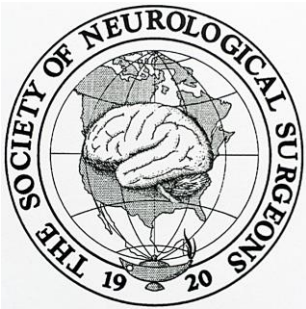


Introduction to Neurosurgical Subspecialties:

Tumor and Skull Base Neurosurgery

Brian L. Hoh, MD¹ and Gregory J. Zipfel, MD²

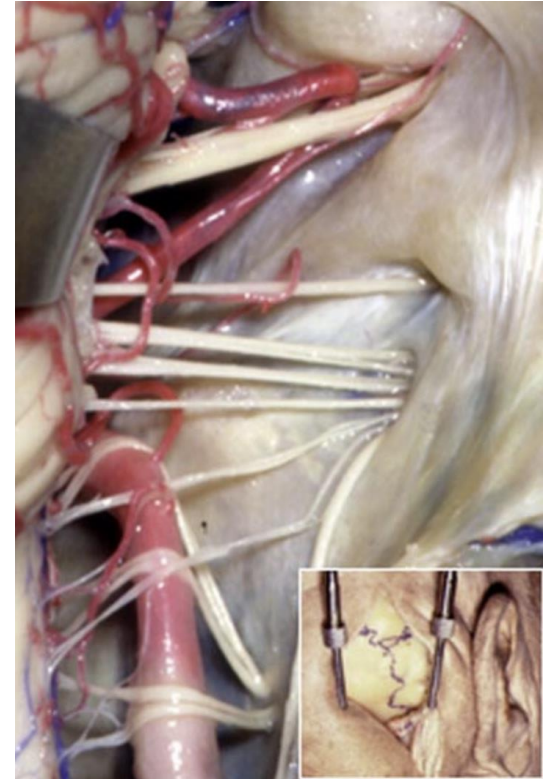
¹University of Florida, ²Washington University



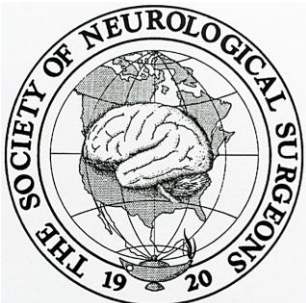
THE SOCIETY OF NEUROLOGICAL SURGEONS

Tumor / Skull Base Neurosurgery

- Brain tumor / skull base neurosurgeons treat patients with:
 - Intrinsic primary brain tumors
 - Astrocytoma, ependymoma, oligodendroglioma, pineal region tumor, craniopharyngioma, hemangioblastoma,, etc.
 - Extrinsic brain tumor tumors
 - Meningioma, schwannoma, pituitary adenoma, etc.
 - Skull tumors
 - Chordoma, chondrosarcoma, etc.
 - Brain metastases



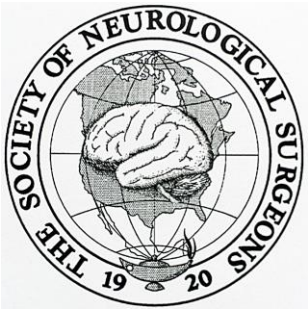
Rhoton collection



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Tumor / Skull Base Neurosurgery

