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Acoustic Neuroma: An Overview

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Moderator:
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**Acoustic Neuroma:
An Overview**

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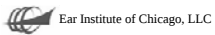
Jill Messina, AuD, CCC-A

Ear Institute of Chicago, LLC
Hinsdale/Chicago/Elk Grove Village, IL



Acoustic Neuroma

- Benign, intracranial tumor
- Slow-growing
- Originate: schwann cells of vestibular nerve
- "Vestibular schwannoma": most accurate term

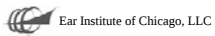


Acoustic Neuroma: Epidemiology

- 6 - 8% of intracranial tumors
- Incidence: 10[†] - 20^{*} / 1,000,000
- ~ 2,500 - 3,500 new cases/year

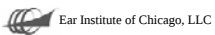
[†]Nestor JJ, et al. Arch Otolaryngol Head Neck Surg 1988; 114:680.

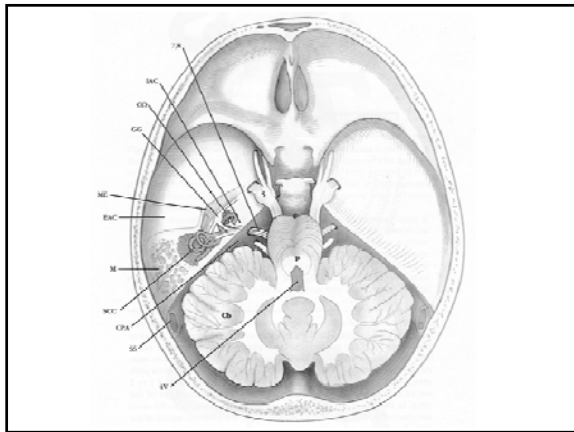
^{*}Stangerup SE, et al. J Laryngol Otol 2004;118:622-7.

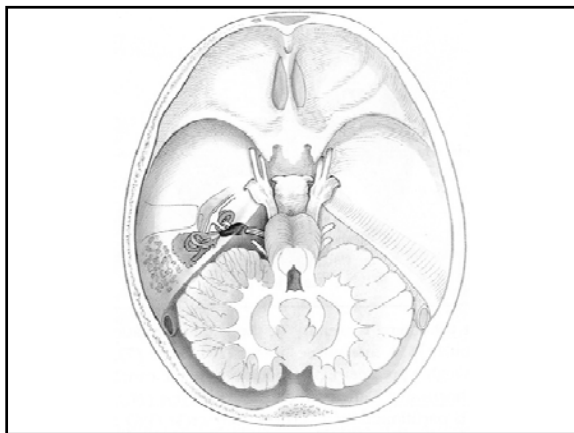


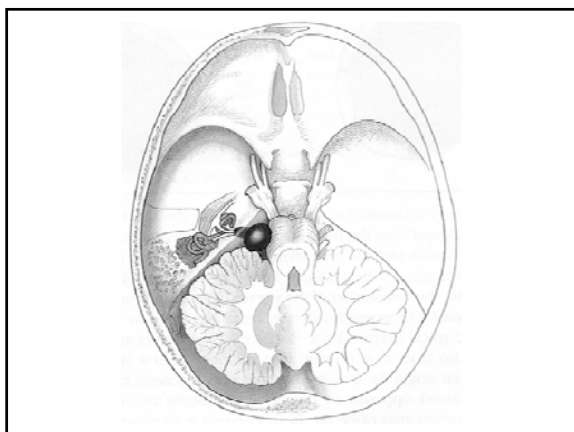
Acoustic Neuroma: Types

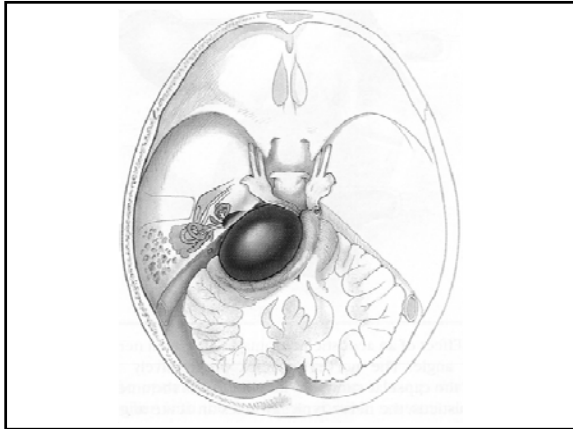
- Two Forms
 - Sporadic: 95%
 - Neurofibromatosis 2 (NF2): 5%











