Endoscopic Skull Base Surgery

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Traditional Craniofacial Approaches

- Surgery for SBT results in a cure for many patients.
- For many traditional open craniofacial surgery is the mainstream with the best chance of success.
- More recently, endoscopic approaches started to emerge.

Traditional Craniofacial Approaches

- Nothing “minimally-invasive” about it....

A more elegant approach?

- Not every skull base lesion is fungating out
- Can scars be avoided?
- Can exposure be reasonably smaller, yet adequate?
- Can anything challenge the “gold standard” visualisation with microscope?
- Can surgical trauma be minimized and recovery become faster?

Series of reconstructive procedures

- Courtesy Dr. Johnny Franco
A more elegant approach?

Traditional approach
- Visible facial and scalp incisions
- Removal facial bones or parts of cranium
- Usually one surgeon operates at a time

Endoscopic approach
- No incisions
- Nostrils used to insert instruments and the scope
- 4-hand surgery

An approach with better visualization?
- Microscope provides 3D visualization, but less illumination than the scope
- Endoscope provides 2D visualization with better illumination
- Microscope gives only direct line-of-sight
- Endoscope gives around the corner view

A Truly Team Approach
- It is essential that the neurosurgeon and an ENT surgeon are on the same page
  - operating with 4 hands, 2 separate monitors
  - if tumor is growing more to the sinuses, neurosurgeon can simply hold the scope

Very good view

Pituitary Apoplexy
- 74 y.o. lady w/HA's and decrease in vision
- Underwent TSA elsewhere and presents with worst HA ever and acute blindess

Pituitary Apoplexy
- Very fibrous hemorrhagic Tm
- Extending into the cavernous sinus
**Pituitary Apoplexy**

- 40 y.o. male with recent h/o worsening vision on the left and headaches, double vision due to Rt abducens nerve palsy.

**Pituitary macroadenoma**

- Tumor in the cavernous sinus.
- Diaphragma sellae.

**Olfactory Groove / Intranasal Meningioma**

- 54 y.o. gentleman with olfactory groove / intranasal meningioma.
- S/P bifrontal crani for resection of a 5 cm intracranial olfactory groove meningioma 4 years ago and coiling of an incidentally found Acom aneurysm.
**CONCLUSIONS:**

- CSF leak occurred in 3.5% versus 2.4% (P=NS), and DI (transient or permanent) in 7.6% versus 4.9%.
- Total tumor removal 45% of microscopic versus 56% of endoscopic.

**Mean SNOT-22 scores transiently worsened in the early postoperative period, and significantly improved at 1 year after surgery (p < 0.01).**

- Visual fields had normalized or improved in 90% versus 88% of patients, respectively (P=NS).
- Hormone resolution was achieved in 81% (95% CI 71-91%) of adrenocorticotropic hormone secreting tumors, 84% (95% CI 76-92%) of growth hormone secreting tumors, and 82% (95% CI 70-90%) of prolactin secreting tumors.
- No delayed cerebrospinal fluid leaks or any other complications occurred.

**RESULTS:**

- High rates of gross tumor removal, hormonal cure and visual field improvement were noted in this series.
- Refinement of endoscopic pituitary surgery requires an understanding of the impact of demographic and surgical variables on outcomes.

**What’s the evidence?**

- Retrospective study.

**Sino-nasal QOL**

- Longitudinal data on sinonasal-related QOL in pituitary patients undergoing endoscopic surgery has not been well evaluated. The study utilized the Sino-nasal Outcome Test (SNOT-22) to prospectively evaluate sinonasal-related QOL.

**Intra-op MRI and endoscopic TSA**

- The aim of this study was to report and show the technique, results, and complications of combined endoscopic and intraoperative MRI.

- Refinement of endoscopic pituitary surgery requires an understanding of the impact of demographic and surgical variables on outcomes.

**What’s the evidence?**

- Retrospective study.
Closure of the defect

• Many options
  • Autogenous fat
  • Fascia lata (autogenous or lyophilized)
  • Lyophilized dura
  • Temporalis fascia
  • Hydroxyapatite
  • Allograft
  • Mucosa
  • Flap (vascularized or non-vascularized)
  • Others (fibrin glue, dissolving packing, sealants)

Closure of the defect

• Size matters
  − Avoid flaps in smaller defects → less postoperative pain and nasal morbidity,
    • lyophilized dermal allograft
    • autologous fat
  − Larger defects → more tissue
    • lyophilized dermal allograft / fascia lata
    • autologous fat
    • flaps

Closure of the defect

• In larger defects
  • vascularized pedicled nasoseptal flap (PNSF)
  • Multi-layered closure
  • In redo cases
    − Hadad-Bassagasteguy flap (HBF): neurovascular pedicled flap of the nasal septum mucoperiosteum and mucoperichondrium based on the nasoseptal artery, a branch of the posterior septal artery

Risk of meningitis

• Review of 67 studies
  • The overall risk of postoperative meningitis following EESB surgery was 1.8% (36 of 2,005).
  • For those reporting a cerebrospinal fluid (CSF) leak, meningitis occurred in 13.0% (35 of 269). For those not reporting a CSF leak, meningitis occurred in 0.1% (1 of 1,736).

Conclusions

- Endonasal Endoscopic Transphenoidal Surgery is safe and effective
- Risk of complications is comparable to or lower than in traditional microscopic cases
- Various options are available for skull base defect closure
- The risk of CSF leak is not very high
- Meningitis is very uncommon, even in patients with leak

Thank you!