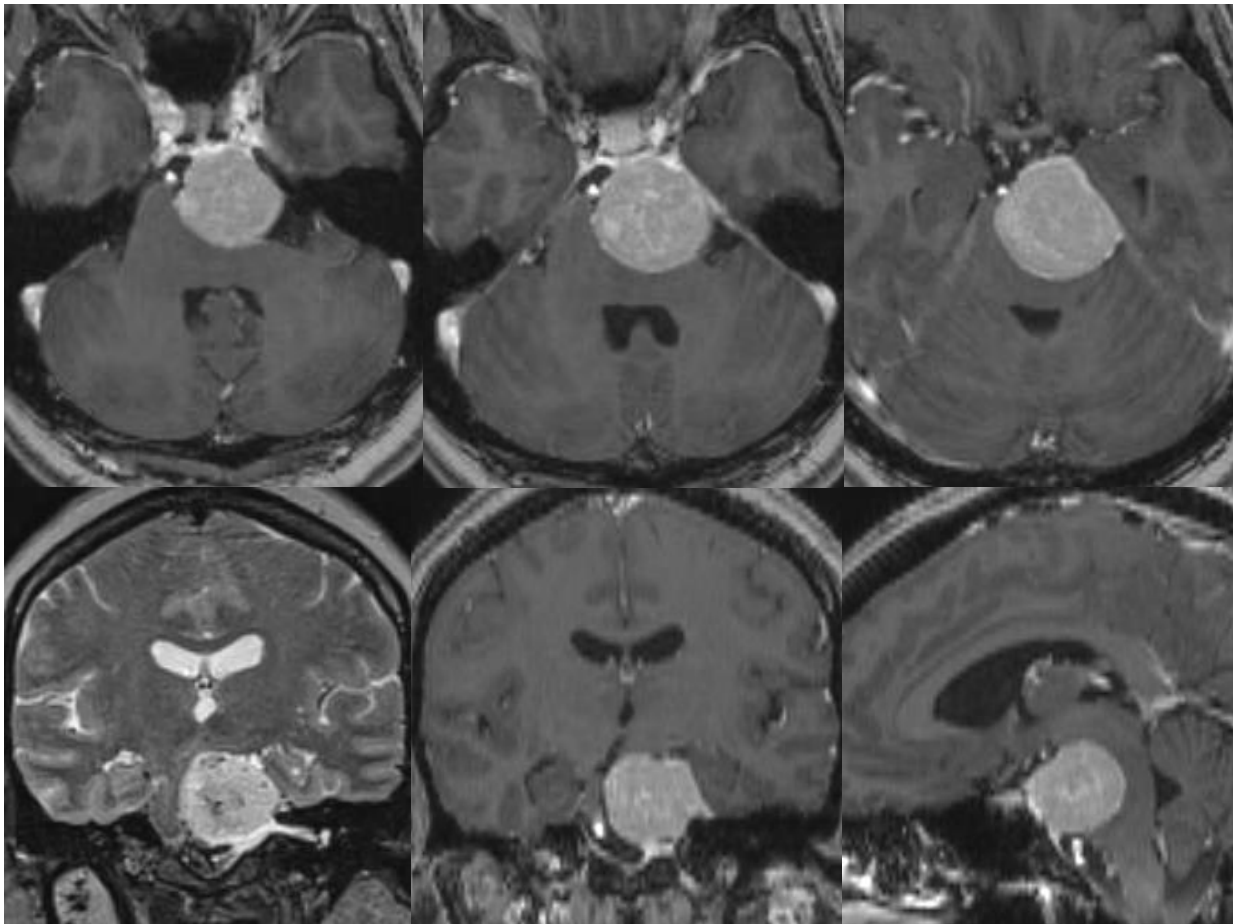
- Fellowship not required, but some neurosurgeons opt for further specialized training in neurosurgical oncology and/or skull base surgery via fellowship
 - Skull base fellowship
 - Surgical Neuro-Oncology fellowship
 - Postdoctoral lab fellowship



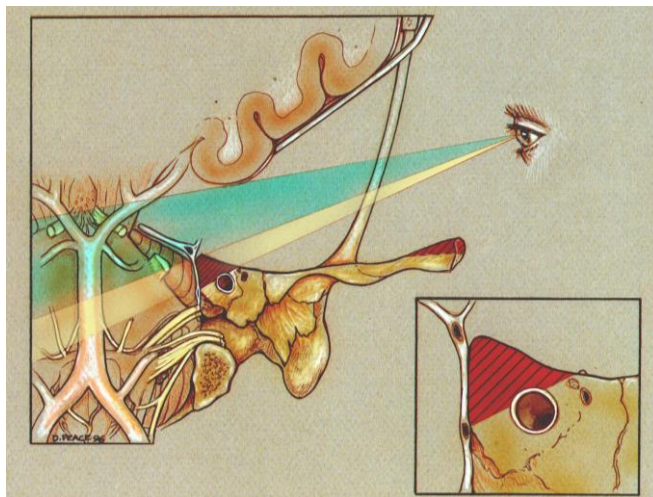
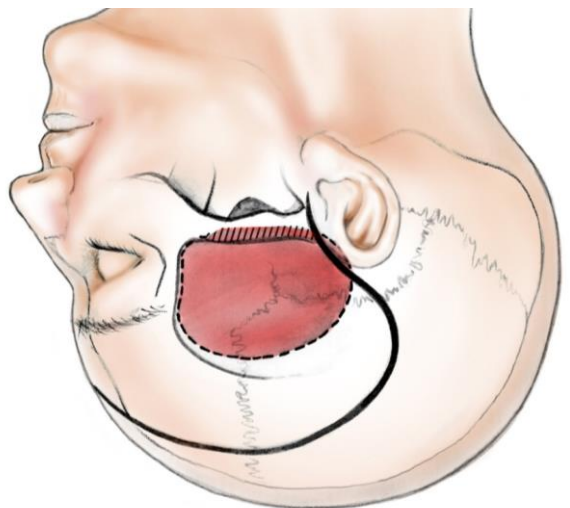
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Case Illustration #1

