MICHIGAN MEDICINE
UNIVERSITY OF MICHIGAN

DEPARTMENT OF
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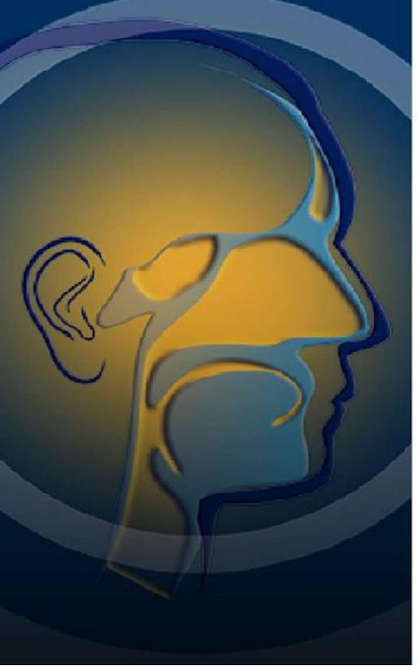
HEAD AND NECK
SURGERY



Superior Semicircular Canal Dehiscence: Symptoms, Audiometry, Nerve Monitoring During Surgical Repair

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What is SSCD?

In SSCD, a small opening / dehiscence exists of the dome of the superior semicircular canal facing the dura of the middle cranial fossa often resulting in changes in vestibular pressures.

Symptoms of SSCD include vertigo, dizziness with loud sounds (Tullio phenomenon), pulsatile tinnitus, autophony (from increased bone conduction) loudness discomfort, aural fullness, nystagmus with pressure changes (Hennebert sign).

What is SSCD?

Cause(s)

The exact cause of SSCD is unknown, but it may be related to head trauma, bone thinning, congenital factors, obesity.

SSCD is a relatively rare condition, prevalence ~1-2% of the population, increasing if dehiscenses of cochlear, facial nerve are included (so-called Third Window Dehiscence Syndrome).

What is SSCD?

SSCD is diagnosed with physical exam, thorough hearing test (more in a moment), and imaging studies such as a CT scan or MRI.

Treatment for SSCD typically involves surgery to repair the dehiscence. In some cases, medication may be used to manage symptoms.

