Nuances on Judicious Use of Naso-septal Flap in Extended Endonasal Approaches for Removal of Pituitary Macroadenoma with Different Patterns of Suprasellar extension

Mehdi Khaleghi, MD; Garrett Dyess; Asa Barnett; Brandon Kaye, MD;
Mark Gacek, MD; Ursula Hummel; Jai D Thakur, MD
Department of Neurosurgery, University of South Alabama

Introduction

Effective endoscopic endonasal reconstruction of the ventral skull base depends on the lesion location, defect size, and possible subarachnoid dissection extent[1,2], although a tailored approach could be obtained to decrease the rate of unnecessary pedicled nasoseptal flap (NSF) usage.[3] We present a modified repair technique for sellar lesions according to the suprasellar growth direction and diaphragmal defect (DD) size.

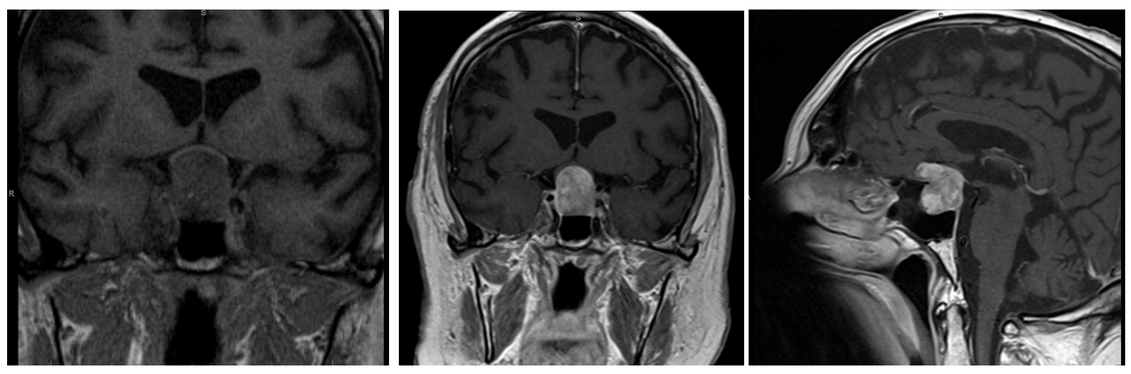

Fig. 1: Preoperative imaging

Case 1

- Clinical: A 72 y/o male, presented with panhypopituitarism, OD 20/25, OS 20/20, no visual field defect
- Radiology: Large pituitary mass with horizontal extension over the planum sphenoidale and interval size increase (Fig. 1)
- Approach selection: ***Extended transplanum-transtuberculum approach***

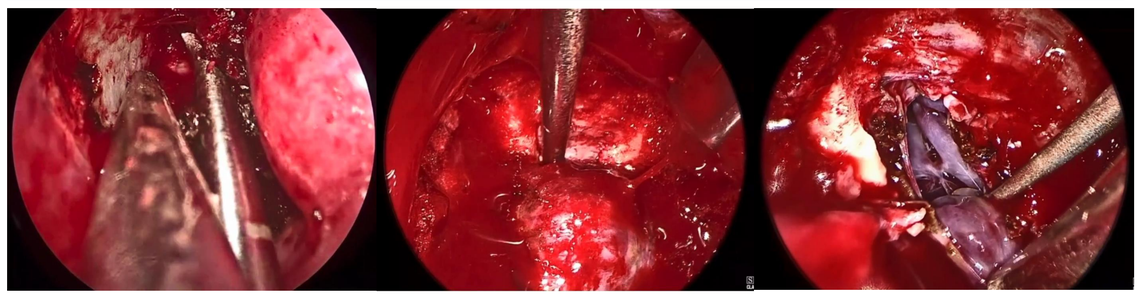

Fig. 2: Intraoperative views

- Approach steps (Fig. 2): Contralateral NSF elevation → Sphenoidotomy and posterior ethmoidectomy → Tubercular and proximal planum removal → Intrasellar tumor removal → Superior intercavernous sinus sacrifice → Planum dural opening → Supra-planum tumor resection
- Intraoperative: Grade 3 intraoperative CSF leak with planum dural opening
- Multilayer reconstruction using NSF
- Outcomes: No CSF rhinorrhea, synechia, or anosmia
- Follow-up imaging: Gross total resection (Fig. 5a)

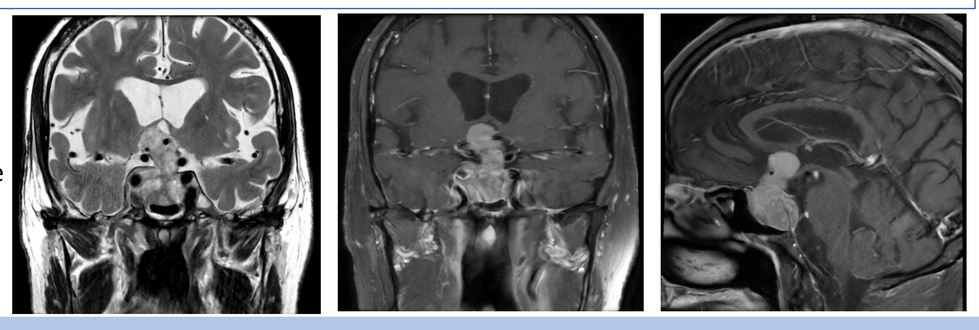

Fig. 3: Preoperative imaging

Case 2

- Clinical: A 86 y/o male with a recurrent pituitary adenoma previously operated via translabial approach (2010), mild hypopituitarism, OD 20/40, OS 20/20, no visual field defect, cardiac comorbidities with the presence of pacemaker/defibrillator
- Radiology: Pituitary macroadenoma with large suprasellar extension toward third ventricle floor and optic apparatus compression (Figure 3)
- Approach selection: ***Trans-sellar transtuberculum approach***