- 36 yo female with headaches and diplopia; large petroclival meningioma on MRI

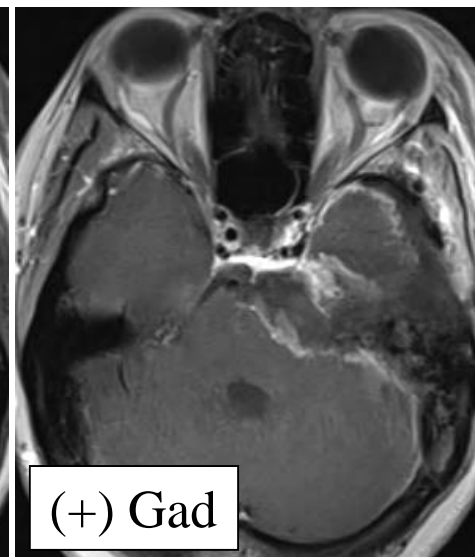
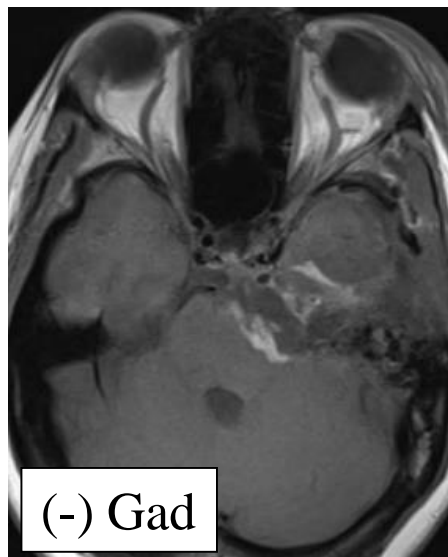


Case Illustration #1



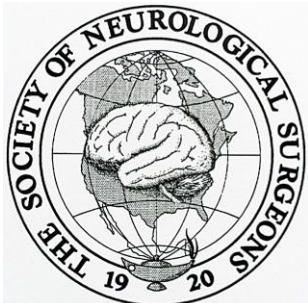
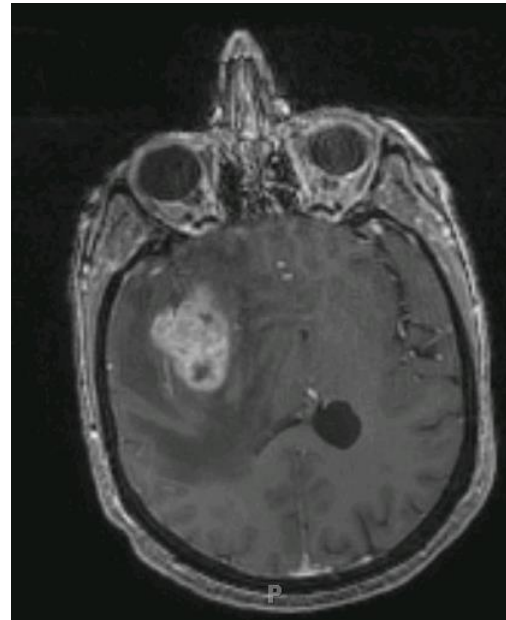
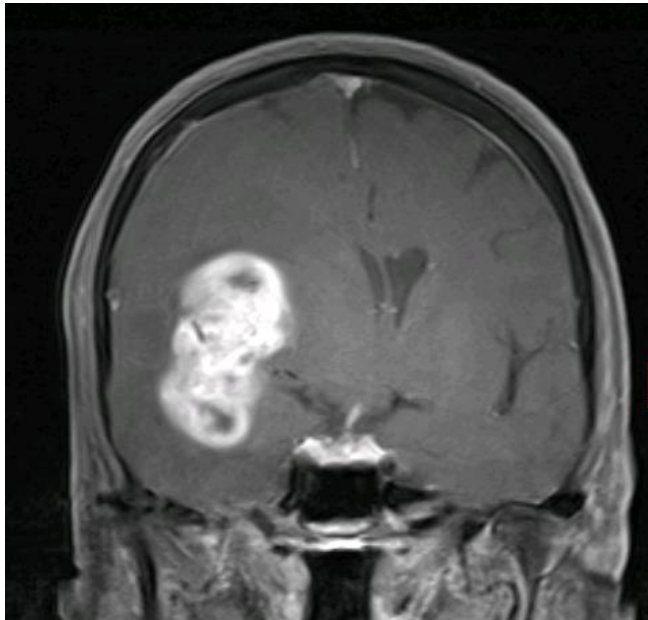
Subtemporal approach with petrosectomy

