New Management of Anterior Fossa Meningioma

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Anterior fossa meningiomas arise either from the olfactory groove more anteriorly or the frontoethmoidal suture more posteriorly and represent 10 percent of all intracranial meningiomas. These tumors can be of formidable size with insidious growth and slow progression of symptoms. At the time of presentation the most common complaint is cognitive dysfunction followed by visual changes and seizures. At the Baylor Skull Base Center, we use the focused transfrontal sinus approach for the more anterior tumors arising from the olfactory groove as oppose to the conventional bifrontal craniotomy and the focused orbitozigomatic approach (FOZA) with extradural navigation for the more posterior tumors arising from the frontoethmoidal suture in the region of the planum sphenoidalis. Both surgical approaches were conceptualized and refined by the senior author, co-director of the Baylor Skull Base Center, and permits resection of these large tumors with minimal brain manipulation while causing less trauma to the surrounding soft tissue.

CASE STUDY

Case #1: 63-year-old male who presented with a three year history of insidious cognitive dysfunction (impulsiveness and memory loss), and more recently new onset of headache. There were no visual changes. Head MRI demonstrated a large olfactory groove meningioma causing bifrontal lobe edema and extending into the ethmoidal sinus. The tumor was removed through the innovative transfrontal sinus approach. The tumor was followed into the sinus and a complete resection was possible. The anterior fossa defect was repaired with free autograft sutured to the dura of the anterior fossa and vascularised pericranium graft. The patient was discharged to home on the POD # 3. At three years the patient has fully recovered from the cognitive dysfunction and has returned to his pre-morbid occupation. There was no CSF leak. Follow up MRI demonstrates no residual or recurrent tumor with significant improvement on the pre-op bifrontal lobes T2 and flair signal change.

Case #2: 58-year-old female with a four years history of progressive severe cognitive dysfunction. She ultimately presented to Baylor University Medical Center at Dallas after a seizure. Head MRI demonstrated a 7cm X 6cm meningioma arising from the planum sphenoidalis with associated bifrontal lobes edema. Prior to surgery the patient was oriented only to herself. The tumor was approached through a focused orbitozigomatic approach (FOZA) with extradural navigation to the origin of the tumor at the planum sphenoidalis and its vascular supply. The dura was opened at the base of the tumor and the lesion was progressively removed and dissected away from the critical anatomical structures. The patient was discharged from the hospital to home on POD # 7. At 26 month follow-up the patient is living independently and have returned to her church work. Post op MRI demonstrate complete resection of the tumor and significant improvement of the bifrontal lobes T2 and flair signal changes.

MRI with contrast shows large meningioma arising from the olfactory groove. Note the invasion of the ethmoidal sinus by the tumor and the anterior location of the tumor.

MRI with contrast after complete resection of the tumor through the transfrontal sinus approach. Note the reconstruction of the anterior fossa and the obliteration of the frontal sinus.
Discussion: At Baylor University Medical Center at Dallas, we use two different minimally invasive approaches according to the more anterior or posterior location of the tumor in the treatment of anterior fossa meningiomas. These focused approaches allow extradural access to the origin of the tumor and minimal brain exposure and manipulation while avoiding the common complications and trauma associated with the more conventional skull base and neurosurgical approaches to these tumors. In summary, anterior fossa meningiomas can be challenging lesions, very successful surgical management, however, is possible with multidisciplinary team and the addition of the innovative minimally invasive skull base approaches.

Large meningioma arising from the planum sphenoidalis
Note the posterior location of the tumor and the significant amount of bifrontal brain edema associated with the tumor.

Axial T1 MRI with contrast on the right shows the resection of the tumor. Note on the T2 weighted image on the left with significant improvement of the pre-op bifrontal brain edema and re-expansion of the brain after tumor resection.

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