THE UNIVERSITY OF TEXAS
MD Anderson Cancer Center
Making Cancer History®

Neurosurgery Department

Skull Base Section Featured Case

Skull Base Meningioma

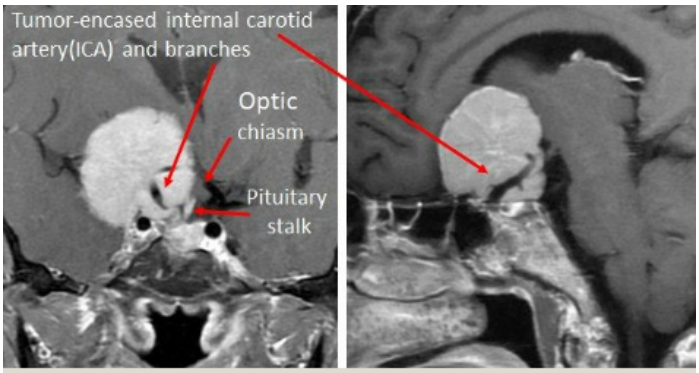
Brief History

This patient is a 58 year-old, right-handed female who had recently undergone right eye cataract surgery. Her preoperative visual acuity was 20/100. Postoperatively, she developed a large retinal tear without detachment and underwent laser barricade 8 days later. Following these treatments, a new visual field defect and a new afferent pupillary defect were noted, along with a worsened visual acuity of 20/400. Neuro-ophthalmologic examination confirmed a dense central and inferior altitudinal visual field defect. There was absence of right-sided color vision. MRI was undertaken which demonstrated a large, right-sided skull base tumor.

Preoperative Imaging Studies

MRI of the skull base without and with contrast revealed a homogeneously avidly-enhancing tumor arising from the region of the anterior clinoid process of the lesser sphenoid wing. There was encasement of the internal carotid artery and its branches. The optic nerve and chiasm were compressed and displaced medially. Cerebral angiography noted elevation, elongation and narrowing of the right internal carotid artery.

Preoperative CT Angiogram



Preoperative MRI

Procedure

Under general anesthesia, a bicoronal incision was made ensuring preservation of a robust vascularized pericranial graft. A right cranio-orbital craniotomy was elevated. Under the operating microscope the dura was incised over the fronto-temporal region and reflected over the orbital contents to allow for a very basal trajectory to the tumor. Microdissection of the Sylvian fissure identified the M2 segments of the middle cerebral artery.

Debulking of the tumor was initiated on its temporal side, following the MCA branches proximally to the ICA bifurcation. Working proximally along the ICA, the tumor was then dissected free from the anterior choroidal and posterior communicating arteries and the 3rd cranial nerve. This removed the entire tumor lateral to the ICA. The tumor origin from the anterior clinoidal process was divided.

Working back along the olfactory nerve the optic nerve was identified. It had been distorted medially by the tumor. The tumor was then dissected off from the A1 and A2 segments of the anterior cerebral artery. The recurrent artery of Huebner was identified and dissected free. The tumor was completely dissected off the optic nerves and optic chiasm. A total tumor removal was accomplished.

The dura was closed primarily and the vascularized pericranial graft was then rotated intracranially to obturate the frontal sinus and seal off the floor of the anterior cranial fossa. The bone was then returned to its proper position and held in place with titanium plates and the scalp was repaired.

Postoperative Course

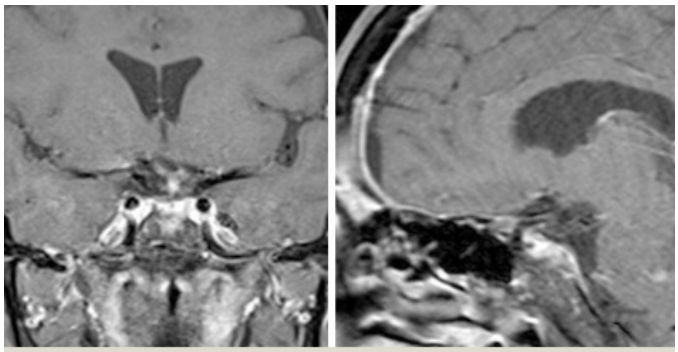
The patient was monitored in the NPCU for 24 hours and transferred to the floor. She was neurologically intact and made an uneventful recovery. Post-operative MRI obtained within 24 hours after surgery revealed a complete resection of the tumor and pathology confirmed that the tumor was a WHO grade 1 meningioma.

On neuro-ophthalmological re-evaluation there was noted to be significant improvement in the visual field of the right eye.The patient went on to a complete recovery and is without symptoms of signs of disease.

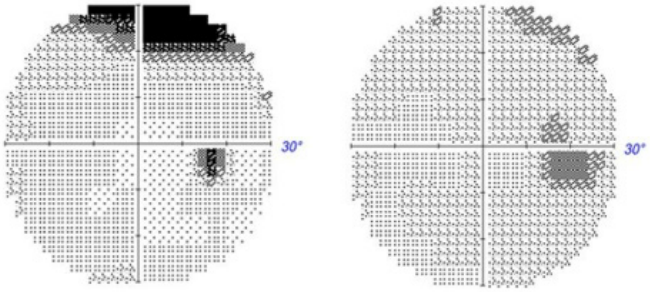
Discussion

Meningiomas are the most common intracranial tumor, making up approximately 35% of all intracranial tumors. Forty percent of these tumors occur at various sites along the skull base. Many patients, with smaller, non-symptomatic tumors, can be observed. Symptomatic, large or growing tumors require treatment. Surgical removal is the most recommended form of treatment. Some meningiomas, in specific locations are best managed by focused irradiation.

The surgical treatment of meningiomas arising from the skull base is challenging. They commonly involve critical blood vessels and cranial nerves and can affect the senses of smell, sight, taste and hearing. Patients require careful neurological, ophthalmological and auditory evaluations. High resolution imaging with CT, MRI and, at times, cerebral angiography is necessary. The surgical procedures themselves may be lengthy and quite complex. Extensive surgical experience is necessary to achieve optimal outcomes.



Postoperative MRI



Preoperative (left) and postoperative (right) visual fields, right eye