Subtemporal approach

It is one of the surgical routes used to reach the interpeduncular fossa, offers a good access to the medial temporal region.

The subtemporal approach avoids neocortical transgression and injury to the optic radiations. 1) 2).

Indications

The subtemporal approach is historically known as the standard approach for the treatment of tumoral, vascular and inflammatory lesions of the middle cranial fossa, the tentorium, the anterior and middle tentorial incisura, the upper-third of the clivus and the petroclival region. This approach had been recognized universally for many years as the best way to treat basilar artery (BA) apex, P1 and P2 posterior cerebral artery (PCA) and superior cerebellar artery aneurysms until the introduction of the pterional approach in 1976 by Yasargil et al. 3).

The standard subtemporal approach and its variations are most frequently requested for sphenoidal wing meningiomas, followed by Yasargil's T1- and T2-type tentorial meningiomas arising from the inner ring of the tentorium 4).

The subtemporal approach can be used for petroclival meningiomas that do not extend below the upper clivus. For lesions extending above and below the tentorium situated on the tentorial edge or in the petroclival area, only those with a small infratentorial component can be removed by the subtemporal approach.

Drawbacks

Access to the posteromedial temporal region needs the retraction of the temporal lobe 5), with a risk of vein of Labbé sacrifice.

Because of the inclination of the tentorium, temporal lobe retraction increases with a more posterior location of the lesion 6).

A more posterior-oriented supratentorial-infra-occipital variation of the subtemporal approach has been described, which is performed to effectively approach and resect epileptogenic lesions in PMT regions 7) 8).

Keyhole subtemporal approaches and zygomatic arch osteotomy have been proposed in an effort to decrease the amount of temporal lobe retraction.

A keyhole and a classic subtemporal craniotomy were executed in 4 fresh-frozen silicone-injected cadaver heads. The target was defined as the area bordered by the superior cerebellar artery, the anterior clinoid process, supraclinoid internal carotid artery, and the posterior cerebral artery. Once the target was fully visualized, Erkan et al. evaluated the amount of temporal lobe retraction by measuring the distance between the base of the middle fossa and the temporal lobe. In addition, the volume of the surgical and anatomical corridors was assessed as well as the surgical maneuverability using navigation and 3D moldings. The same evaluation was conducted after a zygomatic osteotomy was added to the two approaches.

Temporal lobe retraction was the same in the two approaches evaluated while the surgical corridor and the maneuverability were all greater in the classic subtemporal approach.
The zygomatic arch osteotomy facilitates the maneuverability and the surgical volume in both approaches, but the temporal lobe retraction benefit is confined to the lateral part of the middle fossa skull base and does not result in the retraction necessary to expose the selected target 9).

With the help of an endoscope, Sun et al exposed the internal auditory canal and cerebellopontine through a translabyrinthine approach and the inferior colliculus through a keyhole subtemporal approach. This double approach can be combined to expose the internal auditory canal and cerebellopontine angle and inferior colliculus satisfactorily in the same surgical setting. This combined approach can avoid retraction of the cerebellum and reduce serious adverse events and complications 10).

As a minimally invasive approach, this can be considered an effective method for removal of vestibular schwannoma and auditory midbrain implantation in the same surgical setting, while avoiding retraction of the cerebellum and serious adverse events and complications.

see Subtemporal medial transpetrous approach.

see Subtemporal transtentorial approach.

Subtemporal Approach for AICA Aneurysm Clipping

The subtemporal approach represents a feasible approach for retrochiasmatic craniopharyngiomas when gross total resection is not mandatory. It provides rapid access to the tumor and a caudal-to-cranial visualization that promotes minimal manipulation of critical neurovascular structures, particularly the optic apparatus 11).

Subtemporal approach for distal basilar occlusion for giant aneurysm

1) 8)


7) Russell SM, Kelly PJ: Volumetric stereotaxy and the supra- tentorial occipitotemporal approach in the resection of posterior hippocampus and parahippocampal gyrus lesions. Neurosurgery