Post-op MRI



Case Illustration #2

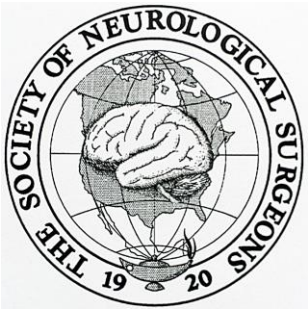
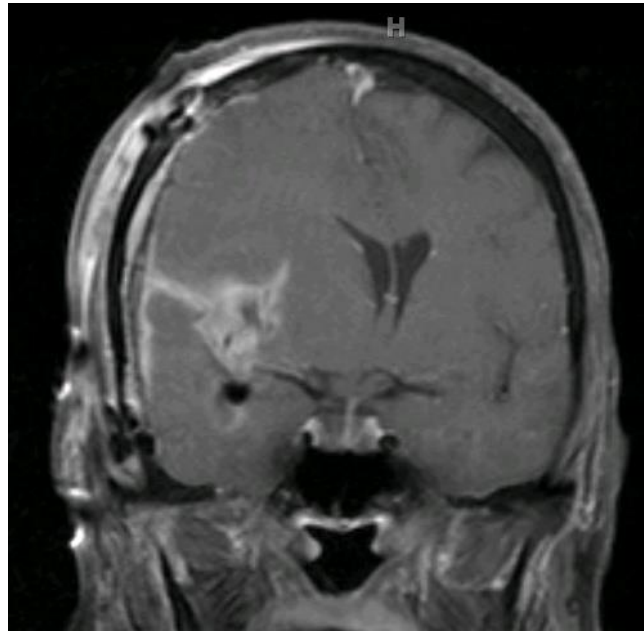
- 72 yo right handed female with large right insular tumor presented with headache



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Case Illustration #2

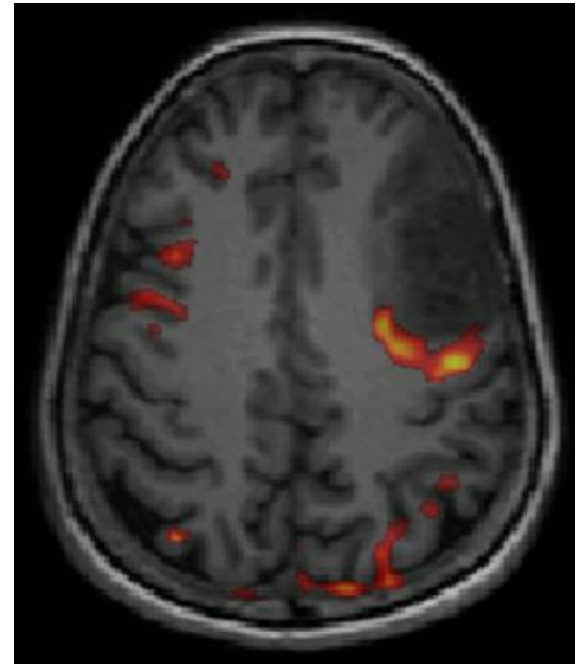
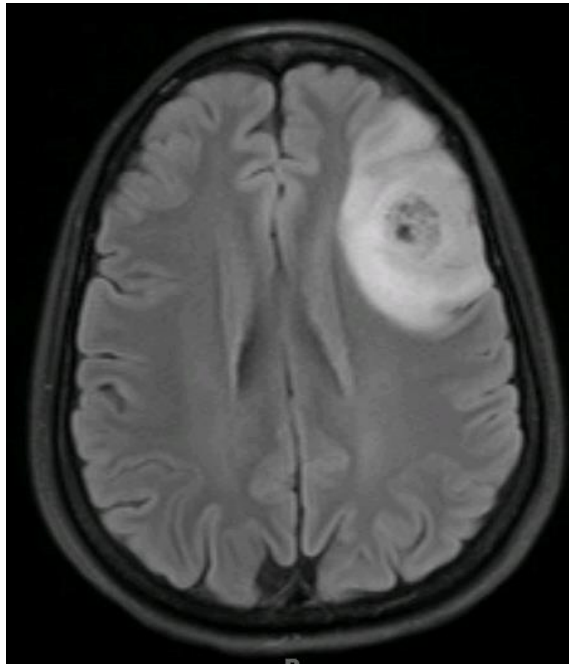
- Gross total resection was achieved via right pterional transsylvian approach using continuous transcranial MEP/SSEP monitoring
- Pathology = glioblastoma



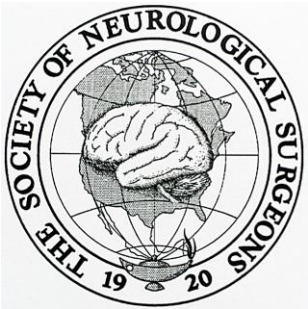
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Case Illustration #3

- 45 year old right-handed woman presented with transient expressive aphasia and found to have 6 cm left inferior frontal FLAIR hyperintense tumor pushing Broca's area posteriorly

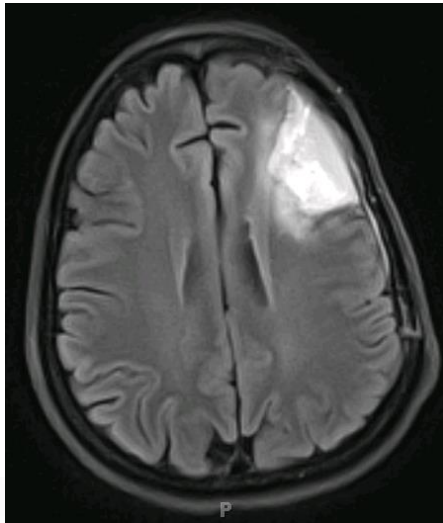


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Case Illustration #3

- A gross total resection was achieved using left frontal awake craniotomy with speech mapping
- Pathology = grade II oligodendroglioma, *IDH1* and *TERT* mutant