Acoustic Neuroma: Symptoms

- Unilateral sensorineural hearing loss > 95%
- Unilateral tinnitus
- Dysequilibrium 50%
- Facial Anesthesia ~ 5 - 20%
- Vertigo 19%
- Facial twitching/weakness < 5%
- Headache



Acoustic Neuroma: Diagnosis

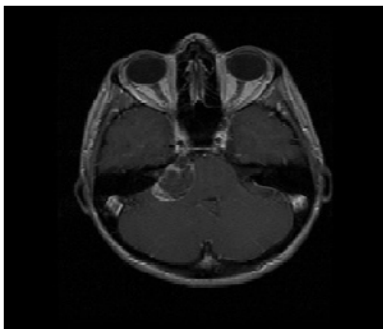
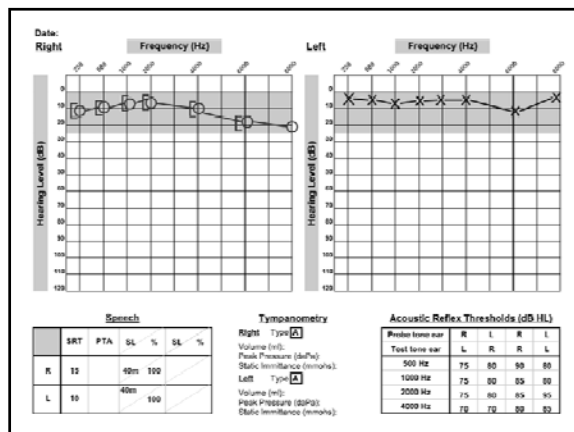
- Audiogram: screening
- ABR: screening
- MRI Brain/Internal Auditory Canal with gadolinium



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Acoustic Neuroma: Hearing Loss

- History
 - 90%: Slowly progressive sensorineural hearing loss
 - ~10%: Sudden, SNHL
- Type of Hearing Loss
 - ~2/3: High-frequency SNHL
 - 1/3:
 - Low-frequency SNHL
 - Mid-frequency SNHL
 - Normal hearing



Acoustic Neuroma: Treatments

A. Observation (Serial radiologic evaluation)

- Relatively asymptomatic
- Age > 65 yrs

B. Stereotactic radiosurgery

- Elderly/Infir
- Tumor < 3cm
- Residual/Recurrent tumor
- Patient preference

C. Microsurgical removal

- All other cases



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Considerations for Management

- Patient's age
- Medical status
- Size of tumor
- Tumor related symptoms and signs
- Patient's reliability and attitude
- Tumor growth rate



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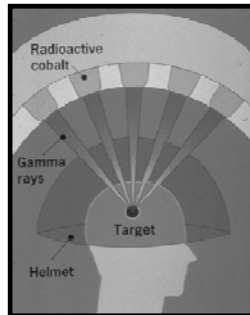
A. Observation: Risks

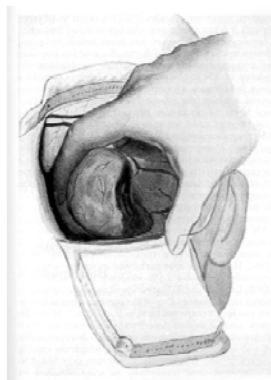
- Cranial nerve dysfunction
- Brainstem compression
- (Death)

