Anatomy

- Borders of cerebellopontine angle
- Internal auditory canal
- Compartments of CN VII and VIII
History

- Unilateral sensorineural hearing loss
- Sudden sensorineural hearing loss
- Unilateral tinnitus
- Vestibular symptoms
- Facial hypesthesia and weakness
- Diplopia
- Hoarseness, dysphagia, aspiration
Physical Examination

- Thorough cranial nerve exam
- Extra-ocular movements
- Funduscopic exam
- Facial motor and sensory function
- Pneumatic otoscopy/Weber/Rinne
- Hitselberger’s sign
- Gag/TVC/SCM and trapezius
Diagnostic Tests

- Pure tone and speech discrimination audiometry
  - Rollover
- Impedance audiometry
  - acoustic reflex
  - tone decay
- Auditory brainstem evoked response (ABR)
- Vestibular testing (ENG)
Radiographic Studies

- CT
- MRI
Acoustic Neuroma

- Benign slow growing tumors from Schwann cells surrounding CN VIII
- 10% of the intracranial tumors and >90% of the CPA tumors
- Incidence 0.1 to 2.5 per 100,000
- Associated with neurofibromatosis
- Rate of growth 0.2 to 4.0 mm per year
Acoustic Neuroma
Radiographic Image

- Centered on IAC, spherical, enlarge the medial IAC, acute bone-tumor angle
- CT: isodense and enhances with contrast
- Inhomogeneous due to cystic degeneration or intratumoral hemorrhaging
- MRI: isointense or hypointense on T1 and T2, but becomes markedly enhanced on T1-gadolinium
Acoustic Neuroma
Rationale of Management

• Observation
• Surgery for small intracanalicular tumors
• Surgery for medium-sized tumors (1-3 cm)
• Surgery for only-hearing ear
• Surgery for bilateral acoustic neuromas (Neurofibromatosis-type II)
Meningiomas

- 15% of intracranial tumors and 3% of CPA tumors
- Arise from cells lining the arachnoid villa
- Benign and do not metastasize, but locally aggressive because they invade bone
- Signs and symptoms referable to site of involvement
Meningioma

Radiographic Image

• Eccentric to IAC hyperostosis at medial IAC
• Hemispherical and sessile with obtuse bone-tumor angle
• CT: hypodense with calcification with marked enhancement; homogeneous
• MRI: isointense/hypointense on T1, but only moderate enhancement on T1-gad
Meningiomas

• Several histologic subtypes
  – syncytial
  – transitional
  – fibrous
  – angioblastic
  – sarcomatous

• Surgical excision with removal of underlying bone
Hemangioma

- Hamartomatous vascular malformations
- Arise from geniculate ganglion or at the IAC
- Closely associated with the facial nerve
- MRI: hyperintense on T2
- CT: intratumoral bone spicules and “honeycomb” pattern of surrounding bone
- Treatment is surgical excision
Other CPA lesions

- Facial nerve schwannoma
- Cholesteatoma (epidermoid)
- Lipoma
- Arachnoid cyst
Translabyrinthine

• Advantages
  – No retraction of cerebellum
  – Allows good identification of CN VII
  – Allows good exposure of IAC
  – Less risk of CSF leak

• Disadvantages
  – Hearing is sacrificed

• Technique
Middle Fossa Approach

• Advantages
  – Excellent for intracanalicular tumors, especially at the lateral end of the IAC
  – Hearing preservation is possible
  – Extradural with low risk of CSF leak

• Disadvantages
  – Lack of access to CPA and posterior fossa
  – Need to retract temporal lobe

• Technique
Retrosigmoid/Suboccipital Approach

- **Advantages**
  - Hearing preservation is possible
  - Access to CPA

- **Disadvantages**
  - Limited access to lateral IAC/Fundus
  - Difficult to repairing or grafting CN VII
  - Increased risk of air embolism/CSF leak/post-op headache
  - Cerebellar retraction is necessary

- **Technique**