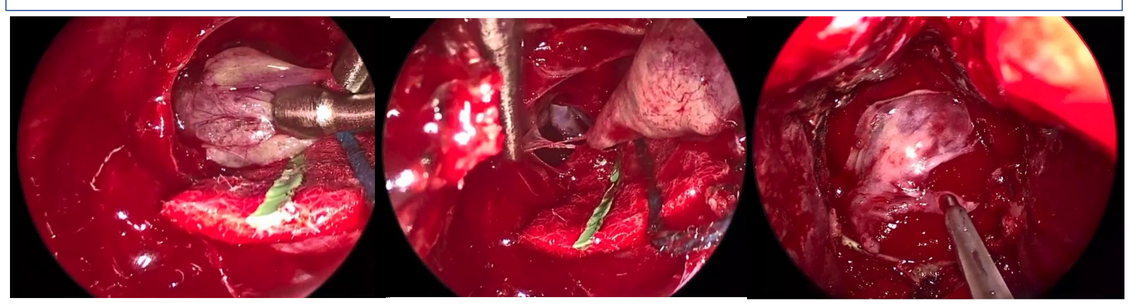

Fig. 4: Intraoperative views

- Approach steps (Fig. 4): Ipsilateral septal mucosal rescue flap → Sphenoidotomy and posterior ethmoidectomy → Tubercular removal → Intrasellar tumor removal → Suprasellar tumor resection through the diaphragmatic defect using an intra-arachnoid extracapsular two-suction technique
- Intraoperative: Grade 3 intraoperative CSF leak with DD < 1cm
- Multilayer reconstruction using local sphenoid sinus mucosa
- Early and long-term outcomes: No new deficits or DI. No diabetes insipidus or CSF rhinorrhea
- Follow-up imaging: Posterior clival residual (Fig. 5b)

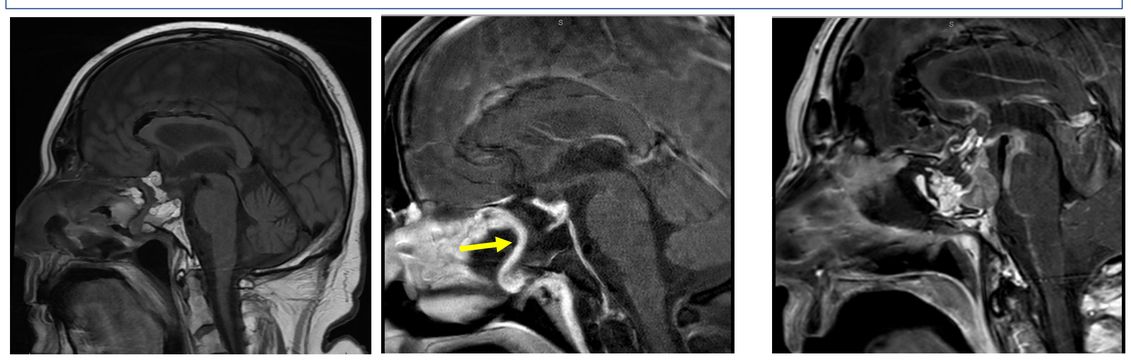

Fig. 5a. Case 1. Postoperative MRI

Fig. 5b: Case 2. postoperative MRI

Conclusions

A tailored approach was depicted for endoscopic endonasal repair of intraoperative CSF leak. For those with vertical expansion toward the suprasellar cistern in which the tumor can be chased through a DD < 1 cm, NSF can be avoided by using a modified multilayer reconstruction with fat, collagen substitute, and local mucosal graft.[4] For horizontal tumor extension over the planum where the anterior skull base dura is opened, NSF augmentation is necessary to avoid CSF fistula.[5]

Contact

Mehdi Khaleghi. MD
Department of Neurosurgery, University of South Alabama
University Hospital, 2451 University Hospital Dr, Mobile, AL 36617
mkhaleghi@health.southalabama.edu
251-471 7000

References

1. Kassam AB, Thomas A, Carrau RL, et al. Endoscopic reconstruction of the cranial base using a pedicled nasoseptal flap. Neurosurgery. 2008;63(1 Suppl 1):ONS44-ONS53. doi:10.1227/01.neu.0000297074.13423.f5
2. Esposito F, Dusick JR, Fatemi N, Kelly DF. Graded repair of cranial base defects and cerebrospinal fluid leaks in transsphenoidal surgery. Oper Neurosurg. 2007;60(4 Suppl 2):295-304. doi:10.1227/01.NEU.0000255354.64077.66
3. Conger A, Zhao F, Wang X, et al. Evolution of the graded repair of CSF leaks and skull base defects in endonasal endoscopic tumor surgery: trends in repair failure and meningitis rates in 509 patients. J Neurosurg. 2019;130(3):861-875. doi:10.3171/2017.11.JNS172141
4. Khaleghi M, Shahid AH, Suggala S, et al. Modified graded skull base reconstruction for intraoperative CSF leak repair in endoscopic endonasal surgeries: a single-surgeon experience in initial years of practice and nuances in the early learning curve. Neurosurg Focus. 2025;58(2):E6. doi:10.3171/2024.11.FOCUS24733.
5. Kassam A, Carrau RL, Snyderman CH, Gardner P, Mintz A. Evolution of reconstructive techniques following endoscopic expanded endonasal approaches. Neurosurg Focus. 2005;19(1):E8. Published 2005 Jul 15.