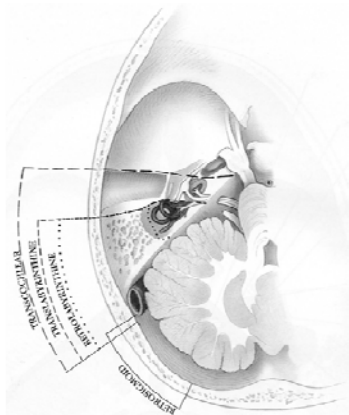


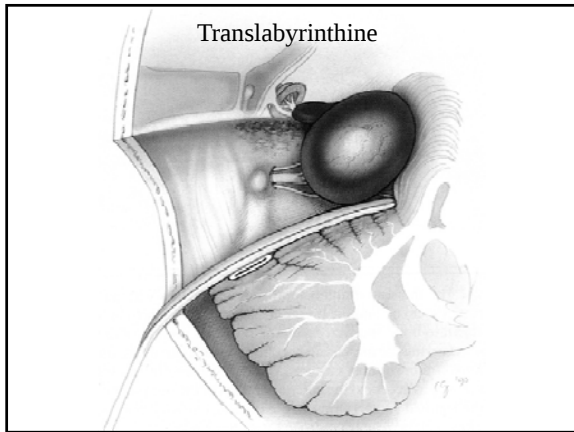
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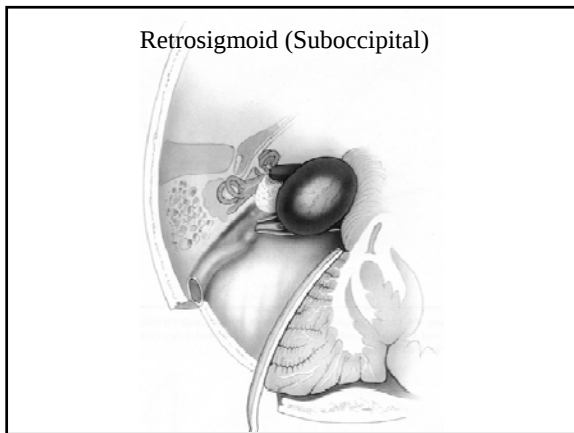
B. Stereotactic Radiosurgery

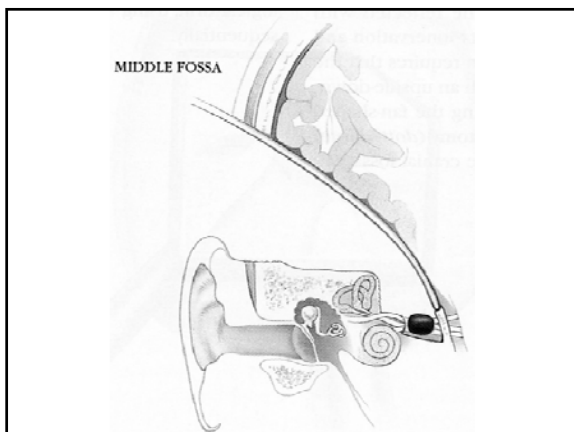






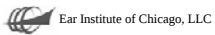






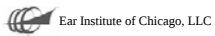
Microsurgical Approaches

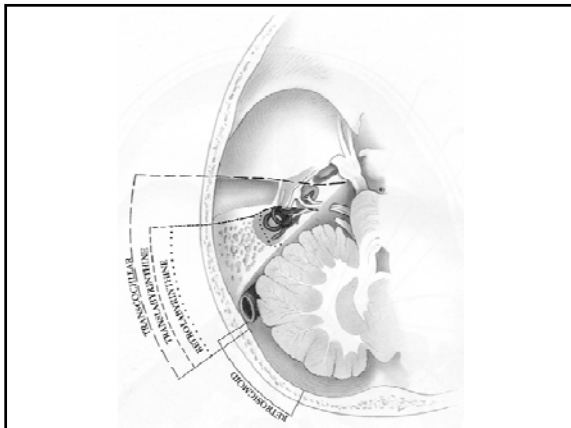
- Hearing Loss
 - Translabyrinthine
- Hearing Preservation (potential)
 - Middle Fossa
 - Retrosigmoid

