Supracerebellar Suprapineal Approach

- The Supracerebellar Suprapineal Approach: A Novel Method to Separate Cadaveric Brain Hemispheres and Preserve the Midline Structures
- Microneurosurgical removal of thalamic lesions: surgical results and considerations from a large, single-surgeon consecutive series
- Commentary: Endoscope-Assisted Contralateral Perimedian Supracerebellar Suprapineal Approach to Third Ventricle Surface of the Thalamus: 3-Dimensional Operative Video
- Endoscope-Assisted Contralateral Perimedian Supracerebellar Suprapineal Approach to Third Ventricle Surface of the Thalamus: 3-Dimensional Operative Video
- Infratentorial supracerebellar approach to the colloid cysts of the third ventricle

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see also Supracerebellar approach

The Supracerebellar Suprapineal Approach is a surgical trajectory traditionally utilized to access deep-seated regions of the brain, particularly the posterior aspect of the third ventricle, the pineal region, and the upper brainstem. This approach leverages the natural anatomical corridors between the cerebellum and the tentorium, allowing for minimal disruption of surrounding brain tissue.

Key Features of the Approach

1. **Anatomical Corridor**

1. The approach uses the gap between the cerebellum and the tentorium cerebelli, providing a natural route to deep midline structures without traversing cortical or white matter.
2. By retracting the cerebellum gently downward, the surgeon gains access to the suprapineal region and third ventricle.

2. **Operative Visualization**

1. Microsurgical techniques are employed, utilizing magnifications ranging from 6x to 40x to enhance visualization of delicate structures.
2. The angle of entry allows for direct visualization of medial structures such as the third ventricle, avoiding blind dissection.

3. **Preservation of Structures**

1. This approach minimizes damage to medial and surrounding brain structures, making it ideal for procedures requiring the preservation of functional anatomy, such as biopsies, tumor resections, or dissection in neuroanatomical studies.

4. **Advantages in Dissection**

1. For cadaveric studies, it allows hemispheric separation with minimal disruption to the midline anatomy.

2. Ensures intact specimens, crucial for neuroanatomical education and surgical training.

Clinical and Educational Applications

- **Surgical Use**: The supracerebellar suprapineal approach is employed in the treatment of pathologies such as pineal region tumors, cysts, and vascular malformations of the posterior third ventricle.

- **Educational Value**: Its adaptation for cadaveric dissection provides high-quality anatomical specimens, enabling precise study of midline structures and offering a reliable training method for neurosurgeons.

Limitations

- **Technical Demands**: Requires advanced microsurgical skills and access to high-quality equipment, which may limit its application to resource-rich environments.

- **Risk of Complications**: In live surgery, risks include venous injury (e.g., damage to the internal cerebral veins or straight sinus) and cerebellar trauma. These are mitigated in cadaveric applications.

Conclusion

The supracerebellar suprapineal approach is a powerful tool in both clinical and educational contexts. Its innovative use in cadaveric dissection by Muñoz-Gualan et al. highlights its potential to enhance neuroanatomical understanding and neurosurgical training, solidifying its role as a critical technique in modern neurosurgery.

Experimental anatomical studies

Muñoz-Gualan et al. describe a novel technique for dissecting cadaver brains without damaging medial brain structures and surfaces, ensuring preservation for neuroanatomical study and training.

Ten adult cadaveric brains were dissected using the supracerebellar suprapineal approach under an operative microscope with 6x to 40x magnification. This approach allowed for the separation of the brain into two hemispheres while providing direct visualization of the third ventricle and preserving midline structures.

The supracerebellar suprapineal approach enabled accurate and feasible dissection of the hemispheres without causing damage to the medial brain structures. All midline structures, including the third ventricle, were preserved, producing high-quality specimens for anatomical study.

The supracerebellar suprapineal approach offers a significant advancement in the technique for hemispheric brain dissection, ensuring the preservation of medial brain structures and providing

superior specimens for neurosurgical training and study [1)]

Muñoz-Gualan et al. deliver a compelling and innovative technique with substantial benefits for neuroanatomy and neurosurgery. However, broader validation through comparative studies, larger sample sizes, and exploration of long-term specimen preservation is needed to establish its robustness and generalizability. Despite these limitations, the method has considerable potential to become a cornerstone in neuroanatomical dissection and training.

1)
Muñoz-Gualan AP, Gungor A, Romano-Albornoz M, Gurses ME, Elias C, Topcam A, Ramanov S, Ture U. The Supracerebellar Suprapineal Approach: A Novel Method to Separate Cadaveric Brain Hemispheres and Preserve the Midline Structures. Sisli Etfal Hastan Tip Bul. 2024 Dec 24;58(4):417-421. doi: 10.14744/SEMB.2024.92679. PMID: 39816423; PMCID: PMC11729829.