Tentorial meningioma

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History

Tentorial meningiomas have been discussed in many articles devoted to posterior fossa meningiomas. Cushing and Eisenhardt (1938) described 15 cases, Campbell and Whitfield (1948) five cases, Russell and Bucy (1953) reviewed 46 cases from the literature and described two of their own, Castellano and Ruggiero (1953) presented 21 cases of tentorial meningioma, Markham, Fagcr, Horrax, and Poppen (1955) described seven cases, and Tristan and Hodes (1958) eight cases.

These tumours are notorious for their ability to escape recognition clinically, a fact noted by many of the authors above 1).

Epidemiology

Meningioma of the tentorium represent about 5% of all intracranial meningiomas reported in the literature 2)

Approximately 70% - 80% of cases in women 3).

Classification

Tentorial meningiomas are a broad and consistent category of tumors but their definition is still unclear and their classification uncertain.

Since the tentorium has a large intracranial area, tumours originating from it may vary widely in the actual location of their mass. Supratentorial, infratentorial, incisural, and posterolateral arc terms that will be used to suggest the principal location of each tumour.

Incisural tentorial meningioma.

Falcotentorial meningioma.
Lateral tentorial meningioma.

Tentorial notch meningioma

Torcular meningioma.

The classification system for tentorial meningiomas proposed by Gazi Yasargil is the most accurate and emphasizes the surgical anatomy.

1. T1–T2 (medial “incisural” meningioma)
2. T3–T8 (falcotentorial meningioma)
3. T4 (paramedian “intermediate” meningioma)
4. T5 (peritorcular “torcular” meningioma)
5. T6–T7 (lateral tentorial meningioma)

T1-T3 the lesions on the inner ring or lesions of the incisura - anterior, lateral and posterior.

T4 and T8 are intermediate ring lesions with T8 tumors involving the falcotentorial junction.

T5-T7 are lesions on the posterior ring, involving the torcular, transverse sinus, and transverse-sigmoid junction respectively.

Clinical features

Signs and symptoms of cranial hypertension are the most common findings, followed by cerebellar ataxia, psychiatric disturbances and cranial nerve dysfunction.

In 1962 Barrows and Harter reviewed a large series of cases of tentorial meningiomas. They divided
the patients into three groups, of which the third presented with “ataxic, slow stiff gait”, slow mentation and urinary incontinence. The ventricles were dilated in all patients 6).

**Diagnosis**

In all patients with tentorial meningiomas, a contrast-enhanced CT scan and a magnetic resonance (MRI) of the brain should be ordered. The CT scan in axial and coronal views should be carefully evaluated to see the relations of the lesion with the falk and tentorium. The CT images still provide superior bone detail and are invaluable where tumors invade bones 7).

**MRI**

The MRI is more precise on revealing information about tumor localization, extension and its relations. Special attention should be given to where the tumor expands mostly into the two compartments. In fact with, MR and MR angiography (MRA) the size, dominance and collateralization of the transverse sinuses can be recognized. This factor is essential for this kind of approach. We should obtain all possible possible about the transverse sinus status. If infiltration is present, it should be quantified 8).

**Cerebral angiography**

Is sometimes necessary to obtain additional information about the arterial and venous system. Using the four-vessels angiography we are able to delineate the vascularity of the lesion and its relationship to the various arteries and veins in this area. The circulation supplying the tumor is carefully analyzed in order to plan both endovascular and surgical procedures. The vein of Galen, the internal cerebral veins and the basal vein of Rosenthal should be studied. As well as the superficial venous system, with the patency of the straight sinus, and the collateralization and enlargement of the normally present sinus should also be analyzed.

If the preoperative embolization is effective the surgical procedure become easier 9).

For Cerebral CT venography see Cerebral CT venography in surgical planning for a tentorial meningioma 10).

**Differential diagnosis**

A 72-year-old male presented with a primary hemangioblastoma of the posterior fossa with unusual dural attachment and meningeal arterial blood supply from the external carotid artery and marginal tentorial artery. Preoperative embolization facilitated complete resection of the tumor with no resultant neurological deficit. Hemangioblastoma must be included in the differential diagnosis of tumors with dural involvement. Preoperative embolization is very useful in such tumors 11).

**Treatment**

see Tentorial meningioma treatment.

**Outcome**

They tend to enclose, displace, or compress the adjacent cranial nerves and vascular structures. Due to their vicinity to crucial neural and vascular structures, they are a surgical challenge.