TUMOR TYPE: BRAIN OLIGODENDROGLIOMA

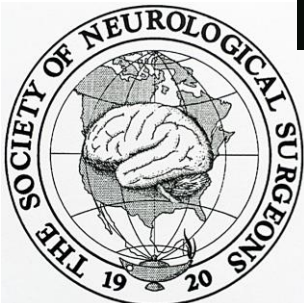
Genomic Alterations Identified†

IDH1 R132H

NRAS G13R – subclonal[‡], Q61K

MUTYH G382D

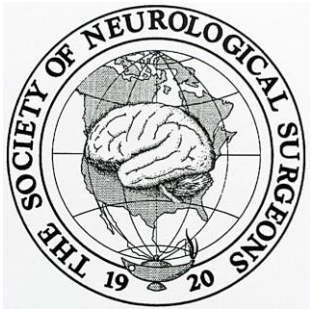
TERT promoter -124C>T



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Case Illustration #4

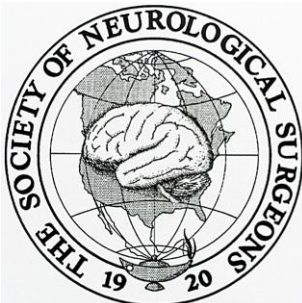
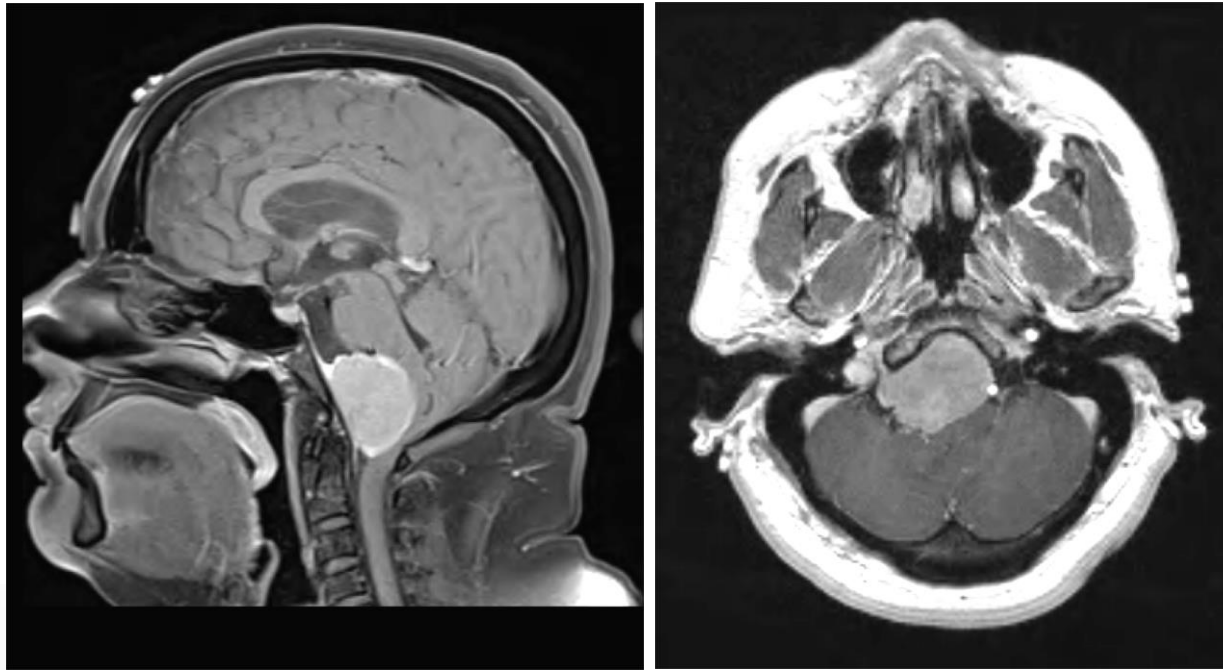
- 51-year-old left-handed female who presents with 1-2 months of increasing paresthesias and weakness in her right hand and forearm, headaches, and an increasingly unstable gait.