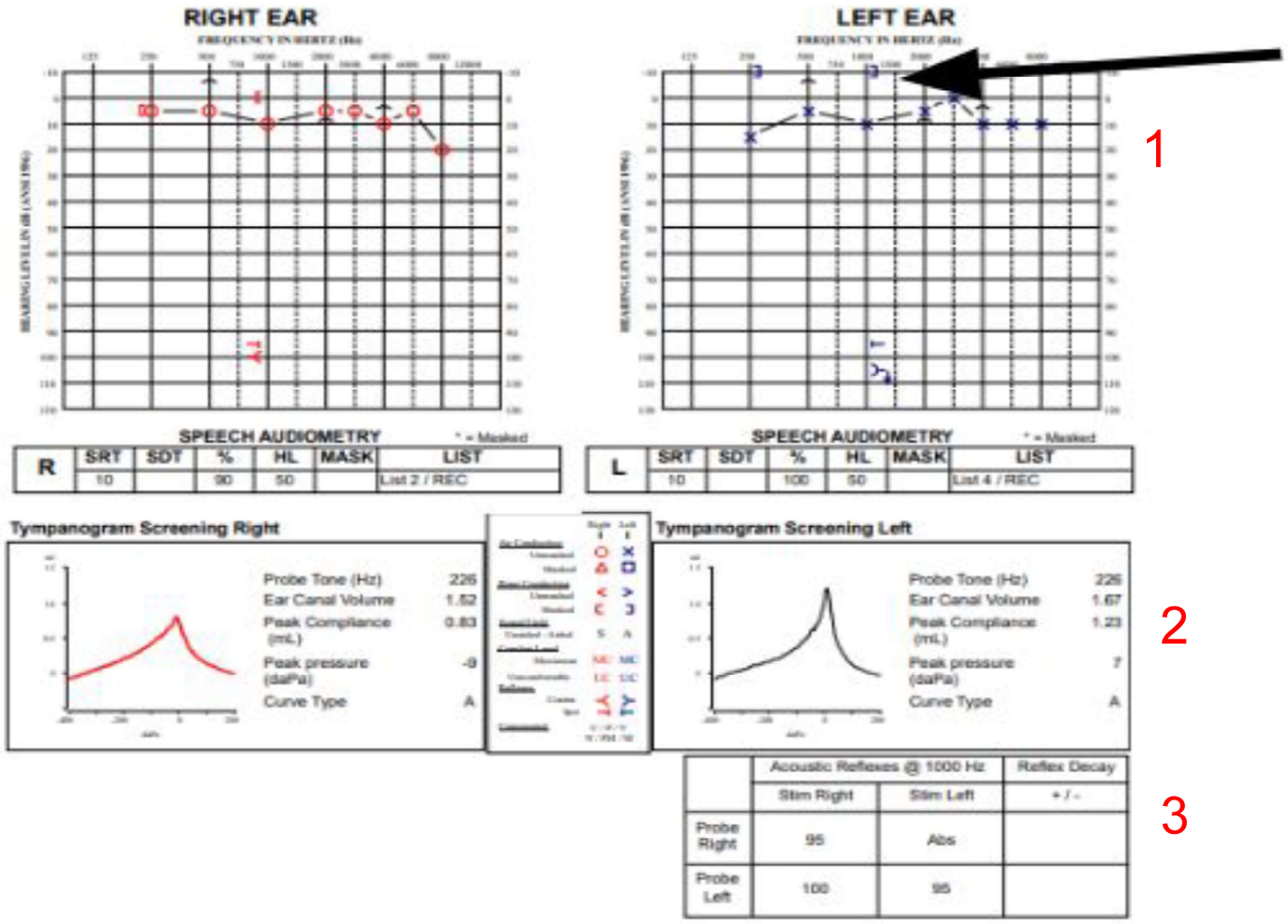
Overview of index patient

- 28 year old female

- Symptoms:
  - Feeling of body tilting when singing
  - Her voice reverberates in left ear only
  - No pulsatile tinnitus

- CT scan: Dehiscent bone over both superior semicircular canals

Audiogram of index patient with SSCD



Note: Better than 0 dB masked bone conduction thresholds. A hallmark audiogram sign of third window pathology, such as superior semicircular canal dehisence