The first historic attempts at tentorial meningioma removal resulted in high rates of mortality and morbidity. In series published up to 1990, the mortality rate ranged from 14% to 44% 12) 13) 14) 15).
Following the development of diagnostic imaging and neurosurgical techniques, mortality rates fell, reaching rates of around 10% in most series published over the last two decades \(^{16, 17}\).

Nonetheless, postoperative morbidity has continued to range from 18.9% to 77\(^{18, 19, 20}\).

Meticulously preserving venous sinuses is important since the risk of venous infarction cannot be predicted even with radiological good venous collaterization and apparent venous sinus blockade by tumor. Laterally situated tumors carry a better prognosis when compared to the medially situated ones. Leaving a small residual tumor in an effort to preserve important neurovascular structures does not obviate the expectation of a good long-term prognosis with minimal morbidity and low recurrence rates \(^{21}\).

**Case series**

see Tentorial meningioma case series.

**Case reports**

*2018*

A 23-year-old female presented at 37 weeks of pregnancy with 1-month history of fluctuating severe left-sided headaches, periodic blurry vision, nausea and vomiting. She had two previous pregnancies without complication. Magnetic resonance Imaging (MRI) revealed a dural-based, heterogeneously enhancing mass along the left tentorium, just posterior to the transverse sinus, with supratentorial extension and surrounding edema. Differential diagnoses included meningioma vs hemangioma vs hemangiopericytoma. The patient followed up with neurosurgery one month after delivery. She had continued left-sided headaches but no longer complained of visual changes. A postpartum surgical resection via left occipital and suboccipital craniotomy was planned. Approximately one month later (now about 3 months after delivery) a repeat MRI demonstrated a marked decrease in meningioma size and the previously seen edema had resolved. In light of the sudden disappearance of the meningioma, no further surgical intervention was pursued.

Since meningioma shrinkage or disappearance may occur after pregnancy, repeat imaging is advised as part of preoperative evaluation. Additionally, it is possible that an undetermined amount of meningioma removal surgeries may be avoided with further research into monitoring hormone levels connected to meningioma growth \(^{22}\).

*2009*

A rare case of hemifacial spasm caused by an ipsilateral tentorial meningioma is described. Magnetic resonance imaging showed a huge tumor in the right cerebellar hemisphere, distant to the cerebello-pontine cistern. The facial-vestibulocochlear nerve complex was stretched by the shift of the brainstem and the right cerebello-pontine cistern was effaced. After removing the tumor, the hemifacial spasm resolved completely. We review our case with the pertinent literature regarding the etiological mechanism \(^{23}\).

Perrini et al. describe a patient with a large paramedian tentorial meningioma associated with acquired Chiari malformation who presented with trigeminal neuralgia TN. Trigeminal pain resolved after gross total tumour resection and postoperative magnetic resonance images disclosed a minimal
residual tumour in the torcular region as well as ascent of cerebellar tonsils. In this article, we investigate the physiopathological hypotheses for this unusual association with emphasis on the role of tonsillar prolapse as neuropathological basis of neuropathic pain in this patient.  

2007

Guan et al. report a spontaneous cerebrospinal fluid rhinorrhea in a patient with tectorial meningioma.

2006

Tentorial meningioma on follow-up presenting with sudden deterioration due to intra- and peritumoral hemorrhage.

2005

A 45-year-old woman suffering from hemifacial spasm, who dramatically improved after surgical removal of a tentorial paramedic meningioma.

Concomitant ectatic posterior communicating artery and tentorial meningioma as a source of oculomotor palsy: case report.

2002

Santoro et al. describe the case of patient who underwent subtotal resection of a chromophobe pituitary adenoma at the age of 18 years, who was successively treated by conventional fractionated radiotherapy with gamma rays emitted by a source of 60Co until a total dose of 41 Gy. Over the next 30 years the patient experienced all the known late effects of radiation, including panhypopituitarism, cranial-nerve deficits (II, III and VI), massive radiation necrosis involving the left cerebral hemisphere and causing right hemiparesis and aphasia and, ultimately, an atypical tentorial meningioma with early recurrence after total resection.

Secondary syringomyelia disappearing after removal of tectorial meningioma.

2001

A 35-year-old right-handed woman presented with a generalized convulsion. Magnetic resonance imaging scans revealed a left medial tentorial meningioma with supratentorial extension at the dominant hemisphere. The main venous drainage route from the ipsilateral temporal lobe was a sphenopetrosal vein.

