Calcifying Pseudoneoplasm of the Neuraxis (CAPNON)

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Clinical Presentation

Patient is a 55 y/o female presenting with progressive short-term memory difficulties. Initial diagnosis was a dermoid tumor, with final diagnosis being a rare Calcifying Pseudoneoplasm of the Neuraxis (CAPNON). Since their discovery, less than 50 of these cases have been reported in the literature.[i] The location of the lesion was interhemispheric with perilesional edema observed in the pre-op MRI.

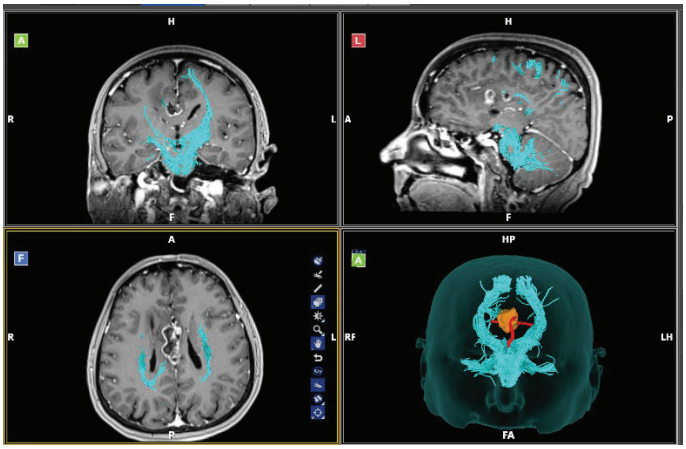

Figure 1. Pre-op MRI with tumor segmentation and tractography overlay.

Surgical Approach

The lesion was surgically accessible with reasonable expected morbidity but required careful surgical consideration and planning as it was adhered to the ascending carotid artery and the vein of Galen. Due to the lesion location deep in the interhemispheric fissure, the approach chosen was interhemispheric and resection of the base of the calcified lesion required an ultrasonic bone scalpel.

Synaptive's BrightMatter™ Guide was used for surgical navigation in conjunction with Synaptive's robotic digital microscope, Modus V™. This allowed for intra-op navigation with overlaid tumor segmentation and tractography (Figure 1), and high quality surgical visualization in 3D (Figure 2). Additionally, a more hands-free approach was possible due to Synaptive's voice control feature and tracked tool integration, including tracked suction tools.

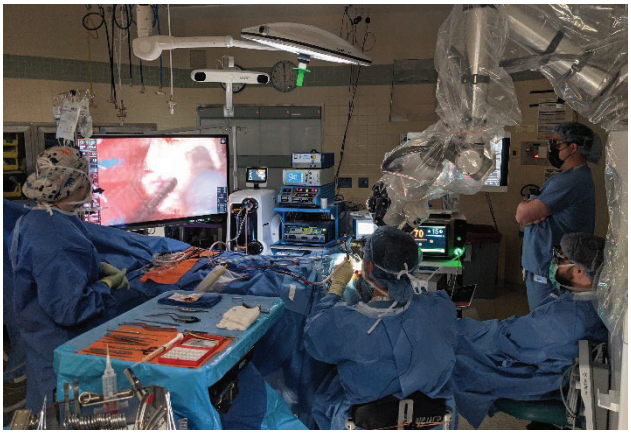

Figure 2. Operative setup with Modus V.

Throughout the resection, Modus V positively impacted the clinical workflow. Visualization of the tumor during use of the bone scalpel at the calcified base of the lesion was superior to the microscope. Ergonomics were also improved resulting in no surgeon pain, as the surgeon was not tethered to the occulars of a microscope (Figures 3 and 4).

