Quicktome case study

LEFT FRONTAL LOBE GLIOMA RESECTION AND THE FRONTAL ASLANT TRACT

Submitted by
Ricardo Ramina, MD, Phd

Patient history

A 34-year-old male patient presenting a first seizure underwent investigation. MRI showed a FLAIR hyperintense infiltrative lesion compromising left superior frontal gyrus. There was minimal T1 contrast enhancement. Spectroscopy was compatible with a glial tumor, with 'hot spots' in the perfusion suggesting a high-grade lesion, with possibility of oligodendroglial lineage. He had a normal neurological and neuropsychological evaluation.

Brain network involvement

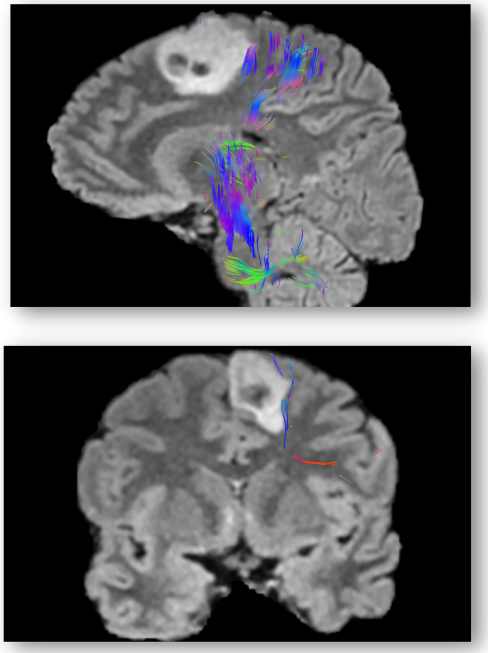
Quicktome was used to evaluate the relationship of the tumor with the surrounding areas, especially the frontal aslant tract (FAT) in the supplementary motor area (SMA), and the corticospinal tract (CST).

These areas were in close proximity to the tumor and so extra care would be needed to avoid damage to the FAT, which can result in speech disorders, as well as impairment of executive functions, visual–motor activities, orofacial movements, inhibitory control, working memory, social community tasks, attention, and music processing. Damage to the CST can lead to an irreversible contralateral motor deficit, and surgical manipulation of the SMA tends to cause transient deficits, recoverable within a few weeks. It is a well-known complication of medial frontal lobe surgery called SMA syndrome.

Performing surgery awake was deemed not possible due to the patient's anesthesiologic contraindications.

Networks and tracts involved:

CORTICOSPINAL | SENSORIMOTOR | FRONTAL ASLANT TRACT



Brain networks as seen in Quicktome, from top: Sagittal view revealing the tumor posterior limit with SMA of the CST; Coronal view showing the lateral boundary of the tumor with the FAT.

Surgical outcomes

After craniotomy, the posterior half of the superior frontal gyrus and medial precentral gyrus were exposed. 5-ALA fluorescence was positive in small spots of the tumor. Intra-operative MRI confirmed the adequate resection, preserving the CST. In the immediate postoperative period, the patient presented hemiparesis in the right side of the body, with progressive and complete recovery after 10 days. There was no speech deficit. Final diagnosis confirmed astrocytoma WHO grade 2 IDH-wildtype, demanding aggressive adjuvant treatment with irradiation and temozolomide.