

Expanded endonasal approach to skull base meningiomas

Acesso endonasal expandido para meningiomas da base do crânio

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Expanded endonasal endoscopic approach is an alternative technique for management of meningiomas of the anterior skull base, allowing complete resection with an acceptable morbidity rate¹⁻³.

We report the first three cases of anterior skull base meningiomas managed by this technique.

CASE REPORT

Case 1 – 79 year-old female with a small olfactory groove meningioma, during follow-up, presented visual impairment and frontalization signs, along with an increase in the volume of the tumor on MRI (Figs 1A and B)

Case 2 – 58 years-old male presented with right oculomotor nerve partial palsy and right facial hypoesthesia. MRI showed a planum sphenoidale and olfactory groove meningioma, associated with a small lesion on the sellar region and sphenoidal sinus (Figs 1C and D).

Case 3 – 39 years-old female, complaining of decreased visual acuity bilaterally, worse on the right side for the past eight months. MRI revealed a tuberculum sellae lesion (Figs 1E and F).

OPERATIVE TECHNIQUE

Endonasal approach was performed with a 0° 4 mm endoscope. Angled endoscopes were used at the end of the procedure to inspect the operative field as a whole. The procedure was carried out by a neurosurgeon and an otorhinolaryngologist working simultaneously.

The procedure was initiated with anterior and posterior ethmoidectomies and wide sphenoidotomies, exposing the anterior skull base, lamina papyracea and the frontal recess. Bilateral middle turbinectomy were carried out, since the

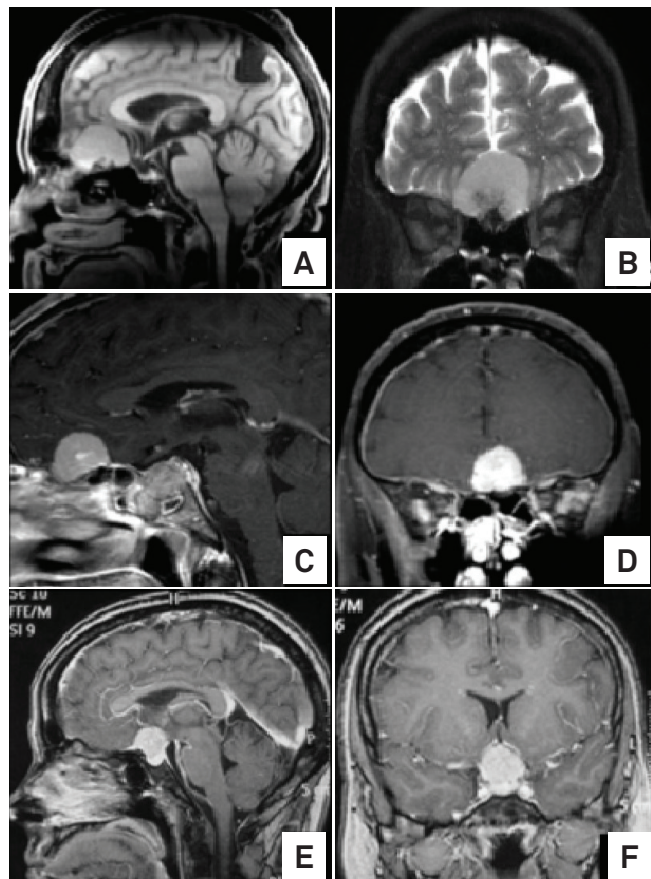


Fig 1. (A and B) Case 1 Magnetic Resonance Imaging (MRI) T1 without contrast showing lesion on olfactory groove and encephalomalacia area in parietal region secondary to a previous ischemic insult. (C and D) Case 2 MRI T1 with gadolinium. Planum sphenoidale and olfactory groove meningioma, associated to a small lesion on the sellar region and sphenoidal sinus. (E and F) Case 3 MRI T2/T1 gadolinium with a tuberculum sellae meningioma.

olfactory groove is located above its insertion on the skull base. A nasoseptal pedicled flap was harvested and placed

into the nasopharynx for posterior reconstruction of the skull base defect⁴ (Fig 2A).

At this point, the superior half of the posterior nasal septum was removed, communicating both nasal cavities and exposing the entire anterior skull base. Anterior and posterior ethmoidal arteries were identified and coagulated to devascularize the tumor³. The boundaries of the approach were as follows: anteriorly, posterior wall of the frontal sinuses; laterally, the medial wall of both orbits; and posteriorly, planum sphenoidale and sellar area⁵.