An operation was performed with the patient in a sitting position, and the tumor was resected totally via the paramedian supracerebellar transtentorial approach without perioperative complications.

The paramedian supracerebellar transtentorial approach is useful for supratentorially located medial tentorial meningiomas without retraction of the temporal lobe and without damage to the vein of Labbé or the sphenopetrosal vein.
2000

A 33-year-old male presented with involuntary and inappropriate laughter. Neuroimaging revealed a meningioma ventrolateral to the pons and midbrain, attached to the medial middle tentorium on the left side. The pathological laughter ceased immediately after subtotal removal of the tumor. Pathological laughter may be an early focal sign of a mass compressing ventrolateral brainstem 32).

A 73-year-old female case with tentorial meningioma suffering from pure word deafness is reported. The patient initially presented with hydrocephalus, and was treated with a ventriculo-peritoneal(V-P) shunt. A year after the V-P shunt, she suffered from a symptom of deafness. On admission, her repetition and auditory comprehension were severely impaired, while reading and visual comprehension were almost normal. Auditory brain stem response(ABR) revealed normal latency between wave I and V, while wave VI and VII was disappeared. Middle latency response(MLR) showed no wave peak. On MRI, tentorial meningioma compressed bilateral medial geniculate bodies, but not auditory radiation or temporal lobe. 99mTc-HMPAO single photon emission computed tomography(SPECT) showed hypoperfusion in the left temporal lobe, considered as a diaschisis resulting from the isolation of left temporal lobe from auditory input via bilateral medial geniculate bodies 33).

1999

A 62-year-old woman was evaluated for tinnitus and headache. Magnetic resonance imaging and angiography revealed the coexistence of a tentorial tumor encroaching the junction of the right transverse-sigmoid sinuses, and dural arteriovenous fistulous malformation (AVFM) of the right transverse sinus. AVFM was not manipulated at all during the surgery. The pathology was fibroblastic meningioma. Postoperatively, the dural AVFM completely disappeared on follow-up angiography. The fistulas were occluded also after surgery, even though there was no manipulation of the AVFM. It is suggested that the right dominant transverse-sigmoid sinuses are partially occluded by tentorial meningioma, developing the dural arteriovenous fistula of the right transverse sinus. An acquired origin of the dural AVFM was suggested in this case 34).

1996

Resolution of chronic cluster headache after resection of a tentorial meningioma: case report 35).

1995

A 28-year-old male was admitted to our hospital with the complaints of numbness of the left upper limb and gait disturbance. Neurological examination disclosed slight left dysmetria, truncal ataxia and sensory disturbance at the dermatome of C8 and Th1. CT and MRI scans showed a large mass lesion in the left posterior fossa, ventricular dilatation, cavum septi pellucidi and cavum Vergae, empty sella, cervical syringomyelia and left tonsilar herniation. The tumor which attached to cerebellar tentorium was totally removed and a histological diagnosis of meningothelial meningioma was made. Postoperative MRI scan demonstrated a disappearing of syringomyelia with the improved tonsillar herniation. Association of syringomyelia with brain tumor is relatively rare, so its pathogenesis was discussed 36).

A patient who had chronic cluster headache for more than 20 years. The headache immediately
resolved upon resection of a tentorial meningioma. Prior reports of cluster headache as a manifestation of structural disease are briefly reviewed. In the patient described, the pain was referred from the right tentorium cerebelli to the right side of the face, in accordance with reported studies on the subjective localization of pain referred from posterior fossa structures. The accompanying abnormalities of autonomic function may have been mediated by central autonomic reflexes that are also involved in the pathogenesis of idiopathic cluster headache 37).

Embolization with temporary balloon occlusion of the internal carotid artery and in vivo proton spectroscopy improves radical removal of petrous-tensorial meningioma 38).

A case is presented of painful tic convulsif caused by a posterior fossa meningioma, with right trigeminal neuralgia and ipsilateral hemifacial spasm. Magnetic resonance images showed an ectatic right vertebral artery as a signal-void area in the right cerebellopontine angle. At operation the tentorial meningioma, which did not compress either the fifth or the seventh cranial nerves directly, was totally removed via a suboccipital craniectomy. The patient had complete postoperative relief from the trigeminal neuralgia and her hemifacial spasm improved markedly with decreased frequency. From a pathophysiological standpoint, the painful tic convulsif in this case was probably produced by the tumor compressing and displacing the brainstem directly, with secondary neurovascular compression of the fifth and seventh nerves (the so-called “remote effect”) 39).


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