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Case Illustration #4

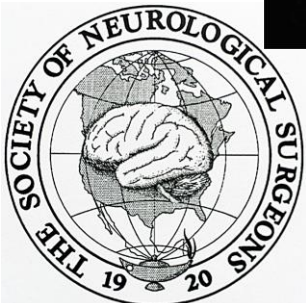
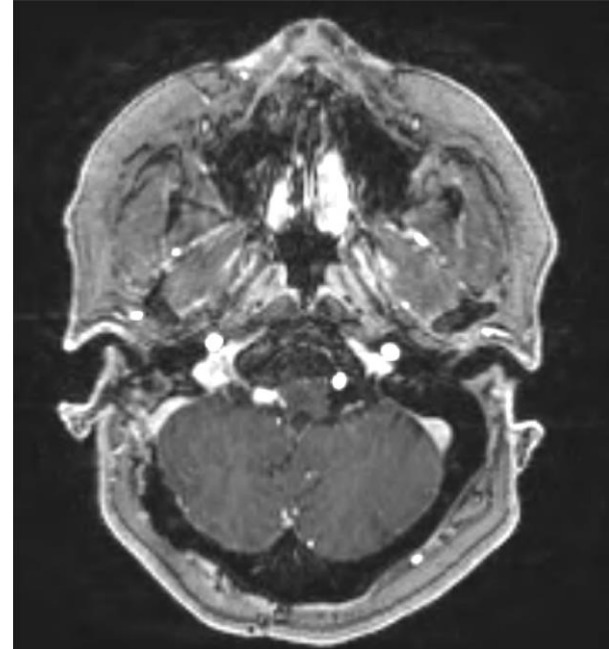
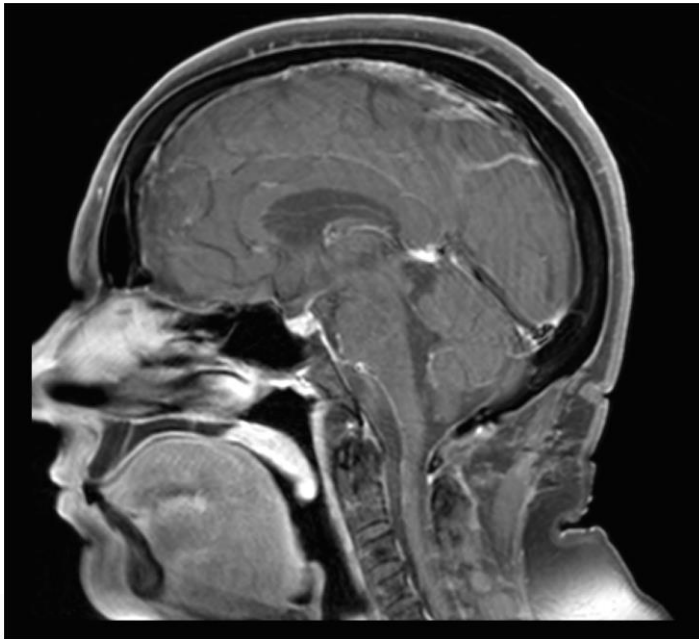
- MRI of the brain showed a large, extra-axial mass with an origin at the anterolateral dura of the lower clivus and foramen magnum. Severe lower brainstem and upper cervical spinal cord compression was noted.



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Case Illustration #4

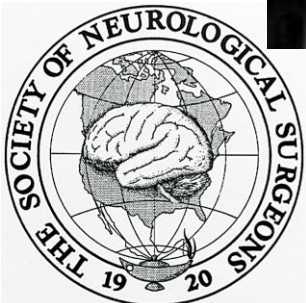
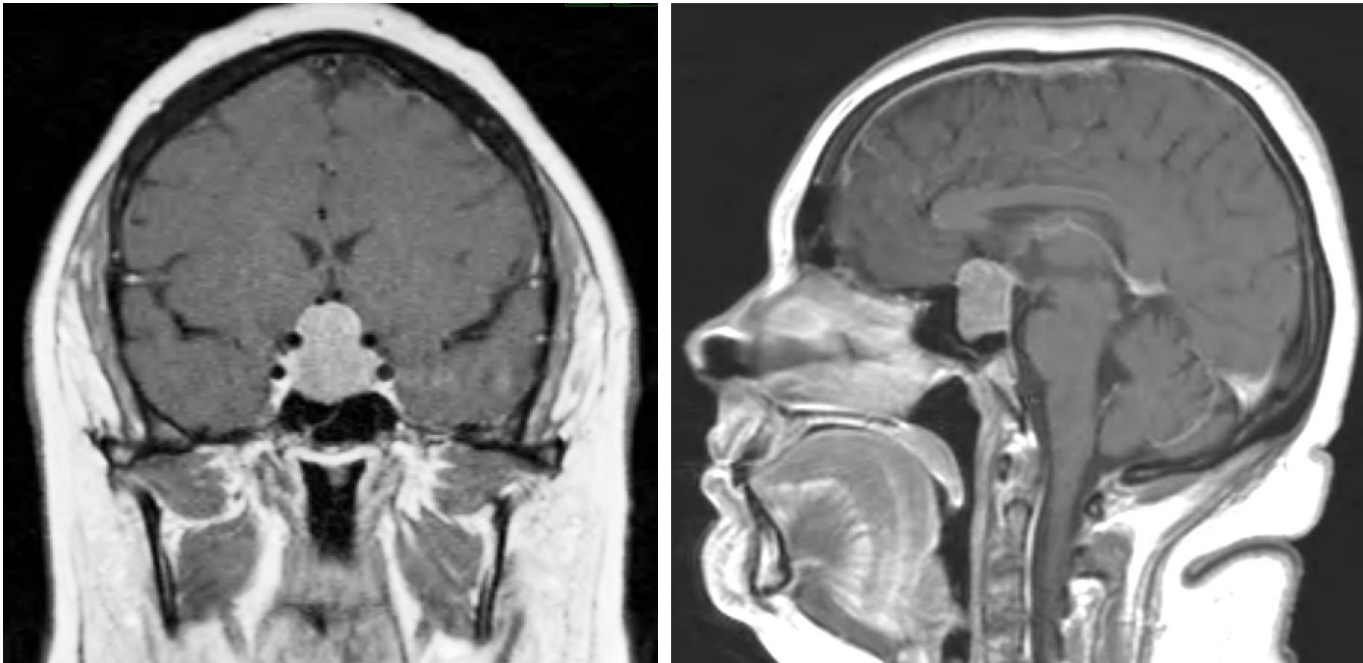
- A gross total resection was achieved through a far lateral approach, which includes a retrosigmoid craniotomy, C1 laminectomy, and partial right occipital condyle removal.
- Pathology revealed a grade 1 meningioma



