left occipital-temporal-parietal AVM/dural-arteriovenous fistula. Surgical planning via CT/MRI/CTA/Color-Doppler was undertaken. The patient underwent angiographic embolization but a significant portion of the deep feeder arteries, particularly the choroidal arteries and the distal middle and posterior cerebral arteries remained, and could not be effectively embolized. The pedicle in the atrial trigone was targeted and accessed via the parieto-occipital sulcus via the port, in order to provide early control of the deep portion. The port was advanced into the sulcus extrapially then travelled through the U-fibers, along the long axis/parallel (para-fascicular) to white-matter fascicles. Following deep-pedicle devascularization, the port was removed, dura was widely opened, and remaining resection was undertaken using the ROVOT-m exclusively. No perioperative complications occurred and recovery of aphasia and improvement in visual fields was evident in a short-term follow-up. Still following principles of microsurgery, this approach and collaborative technologies, has the potential to enhance safety and efficiency in the surgical management of complicated cerebrovascular lesions.

Disclosures

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COMMENTS

In this surgical video, the authors showcase the resection of a left parieto-temporo-occipital Spetzler-Martin Grade V AVM using the ROVOT-m in 2 main stages: the initial part of the surgery targets deep feeders of the AVM that could not be safely embolized endovascularly, by using a navigated port introduced via the parieto-occipital sulcus and a para-fascicular approach to coagulate those deep feeders and devascularize the lesion. The second part is done without the port but continues to use the ROVOT-m rather than traditional operating microscope to completely resect the AVM.

This is an excellent surgical video that combines cutting edge technology and high-level microsurgical technique to resect a large, deep seated, and complex AVM. As technological advances become available, incorporating them into the neurosurgeon's armamentarium as useful surgical adjuncts will continue to be an ever-evolving art, as nicely demonstrated herein.

We congratulate the authors for this great result.

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