**Trigone meningioma**

Intraventricular intracranial meningiomas as a rule arise in the trigone.

Trigone meningioma is a intraventricular meningioma in a deep-seated location surrounded by intact neural tissue, near to vital ventricular structures, and deeply vascularized.

**Approaches**

Many approaches to the trigone have been described and the challenge is to choose the best to provide wide tumor exposure and early access to the vascular pedicle to allow complete tumor resection causing less additional lesion.

Surgical approaches for trigone meningioma is challenging, because excessive cortical dissection or brain retraction carries a risk of post-operative visual field deficit, speech disturbance, or epilepsy. Occlusion of posterior and anterior choroidal blood supplies is also important to achieve tumor hemostasis. Thus, there is still a degree of controversy regarding the optimal surgical approach for this tumour. Several surgical approaches have been described for trigone meningiomas, each with their proponents.

There is always a need for some kind of cortical incision and white fiber dissection to reach the tumor. Surgical resection is difficult without complications or new neurological morbidities. There is a high incidence (42%) of morbidity.

**Case series**

Kim et al., from the Chonnam National University Hwasun Hospital, South Korea, report the surgical outcome of trigonal intraventricular meningiomas through three different approaches with attention to visual outcomes.

Between 1994 and 2017, twenty-three patients underwent resection of trigonal meningiomas.

They performed tumor removal using three different surgical approaches through the superior parietal lobule, middle temporal gyrus (MTG), and modified-MTG. The patients were retrospectively identified and surgical results including visual outcome were analyzed.

Twenty three patients with a mean age of 45 years formed the study group. The most common symptom and sign were headache (N=14, 60.9%) and visual disturbance (N=6, 26.1%). All patients underwent surgical resection, 6 via trans-lateral approach through MTG, 8 via trans-lateral approach through modified MTG, and 9 via trans-parietal approach through superior parietal lobule (SPL). Gross total resection was achieved in all patients.

They found that visual preservation rate was 25% (1/4) in the MTG group, 62.5% (5/8) in the modified MTG group, and 100% (7/7) in the SPL group, respectively (p=0.044). Permanent complication rate was 50% (3/6) in the MTG group, 50% (n=4/8) in the modified MTG group, and 11.1% (n=1/9) in the SPL group.

The superior parietal lobule approach is a safe and applicable procedure with a great visual preservation and an acceptable risk of morbidity for trigonal meningiomas, when there is a chance of
visual recovery or preservation ¹).

**Case reports**

A 44-year-old male presented to the outpatient clinic complaining of cephalalgia increasing in frequency and intensity over the last month. His neurological exam was normal, yet a brain computed tomography scan revealed a lesion in the right trigone of the ventricular system. The diagnosis of possible meningioma was set. After thoroughly informing the patient, tumor resection was decided. An intraparietal sulcus approach was favored without the use of any modern technological aids such as intraoperative magnetic resonance imaging or neuronavigation. The postoperative course was uneventful and a postoperative computed tomography scan demonstrated the complete resection of the tumor. The patient was discharged two days later with no neurological deficits. In a two-year-follow-up he remains recurrence-free.

In the current cost-effective era it is still possible to safely remove an intraventricular trigonal meningioma without the convenience of neuronavigation. Since the best neuronavigator is the profound neuroanatomical knowledge, no technological advancement could replace a well-educated and trained neurosurgeon ²).

A 57-year-old, right-handed woman complained of numbness of the lower extremities and underwent magnetic resonance imaging, which incidentally demonstrated a trigonal meningioma in the left lateral ventricle with a maximal diameter of 4 cm. The patient's preoperative neurologic examination was normal. The tumor was successfully removed by a parieto-occipital interhemispheric approach with an incision of the left precuneus cortex. Postoperative motor, sensory, and visual functions were normal; however, recent memory disturbance developed, which gradually resolved in the following 3 months.

An interhemispheric precuneus approach is a useful alternative to trigonal tumors with few surgical complications, but postoperative memory disturbance can be one pitfall of this procedure ³).

A case of trigonal meningioma in a 43-year-old woman who presented with intraventricular hemorrhage, and describe the CT, MRI and angiographic findings ⁴).

The first case of a ventricular meningioma that was encapsulated by the dura-like membrane is reported. Magnetic resonance imaging (MRI) showed a heterogeneous mass with a low intensity rim in the trigone of the right lateral ventricle of a 63-year-old male. Histological examination revealed that the tumor was a transitional meningioma encapsulated by a thick dura-like membrane. Moreover, abundant clusters of the dura-like connective tissue existed in the tumor, indicating that both the dura-like capsule and the dura-like clusters in the tumor were created by the tumor cells ⁵).


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