The cribriform plate was drilled and removed bilaterally. Tumor was debulked and surrounding arachnoid was dissected away from the tumor capsule. Once tumor has been freed from any adherence, the tumor capsule could be gently peeled away from surrounding structures and removed piecemeal or en bloc, achieving gross total resection (Fig 2B).

Reconstruction of the skull base was accomplished with one underlay layer of fascia lata, followed by the nasoseptal flap covering the entire defect and fibrin glue. A Foley balloon catheter was inflated with saline solution under endoscopic vision (Figs 2C and D).

OUTCOMES

Case 1 improved her visual symptoms. Case 2 showed slight improvement of diplopia without new deficits. Case 3 visual complaints improved one day after surgery, but experienced cerebrospinal fluid (CSF) leakage ten days after surgery and, forty days after surgery, deep venous thrombosis, massive lung embolism and death.

CONCLUSION

Expanded endonasal endoscopic approach is a feasible option to remove selected skull base meningiomas with

minor injury to other structures, allowing complete removal and consistent reconstruction of skull base floor.

CSF leak is the major complication related with this approach².

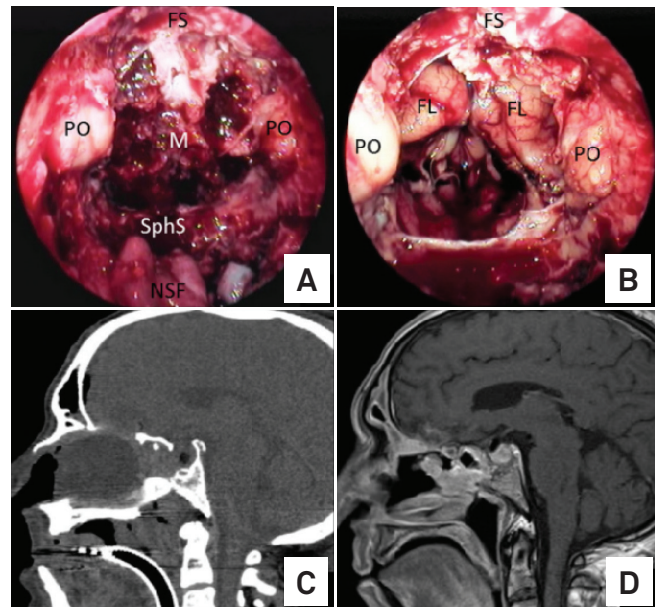


Fig 2. (A) Exposure of the anterior skull base meningioma (M), limited anteriorly by the frontal sinus (FS), laterally by the periorbits (PO) and posteriorly by the sphenoidal sinus (SphS). The nasoseptal flap is displaced into the nasopharynx. (B) After removal of the meningioma, the frontal lobes (FL) can be observed. (C) Immediate postoperative CT scan with an insufflated 24F Foley catheter within the nasal cavity retaining the nasoseptal pediculated flap against the dural defect. Small pneumoencephalus in the frontal and sellar region may be noted. (D) MRI T1 showing no residual lesions, after Foley catheter removal, seven days after surgery.

References

1. Al-Mefty O, Holoubi A, Rifai A, Fox JL. Microsurgical removal of suprasellar meningiomas. *Neurosurgery* 1985;16:364-372.
2. Gardner PA, Kassam AB, Thomas A, et al. Endoscopic endonasal resection of anterior cranial base meningiomas. *Neurosurgery* 2008;63:36-52.
3. de Divitiis E, Esposito F, Cappabianca P, Cavallo LM, de Divitiis O, Esposito I. Endoscopic transnasal resection of anterior cranial fossa meningiomas. *Neurosurg Focus* 2008;25:E8.
4. Hadad G, Bassagasteguy L, Carrau RL, et al. A novel reconstructive technique after endoscopic expanded endonasal approaches: vascular pedicle nasoseptal flap. *Laryngoscope* 2006;116:1882-1886.
5. Kassam A, Snyderman CH, Mintz A, Gardner P, Carrau RL. Expanded endonasal approach: the rostrocaudal axis. Part I. Crista galli to the sella turcica. *Neurosurg Focus* 2005;19:E3.