Endoscopic transorbital superior eyelid approach

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Recent advancements in endoscopic surgery have suggested a more minimally invasive and direct route for tumors in and around Meckel's cave, including the endoscopic endonasal approach (EEA) and endoscopic transorbital superior eyelid approach (ETOA).

A retrospective multicenter analysis was performed on 25 patients who underwent endoscopic surgical treatment for trigeminal schwannomas between September 2011 and February 2019. Thirteen patients (52%) underwent EEA and 12 (48%) had ETOA, one of whom underwent a combined approach with retrosigmoid craniotomy. The extent of resection, clinical outcome, and surgical morbidity were analyzed to evaluate the feasibility and selection of surgical approach between EEA and ETOA based on predominant location of trigeminal schwannomas.

According to predominant tumor location, 9 patients (36%) had middle fossa tumors (Samii type A), 8 patients (32%) had dumbbell-shaped tumors located in the middle and posterior cranial fossae (Samii type C), and another 8 patients (32%) had extracranial tumors (Samii type D). Gross-total resection (GTR, n = 12) and near-total resection (NTR, n = 7) were achieved in 19 patients (76%). The GTR/NTR rates were 81.8% for ETOA and 69.2% for EEA. The GTR/NTR rates of ETOA and EEA according to the classifications were 100% and 50% for tumors confined to the middle cranial fossa, 75% and 33% for dumbbell-shaped tumors located in the middle and posterior cranial fossae, and 50% and 100% for extracranial tumors. There were no postoperative CSF leaks. The most common preoperative symptom was trigeminal sensory dysfunction, which improved in 15 of 21 patients (71.4%). Three patients experienced new postoperative complications such as vasospasm (n = 1), wound infection (n = 1), and medial gaze palsy (n = 1).

ETOA provides adequate access and resectability for trigeminal schwannomas limited in the middle fossa or dumbbell-shaped tumors located in the middle and posterior fossae, as does EEA for extracranial tumors. Tumors predominantly involving the posterior fossa still remain a challenge in endoscopic surgery ¹⁾.

Di Somma et al., undertooked a anatomical study in order to contribute a neurosurgical perspective, exploring the anterior and middle cranial fossa areas through this purely endoscopic transorbital trajectory.

Anatomical dissections were performed in 10 human cadaveric heads (20 sides) using 0° and 30° endoscopes. A step-by-step description of the superior eyelid transorbital endoscopic route and surgically oriented classification are provided.

The authors' cadaveric prosection of this approach defined 3 modular routes that could be combined. Two corridors using bone removal lateral to the superior and inferior orbital fissures exposed the middle and anterior cranial fossa (lateral orbital corridors to the anterior and middle cranial base) to unveil the temporal pole region, lateral wall of the cavernous sinus, middle cranial fossa floor, and frontobasal area (i.e., orbital and recti gyri of the frontal lobe). Combined, these 2 corridors exposed the lateral aspect of the lesser sphenoid wing with the Sylvian region (combined lateral orbital corridor to the anterior and middle cranial fossa, with lesser sphenoid wing removal). The medial corridor, with extension of bone removal medially to the superior and inferior orbital fissure, afforded exposure of the opticocarotid area (medial orbital corridor to the opticocarotid area).

Along with its minimally invasive nature, the superior eyelid transorbital approach allows good visualization and manipulation of anatomical structures mainly located in the anterior and middle cranial fossae (i.e., lateral to the superior and inferior orbital fissures). The visualization and management of the opticocarotid region medial to the superior orbital fissure are more complex. Further studies are needed to prove clinical applications of this relatively novel surgical pathway²⁾.

In a retrospective chart evaluation of patients with spheno-orbital meningiomas treated by means of endoscopic transorbital superior eyelid approach in 3 referral centers over the last 4 yr.

Fourteen cases were included in this study. In 4 patients, the transorbital endoscopic approach was combined with an endonasal route. Mean age was 51 and male-to-female ratio was 1:6. In 8 patients (57.1%), an intraorbital involvement was observed, 3 of them (21.4%) showed significant intraconal disease. No patient presented significant cavernous sinus infiltration. Main presenting symptoms were proptosis, diplopia, and visual impairment in 14, 6, and 6 patients, respectively. Mean proptosis improvement was 2 mm (standard deviation 2.3). We observed no major postoperative complications.

This preliminary clinical experience seems to demonstrate that selected spheno-orbital meningiomas can be safely managed by means of an endoscopic transorbital route through a superior eyelid approach. Patients with orbital or cavernous sinus infiltration are at highest risk of persistence ³.

References

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