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Case Illustration #5

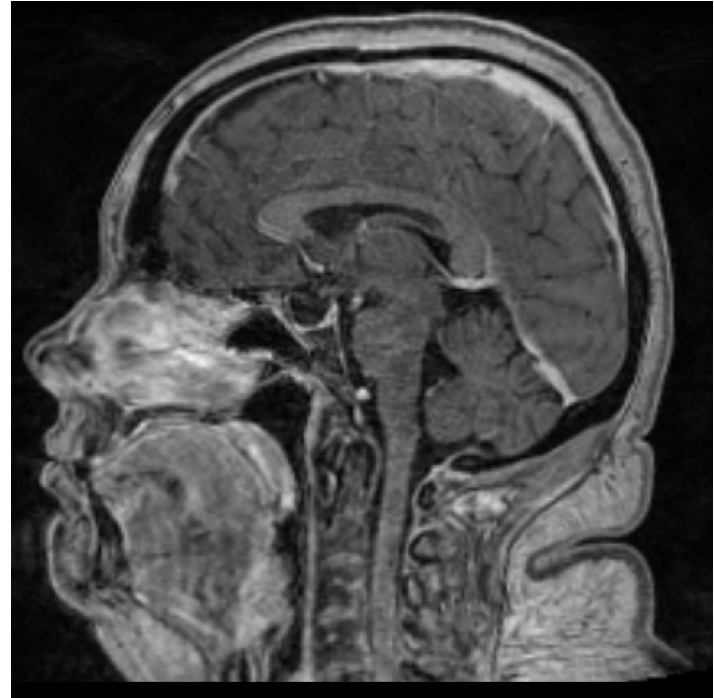
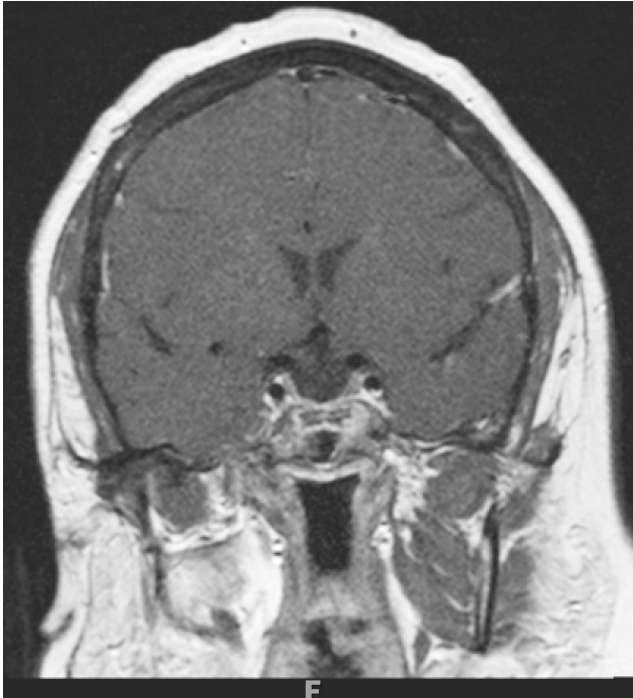
- 42-year-old right-handed female presents with progressive mild headaches and bitemporal hemianopsia. Pituitary hormone laboratories were within normal limits.