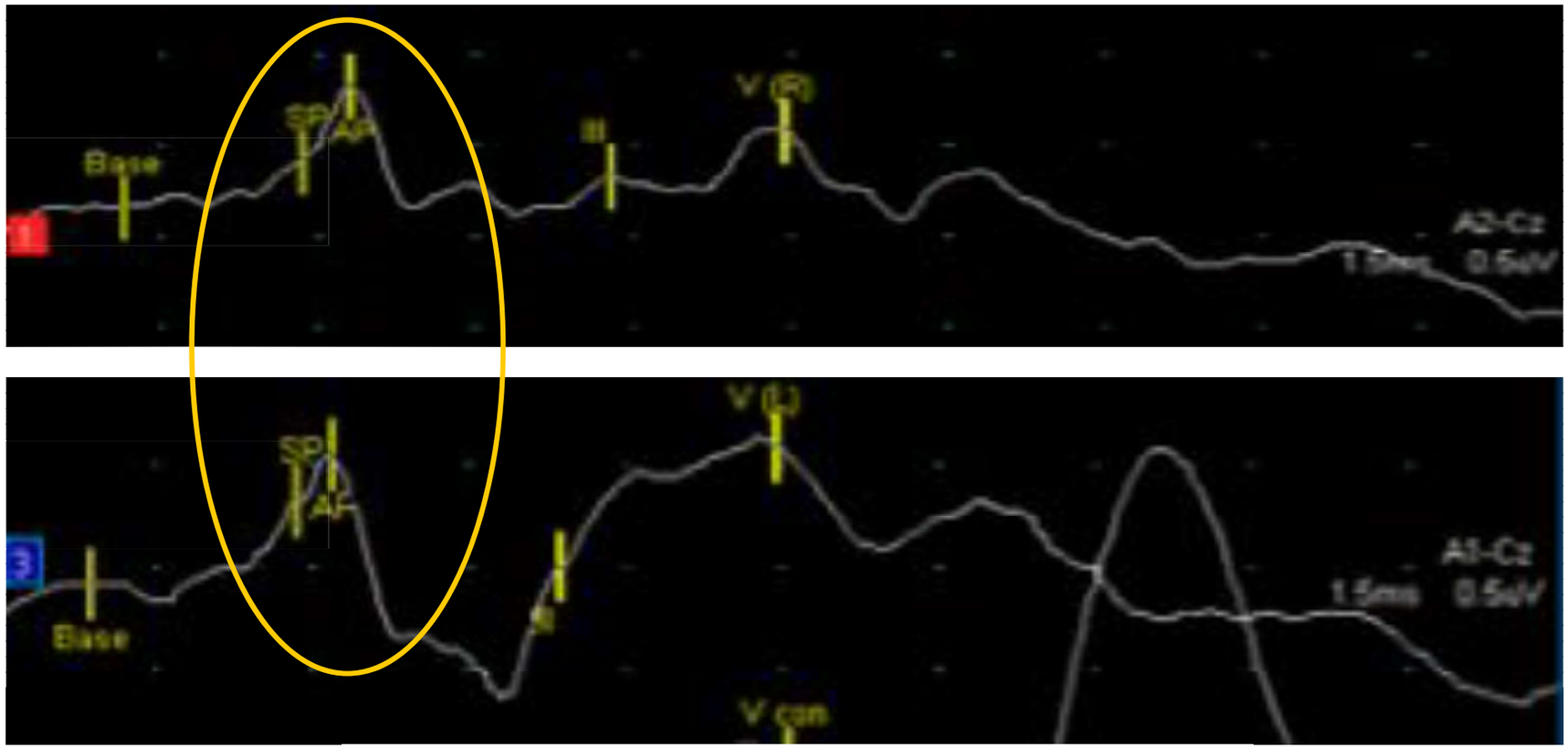
Examples of Poschl, Stenver views of superior canal dehiscence using high resolution CT

@ www.sciencedirect.com/science/article/pii/S2468548818302212

Pre-Operative ECochG of index patient

Right ear

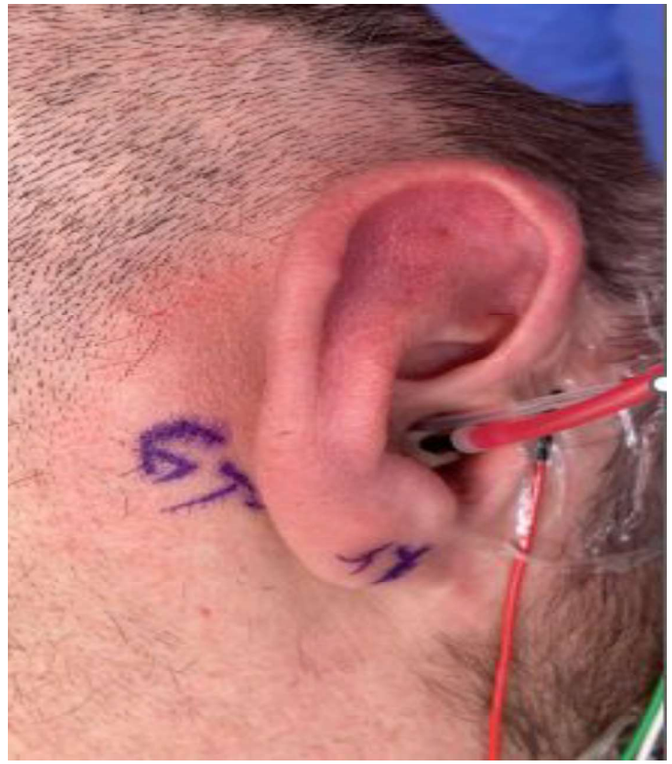
Left ear



SP/AP ratio borderline normal on right (0.39)
and abnormally elevated on left (0.65)

