ENDOSCOPIC SKULL BASE SURGERY
STATE OF THE ART

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DISCLOSURE

• Grant support and an honoraria from Stryker Corporation to run an Endoscopic Skull Base Approaches course for surgical residents in Otolaryngology and Neurosurgery (Nov 1-3, 2013).
A FIELD IN EVOLUTION

THIS TALK

- Review the State of Antero-Lateral Skull Base Surgery
- Review the Key Anatomic Concepts
- Cutting Edge Technologies in Development
- Outcomes of Endoscopic Skull Base Surgery
WHAT IS ENDOSCOPIC SKULL BASE SURGERY

• One or Two Surgeons
• Dissection of the Antero-lateral skull base via a transnasal approach
• Endoscopic assisted with open (sublabial incisions? Or Transoral)

KEY CONCEPTS IN EXPANDED ENDONASAL SURGERY

• Corridor Surgery
• Two Surgeon- 4 instruments
• Piecemeal Resection
• Equivalent margins whether open or endoscopic approach
WHY ENDOSCOPIC?

- Cosmesis
- Decreased risk of wound complication: Skin dehiscence, bone flap necrosis
- No brain retraction - reduced severe morbidity?
- Reduced hospital stay?

THE PITTSBURGH CORRIDOR CONCEPT

- Total Ethmoidectomy
  - ASB = Bilateral
  - CSB = Unilateral
- Middle Turbinate Resection
- Open up maxillary sinus
- Define orbit to orbit in sphenoid.
- Posterior septectomy or septal incision
CORRIDORS DEFINED BY SKULL BASE ZONE

THE PTERYGOID WEDGE IS A LANDMARK
WORK IN THE ANATOMIC LAB AIDS DEVELOPMENT OF ENDOSCOPIC SURGERY

CENTRAL SKULL BASE: UNDERSTANDING DANGER POINTS
KADISH C ESTHESIONEUROBLASTOMA

TREATMENT WOULD HAVE BEEN

• Bifrontal craniotomy/ lynch incision
• 10 days in hospital
• 36% risk of major complication
  • Infectious
  • Vascular
  • Neurologic-Significant risk of seizure
  • Systemic
ENDOSCOPIC OPTIONS AVAILABLE

- 5-7 days in hospital with lumbar drain and nasal packing
- 5% risk of CSF leak for anterior skull base tumors
- Typically able to walk, eat, drink, communicate normally in post operative period

ENB POST OPERATIVE
CHORDOMA

Clival Chordoma

Video of Basilar Artery and dura
- Would Require Trans oral palate split or Leforte I approach

CHORDOMA

- Avoid palate split and associated dysphagia and possible VPI
- Gross total resection
- 7 day hospitalization
LATERAL SKULL BASE

- There is the Anterior Endonasal Approach
  - Transnasal
  - Transeptal
  - Endo Anterior Maxillotomy

- Posterior Dissection
  - Transpterygoid
  - Transmaxillary

COMPARISON OF THREE APPROACHES

- Transnasal

- Transeptal

- EAM

Pletcher, El-Sayed. Chapter: Surgery of the Infratemporal Fossa Thieme
VIDIAN SCHWANNOMA EXTEND TO PTF

SCHWANNOMA
VIDIAN SCHWANNOMA – SURGICAL CORRELATION

Dehiscent carotid

Removed Pterygoid wedge
With residual Eustachian tube

Sella

Eustachian tube orifice in Nasopharynx

Case 2: Schwannoma

- Home Post Op Day 2
- Nasal Packing 5 days
- Chronic saline irrigations
- Can develop trismus from muscle fibrosis
- Sinusitis
- These problems would not be avoided with open approach
METASTATIC PAPILLARY THYROID CA TO FORAMEN OVALE

INFERIOR EXTENSION
ENDONASAL - TRANSCERVICAL
• Transcervical Exposure Tumor

• Identify Carotid and cranial nerves
SUMMARY
LATERAL SKULL BASE LESIONS

- Optimal approach in evolution
- Categorizing lesions by access and risks is helpful for planning.
- Thorough understanding of anatomy
- Lesions involving the Carotid Space merit special attention

NASAL SEPTAL FLAP USED FOR CLOSURE

CLOSURE WITH NSF UCSF EXPERIENCE

- Endoscopic Surgery CSF Leak rate of ~10%
- ASB has a CSF leak rate of 3.6%
  - Risks increase with size >2.0cm²

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ALTERNATE FLAPS

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ALTERNATE FLAPS

- Pericranial Flap

WHAT DOES THE FUTURE HOLD?
ROBOTIC SURGERY?

Hanna et al, Laryngoscope

ROBOTS?

prospectaV. Trévilleta,b, European Annals of Otorhinolaryngology, Head and Neck diseases (2013) 130, 201—207
Augmented Real-Time Navigation With Critical Structure Proximity Alerts for Endoscopic Skull Base Surgery

Benjamin J. Dixon, MBBS; Michael J. Daly, MSc; Harley Chan, PhD; Allan Voscan, MD; Ian J. Witteveen, MD; Jonathan C. Irish, MD
PLUGGING THE HOLE: CAROTID INJURY?

Romparey et al. Laryngoscope 2013

EARLY OUTCOMES FOR ENDOSCOPIC SKULL BASE SURGERY
ESTHESIONEUORBLASTOMA
META-ANALYSIS 316 PATIENTS

UCSF OUTCOMES RATHKE’S CYST
UCSF OUTCOMES RATHKE’S CYST

![Graph showing outcomes for different surgical approaches: Visual Normalization, Headache Improvement, Pituitary Axis Normalization.](image1)

UCSF OUTCOMES RATHKE’S CYST

![Graph showing outcomes for different surgical approaches: Diabetes Insipidus, CSF leak.](image2)
OUTCOMES: MENINGIOMA META-ANALYSIS REVIEW (UCSF)

- 5 studies EEA (49 patients)
- 10 studies Transcranial (N=390)
- Equivalent tumor resection
- EEA better visual outcome
  - \( p < 0.05; OR 1.6; 95\% CI 1.4, 1.9 \)
- EEA may have higher acute CSF leak.

IN CONCLUSION

- Emerging Data demonstrates EEA equal and possibly better outcomes
- Role of two surgeons with OHNS/Neurosurgery evolving
- Endoscopic Skull Base Surgery Has a Definite role in the management of paranasal sinus and skull base tumors.