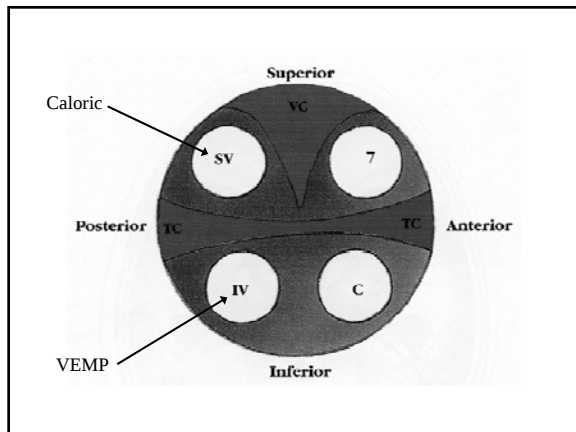


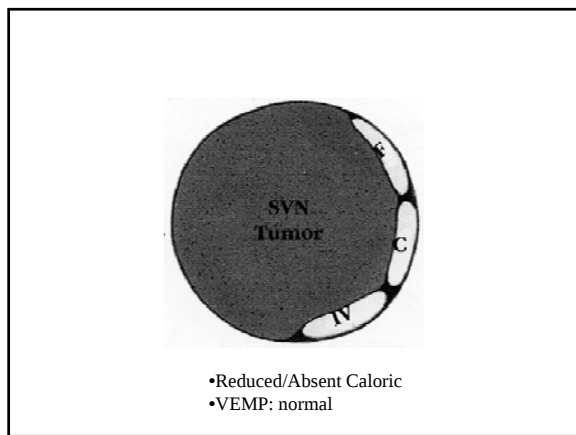
Surgery: Hearing Preservation Positive Prognostic Indicators

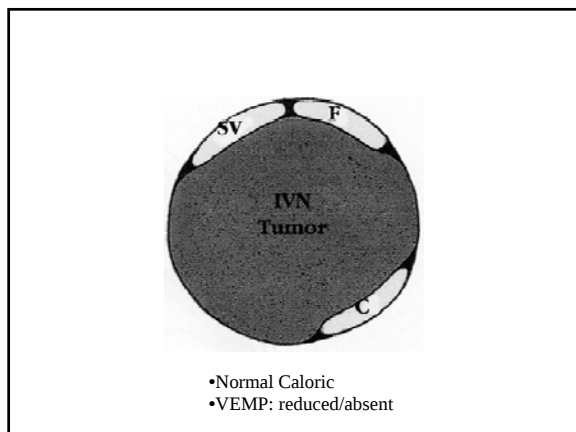
- Tumor: ≤ 1.5 cm
- Audiogram: <50 dB PTA/ $>50\%$ WRS
- ABR: Normal
- VNG caloric: Reduced
- VEMP: normal







