Clinoidal meningioma

- Effect of routine extradural optic canal decompression performed by skull base trained surgeons on visual outcomes in patients with anterior skull base meningiomas
- Anterior Clinoid Process Metastasis with Sudden Loss of Vision: Role of Emergency Optic Nerve Decompression
- Transorbital Approach Through a Transpalpebral Incision for Resection of a Meningioma Involving the Lateral Anterior Clinoid Process: 2-Dimensional Operative Video
- Management of vascular encasement in parasellar meningiomas-How I Do It
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- Giant Meningiomas Invading the Cavernous Sinus: The "Inevitable Ones"
- Case Report: Intracranial ectopic schwannoma originating from the internal carotid artery wall
- The importance of the optic nerves unlocking during the resection of anterior skull base meningiomas for visual function preservation: surgical nuances and clinical outcome

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Clinoidal meningiomas were clearly defined for the first time in 1938 by Cushing, who identified a distinct subgroup of medial third meningiomas from the larger cohort of sphenoidal ridge meningiomas [1)].

Anterior clinoidal meningioma (medial sphenoid wing) meningiomas are a subcategory of the medial sphenoid wing meningiomas.

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see also Tuberculum sellae meningioma.

Differential diagnosis

Anterior clinoidal meningiomas are frequently grouped with suprasellar meningioma or sphenoid ridge meningiomas, masking their notorious association with a high mortality and morbidity rate, failure of total removal, and recurrence. To avoid injury to encased cerebral vessels, most surgeons are content with subtotal removal. Without total removal, however, recurrence is expected. Recent advances in cranial-base exposure and cavernous sinus surgery have facilitated radical total removal. The author reports 24 cases operated on with vigorous attempts at total removal of the tumor with involved dura and bone. This experience has distinguished three groups (I, II, and III) which influence surgical difficulties, the success of total removal, and outcome. These subgroups relate to the presence of interfacing arachnoid membranes between the tumor and cerebral vessels. The presence or absence of arachnoid membranes depends on the origin of the tumor and its relation to the naked segment of carotid artery lying outside the carotid cistern. Total removal was impossible in the three patients in Group I, with postoperative death occurring in one patient and hemiplegia in another. Total removal was achieved in 18 of the 19 patients in Group II, with one death from pulmonary embolism. In the two patients in Group III, total removal without complications was easily achieved [2)].

A cavernous hemangioma presenting as a clinoid meningioma is extremely rare.

A 36-year-old male with an asymptomatic intracranial mass found incidentally after an ATV accident. Preoperative MRI revealed a well-defined dural-based lesion arising from the right anterior clinoid process which was nearly homogenously enhancing, with a radiological diagnosis of meningioma. The mass was resected via right pterional craniotomy with microsurgical technique. Complete resection of the mass was performed with no complications and, notably, no significant bleeding. Contrasting with the radiologic and gross tumor appearance, histopathologic examination revealed dilated vascular spaces, sclerotic vessels without intervening neural tissue, and intravascular thrombi suggesting slow blood flow - all consistent with cavernous hemangioma.

Anterior clinoid dural-based cavernous hemangioma are extremely rare. Though preoperative diagnosis is difficult using imaging, this etiology should be considered for any dural-based middle fossa lesion due to the tendency for these lesions to bleed heavily during resection in some instances [3].

Treatment

Anterior clinoid region meningioma treatment.

Outcome

Clinoidal meningiomas remain a challenging pathology because of their intimate relationship to vital neurovascular structures [4] [5]. Among skull base lesions, these are tumors that are still associated with high surgical morbidity and recurrence, next only to petroclival meningiomas [6].

Medial sphenoid wing meningioma of the anterior clinoid process are uncommon tumors, acknowledged by most experienced surgeons to be among the most challenging meningiomas to completely remove due to their propensity to encase the internal carotid artery (ICA) and its branches, and invade the cavernous sinus and the optic canal [7] [8] [9] [10].

In many cases, the tumor is densely adherent to the carotid artery, rendering complete tumor removal impossible, even in experienced hands [11] [12] [13] [14].

