

Glioblastoma Multiforme

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Clinical Presentation

A 39-year-old male presented at an outside institution with headaches and right arm weakness. MRI indicated a left frontal heterogeneously enhancing mass. He underwent a resection at that hospital and the specimen was interpreted as infected tissue rather than tumor. The lesion recurred despite antibiotics, and he underwent a second resection three months later. This time, pathology indicated Glioblastoma Multiforme (GBM; IDH wild-type, MGMT promoter unmethylated). He was treated with external beam radiotherapy and Temodar. Despite chemoradiotherapy, the patient presented 11 months post-op with GBM recurrence (Figure 1). At the time of the recurrence, he had mild right hemiparesis, most pronounced in the right arm.

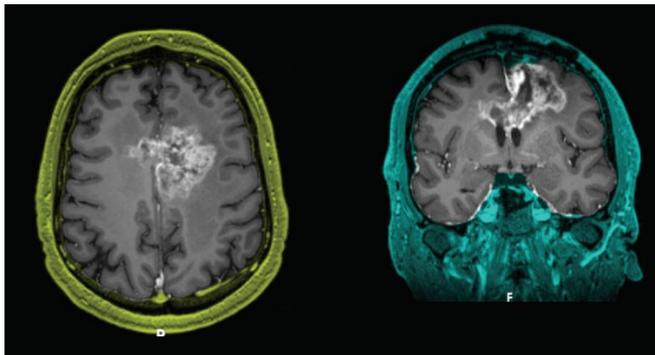


Figure 1: Pre-operative MRI.

Surgical Planning, Approach, and Management

The same left frontal surgical approach used in the first two surgeries was chosen. Whole brain tractography was generated and visualized using Synaptive tractography. Tractography revealed that the lesion's posterior border was adjacent to the corticospinal tract (CST) and that care would be required to avoid damaging these tracts (Figure 2).

The surgery was performed with the patient supine, with the head tilted to the right to expose the left side of the head. The CST generated by Synaptive tractography was exported into a third-party, image-guided surgical neuronavigation system (Figure 3) for the surgery. Exporting this data was critical to identifying the CST's location intra-operatively, to ensure these fibers were avoided during resection.

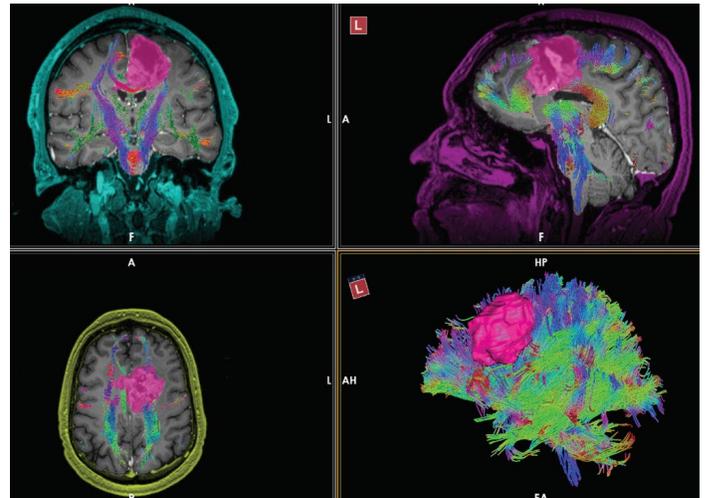


Figure 2: Pre-operative tractography revealing corticospinal tracts at the posterior margin of lesion.

Clinical Outcomes

As revealed by a post-operative MRI (Figure 4), the surgery resulted in a 90 percent resection. The patient experienced a transient deterioration of his right arm paresis for two days after surgery. His strength returned to baseline by the time of discharge on post-operative day four. At the time of his first post-operative office visit two weeks later, he had full strength in his right arm.

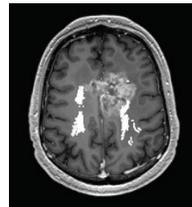


Figure 3: Corticospinal tract generated by Synaptive tractography was exported to a third-party neuronavigation system.

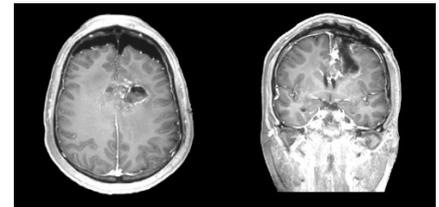


Figure 4: Post-operative MRI - Day 1.

Highlights

- Tractography confirmed the location of the CST
- Exporting tractography to the navigation system provided additional confidence intra-operatively
- At two weeks post-op, the patient demonstrated complete recovery of right arm strength