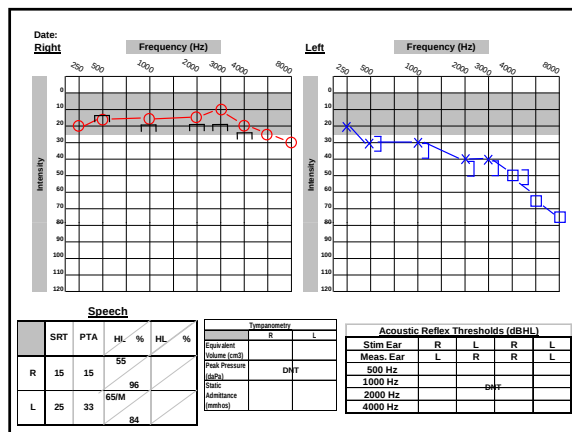




Conventional Audiometry

- Most common abnormality is an asymmetric high frequency hearing loss

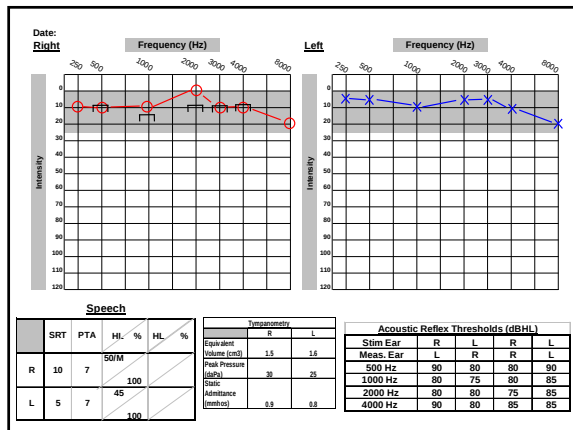




Conventional Audiometry

- Normal hearing or even symmetric hearing does NOT exclude an acoustic neuroma





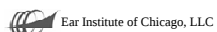
Audiometric Testing

- Acoustic Reflexes
- Speech Discrimination
 - Often worse than expected; rollover (decreased ability to understand words with increased volume)



ABR Testing For Acoustic Neuroma

- Less sensitive/less expensive than MRI
- Characteristic findings:
 - Wave I, no waves III or V
 - Delayed I-III latency
 - Delayed wave V latency
- High false-positive/false-negative rates (pts with small tumors can have normal ABR's)



ABR Testing, cont.

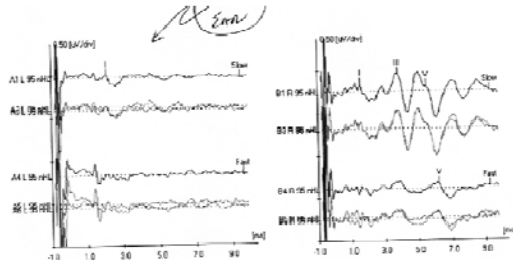
- Tumor Size: more predictive than location
 - > 1.5 cm : ABR = 92-98% accuracy
 - < 1.5 cm : ABR = 60-70% accuracy

Schmidt et.al (2001)



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ABR Testing, cont.



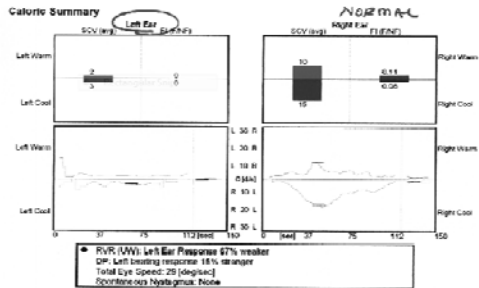
ENG/VNG Testing

- Most pt's with an AN have a unilateral caloric weakness (however, weakness could be from other causes)
- ENG/VNG not specific



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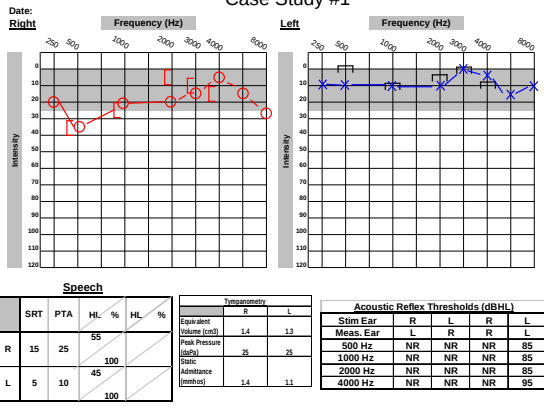
ENG/VNG Testing, cont.



