Supracerebellar transtentorial approach technique

Position

see Position for supracerebellar transtentorial approach.

In a Mayfield clamp and flexed and rotated contralaterally, thus creating a direct access to the tentorium.

Incision in the suboccipital region.

Infiltration of local anesthesia with epinephrine.

Vertical linear incision extended above the superior nuchal line (above the transverse sinus) and down to the base of the occiput.

The muscle and soft tissues are dissected and held open with self-retaining retractors.

The craniotomy extension just above the transverse sinus, abutting the superior sagittal sinus and extending laterally to near the transverse-sigmoid junction. About two-thirds of the craniotomy extended to the suboccipital region but did not involve the foramen magnum.

The craniotomy is carried out to nearly the sigmoid sinus on the side of interest and across the midline on the contralateral side. This facilitates a more medial access and enabled removal of the lateral extents of the lesion.

The dura is opened in a V-shaped manner; the opening based superomedially, just inferior to the torcula, sometimes extending to the contralateral side across the inferior sagittal sinus and the lateral border extending to the limit of the cranial opening. Both cranial and dural openings made as wide as possible, to create a good working corridor and help avoid sacrifice of the bridging vein. The dural opening is limited superiorly by the transverse sinus, which is exposed to facilitate superior retraction of the dural flap. After opening of the dura, the occipital surface of the cerebellum is carefully retracted in the midline to drain CSF from the cisterna magna. This drainage significantly relax the cerebellum.

The bridging veins between the tentorial surfaces of the cerebellum and tentorium are coagulated and divided to further relax the cerebellum.

The tentorium is coagulated and incised laterally to the straight sinus in a radial manner, from lateral to medial. Bleeding edges are coagulated and the durotomy carried to the tentorial incisura by progressively coagulating the dural leaves. The tentorial incision allow placement of a retractor above the tentorium behind its petrous attachment. In addition, large tentorial lakes may be present, especially in very young children, and these were avoided whenever possible. Preoperative venous-phase MR angiography may be helpful in identifying large venous sinuses within the tentorium, and image guidance may be used to help avoid these sinuses during the operation. Importantly, the vein of Rosenthal may drain into the tentorium, and this should be considered a contraindication to the SCTT approach.

Care should also be taken to avoid sacrificing the paramedian tentorial bridging veins whenever possible. The midline tentorial bridging veins and the petrosal vein (laterally) must be preserved because they represent the predominant venous drainage of the posterior fossa.

Temporary arrhythmia or bradycardia, mediated through the trigeminal vagal pathway, has been reported during this step of tentorial manipulation; therefore, at this stage, communication with the anesthesiologist is important. The undersurface of the temporal lobe is visualized, and a self-retaining retractor is then placed through the tentorial opening into the supratentorial space to depress the tentorium in order to create a larger working corridor.

The quadrigeminal and posterior ambient cisterns is then exposed; this typically allow for visualization of the straight sinus and vein of Galen medially and of the basal vein of Rosenthal. Opening of the thick arachnoid of the quadrigeminal and posterior ambient (perimesencephalic) cisterns allow for visualization of the posterior cerebral arteries. The trochlear nerve should first be identified as it exits the posterior midbrain below the inferior colliculus and should be followed anteriorly as it travels the quadrigeminal and ambient cisterns until it tucks under and pierces the tentorium. The nerve extends below the tentorium before entering the dural canal, usually at the anteroposterior midpoint of midbrain (for example, at the posterior border of the cerebral peduncle). Thus, the safest location to incise the tentorium is posterior to the tectum of the midbrain.

As such, injury to the trochlear nerve is never a major risk. Frameless image guidance can greatly aid at this stage.

With the tentorium opened and retracted, the undersurface of the PMT lobe is visualized.

In the series of Weil et al. the tumor typically obscured the normal anatomy of the fusiform and parahippocampal gyri, allowing direct visualization of the tumor and of the infiltrated cortex. In cases where refractory epilepsy is the primary presentation, it is possible to place a subdural strip under the parahippocampal gyrus to perform electrocorticography (ECoG).

As intratumoral decompression is performed, care has to be was taken to respect the pial plane, which is sought medially, so as to avoid encountering the midbrain and vascular structures medially. Depending on tumor extent, the temporal horn of the ventricle is frequently entered.

Tumor removal is carried out with a combination of suction, bipolar coagulation, and ultrasonic aspiration. The limits of the resection are easily visualized with this approach, but this delineation required frequent repositioning of the operating microscope and the operating table for adequate resection.

After adequate tumor resection had been achieved and hemostasis had been secured, the tentorial retractor is removed and the cavity filled with irrigating fluid to remove as much air as possible. The tentorial edges not reapproximated, the convexity dura closed, and the bone replaced [1].

[1]
Weil AG, Middleton AL, Niazi TN, Ragheb J, Bhatia S. The supracerebellar-transtentorial approach to posteromedial temporal lesions in children with refractory epilepsy. J Neurosurg Pediatr. 2015 Jan;15(1):45-54. doi: 10.3171/2014.10.PEDS14162. PubMed PMID: 25396700.