Meningiomas of the anterior clinoid process may infiltrate the bone over which they arise, therefore requiring an anterior clinoidectomy to achieve a Simpson Grading System 1 resection. A clinoidectomy, however, is not without risks.

It is hard to argue that any group of skull base meningiomas represent a unified group of uniform pathologic anatomy. While some skull base meningiomas present as a localized mass, others present as a diffuse mass, infiltrating the cavernous sinus, encasing vessels, and invading cranial nerve foramina. Most skull base surgeons are well aware that not all clinoid meningiomas are the same.

However, due to the rarity of these lesions, it has been difficult to sub-stratify and sub-analyze these lesions differently based on differing radiographic features. Thus, the literature to date has generally not analyzed outcomes for clinoidal meningiomas in the same way that skull base surgeons think of them when they are planning an operation [15].

Case series

Anterior clinoid region meningioma case series.

Case reports

A 54-year-old woman had an anterior clinoid process meningioma. She was initially diagnosed as having a cerebrovascular disease, however, her stroke-like symptoms were most likely caused by internal carotid artery compression or vasospasm due to meningiomal involvement, but initially overlooked. Meningiomas are rarely reported as a cause of a stroke. A detailed evaluation can provide a high degree of confidence in differentiating stroke and non-stroke medical conditions, known as stroke mimics or chameleons, to be considered when a diagnosis of stroke has not been confirmed [16]

HGUA

A 54-year-old woman

She has had episodes of language and consciousness alteration lasting one minute, with subsequent recovery and no awareness of the illness. She has stiffness in her limbs but no loss of postural tone or sphincter control.

Physical Examination Glasgow Coma Scale (GCS) score of 15 with no apparent focal deficits

Additional Evaluation

MRI of the brain: Right clinoidal meningioma

Right pterional approach in Supine position with the head tilted 30 degrees to the left, and the forehead reflected, resting on a Mayfield headrest.

Incision Frontotemporal incision behind the hairline

Surgical Technique

Incision on the right frontotemporal skin. Dissection of the muscle as a block (myocutaneous) folded forward. The myocutaneous flap is secured with hooks and protected with damp gauze. Once the bone is exposed, a right pterional craniotomy is performed using three trephines: keyhole, basal, and posterior. Care is taken not to make the trephine more anterior towards the orbit to avoid exposure, and at the basal level, to prevent laceration of the middle meningeal artery. Peripherally, prior to dural opening, coagulation is applied. The dura is coagulated and opened, folded forward. Dissection

of the proximal third of the Sylvian fissure medially and basally toward the carotid bifurcation and the tumor. Once the tumor is exposed, its surface is coagulated to devascularize it. It is essential to note that the middle cerebral artery is pushed posteriorly, and the anterior communicating complex shifts to the left due to the tumor. Additionally, the optic nerve is at the basal part. Debulking with the help of bipolar and CUSA. A sample is sent for pathological examination. Dissection of the meningioma from the surrounding parenchyma and complete resection. Extreme caution is taken with the neurovascular structures described above. If optic canal invasion is observed, unroofing is performed with optic nerve decompression. Bipolar is not used near the optic nerve to avoid heat damage. Hemostasis. Espongostan is applied to the exposed cortex. Primary dural closure is reinforced with Tachosil, if necessary. Bone replacement with plates and trephine. Subcutaneous sutures with Vicryl 2/0 at all levels. Skin is closed with staples. Equipment CUSA (Cavitron Ultrasonic Surgical Aspirator) Microscope Tachosil Ultrasound Estimated Prolongation and Expected Time (Estimation Only) 16-17 hours Potential Complications to Be Avoided in This Case

Surgical wound infection Surgical wound dehiscence Cerebrospinal fluid fistula Injury to the anterior cerebral artery (ACA) or anterior communicating artery (ACoA) Epidural or subdural hematoma Seizures Cerebral edema Optic nerve injury Post-Surgical Tests CT scan of the skull

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