VEMP testing

- VEMPs absent or decreased amplitude in approximately 80% of patients with vestibular schwannoma (Murofushi et. al., 1998)
- Sacculle innervated by inferior vestibular nerve

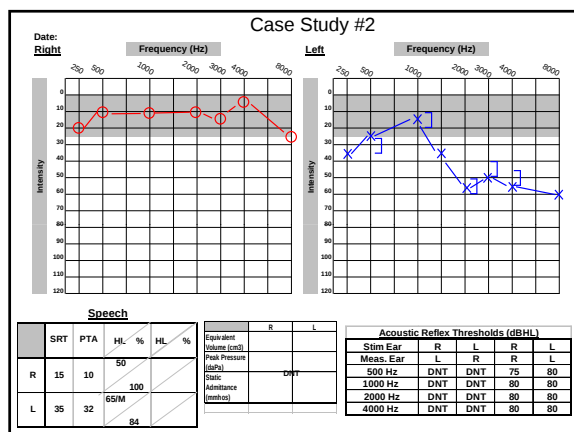
Case Study #1



Case Study #2

- 59 y.o. male
- Left-sided tinnitus, hearing loss (5 year history), and vertigo
- MRI showed intracanalicular small acoustic neuroma (1.1 cm mass)



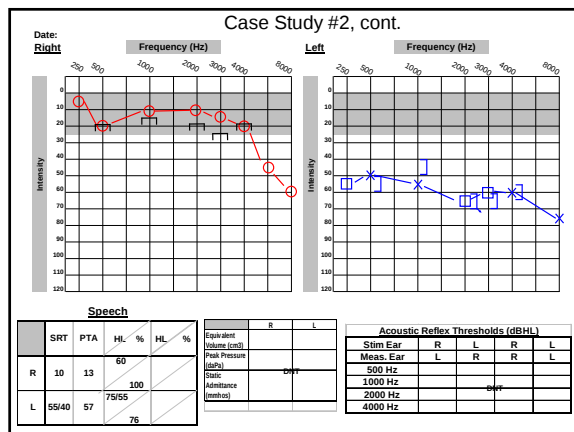


Case Study #2, cont.

- ABR: Abnormal (prolonged latencies)
- VNG: Normal
- Retrosigmoid craniotomy and removal of the acoustic tumor with attempted preservation of the seventh and cochlear division of the eighth nerve



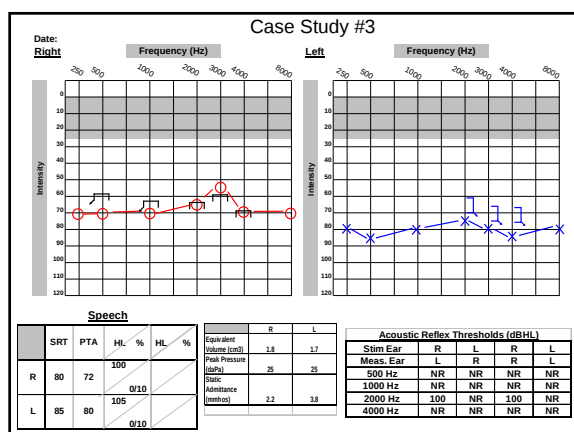
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Case Study #3

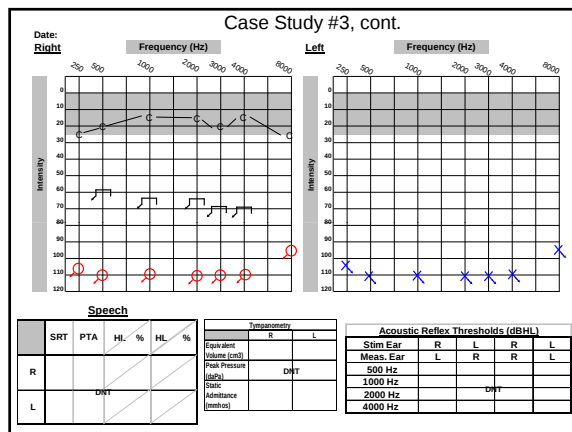
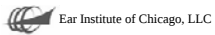
- 58 y.o. female
- Sudden right hearing loss, tinnitus, and dizziness
- Similar incident on left side 20 years ago

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Case Study #3, cont.

- MRI revealed 4 x 6.5 mm acoustic neuroma on the LEFT side
- Patient underwent translabyrinthine removal of LEFT acoustic neuroma
- Two months later patient was implanted with cochlear implant on RIGHT side



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