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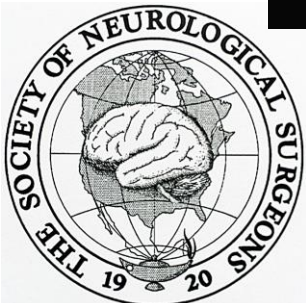
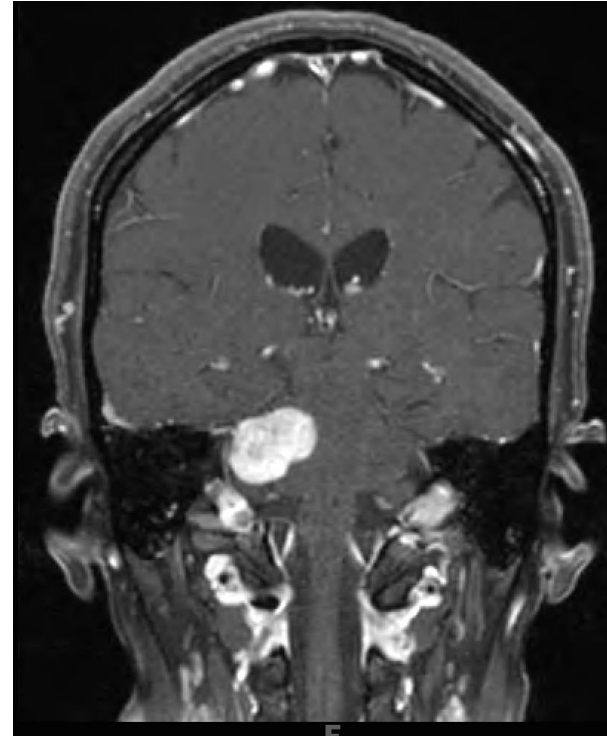
Case Illustration #5

- A gross total resection was achieved through an endonasal endoscopic transsphenoidal approach in collaboration with otolaryngology. Her visual field deficits improved completely, and she had no new hormonal deficits.
- Pathology revealed a typical pituitary adenoma.



Case Illustration #6

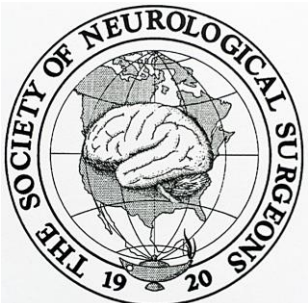
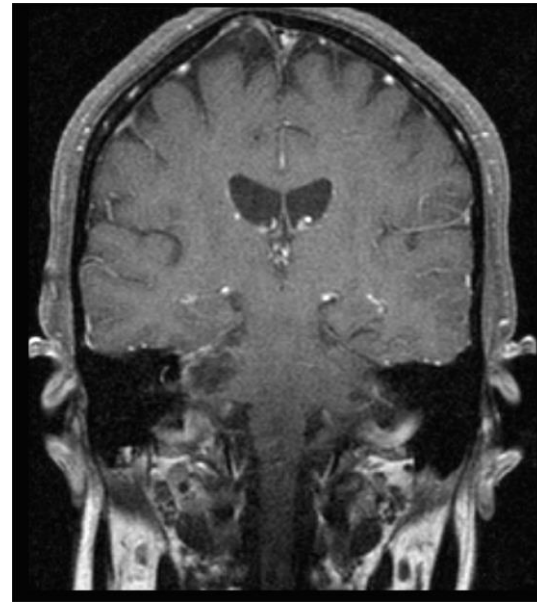
- 49-year-old right-handed female who had progressive hearing loss and a new headache, which prompted an MRI.



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Case Illustration #6

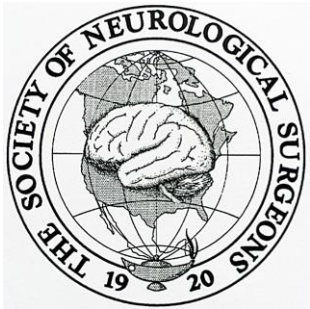
- A near gross total resection was achieved through a retrosigmoid approach with internal acoustic canal drilling by otolaryngology. A small amount of tumor adherent to facial nerve was left. The patient had a transient right facial nerve weakness (House Brackmann grade II), which improved to normal within 1 month.
- Pathology revealed a vestibular schwannoma.



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Subspecialization within Neuro-oncology and Skull Base Neurosurgery

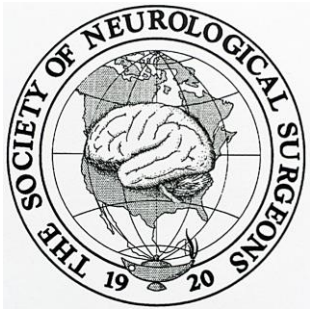
- Intra-axial tumors: gliomas, metastasis
- Meningiomas and skull base meningiomas in particular
- Skull Base pathologies from head and neck cancers.
- Neuro-endocrinology/neuro-endoscopy
- Vestibular schwannomas



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Conclusions

- Neuro-oncology is a fascinating field where more understanding of tumor development and treatment are required
- Skull base neurosurgery is a challenging and varied field that addresses tumors along the base of the skull



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