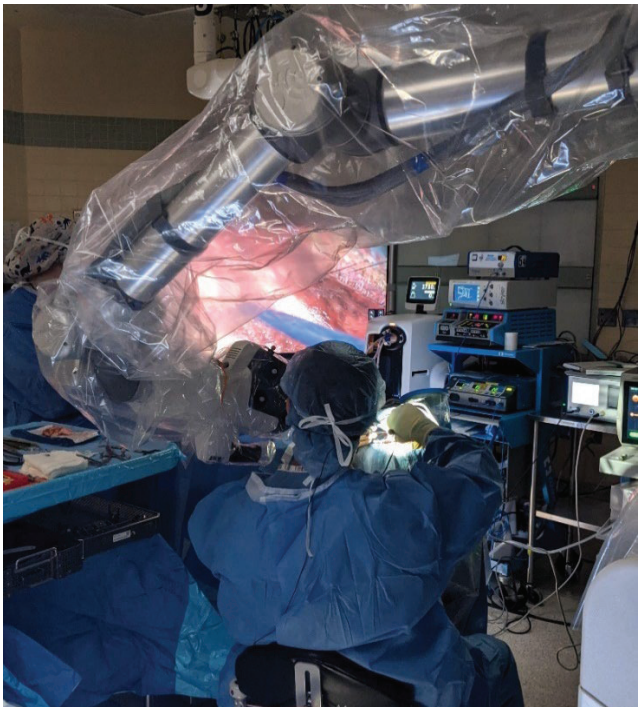

Figure 3: Operative setup showing the ergonomic benefit of Modus V. The extreme viewing angle required can be achieved while allowing the surgeon to remain upright and comfortable during surgery.

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Figure 4: Operative setup showing ample working room while maintaining optimal light delivery and visualization of the lesion.

Lastly, Modus V gave the surgical team more control due to the use of tracked surgical tools to manipulate positioning of the end effector, and voice control to perform fine focus adjustments, zoom adjustment, and light intensity adjustment.

Throughout the resection, neuromonitoring of motor and SSEP's was conducted, and no complications were observed.

Conclusion

The patient's hospital course was three days post-op with no peri-op complications and a good short-term outcome.

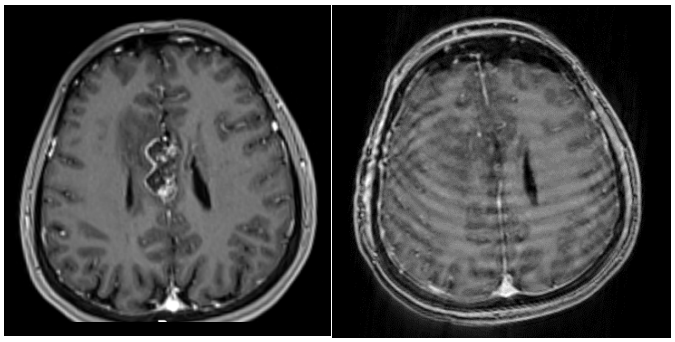


Figure 5: Pre-op MRI (left) and post-op MRI (right) showing near total tumor resection.

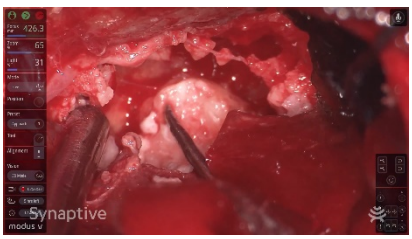
Post-op MRI showed near total tumor resection (Figure 5); some tumor was left attached to the vein of Galen. Long term gradual improvement to the patient's memory is expected.

Highlights

- Modus V enabled a faster surgery when compared to use of a traditional surgical microscope resulting in reduced blood loss and time under anesthesia
- Ergonomics were improved with Modus V resulting in no back or neck pain when compared to the same type of surgery with a traditional surgical microscope
- Patient positioning was easier as Modus V enables light delivery and alignment of optics in ways not possible without robotics and the heads-up display of Modus V
- Near gross total tumor resection of a rare and complex tumor was achieved with long term improvement of symptoms expected

Surgical Video

Highlights of the case can be viewed here: https://youtu.be/Qg5R1zJV3v0



[i] Stienen, M. N., Abdulazim, A., Gautschi, O. P., Schneiderhan, T. M., Hildebrandt, G., & Lücke, S. (2013). Calcifying pseudoneoplasms of the neuraxis (CAPNON): clinical features and therapeutic options. Acta neurochirurgica, 155(1), 9–17. https://doi.org/10.1007/s00701-012-1502-2

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