ECochG in the OR

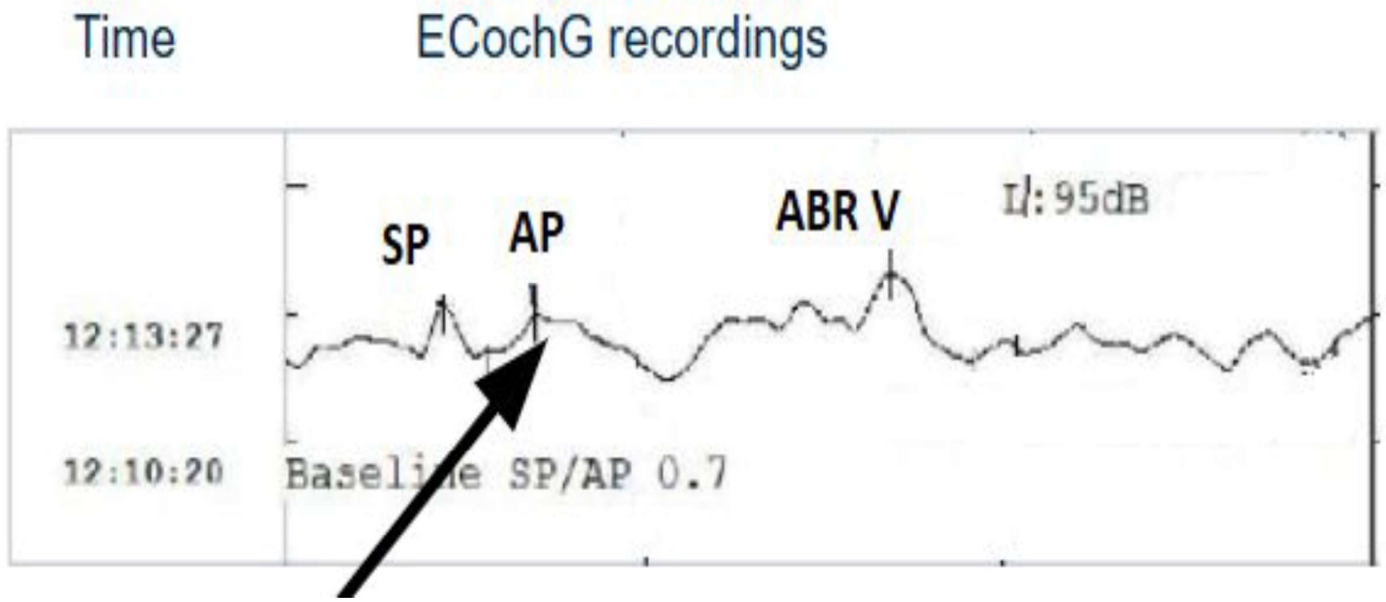
- To record ECochG, we use a Lilly Wick electrode, situated against the tympanic membrane
- An insert earphone and cotton help to secure the electrode
- Use of a TM electrode allows us to get closer to generator (distal cranial nerve VIII) for larger Wave I / AP - action potential of ABR



Preparation for ECochG in the OR: Lilly Wick electrode, insert earphone secured in the ear canal, cotton and tape placed to close off canal

Baseline OR ECochG SP/AP ratio = 0.7

Note: This was a challenging case to monitor due to a lot of electrical noise interference!

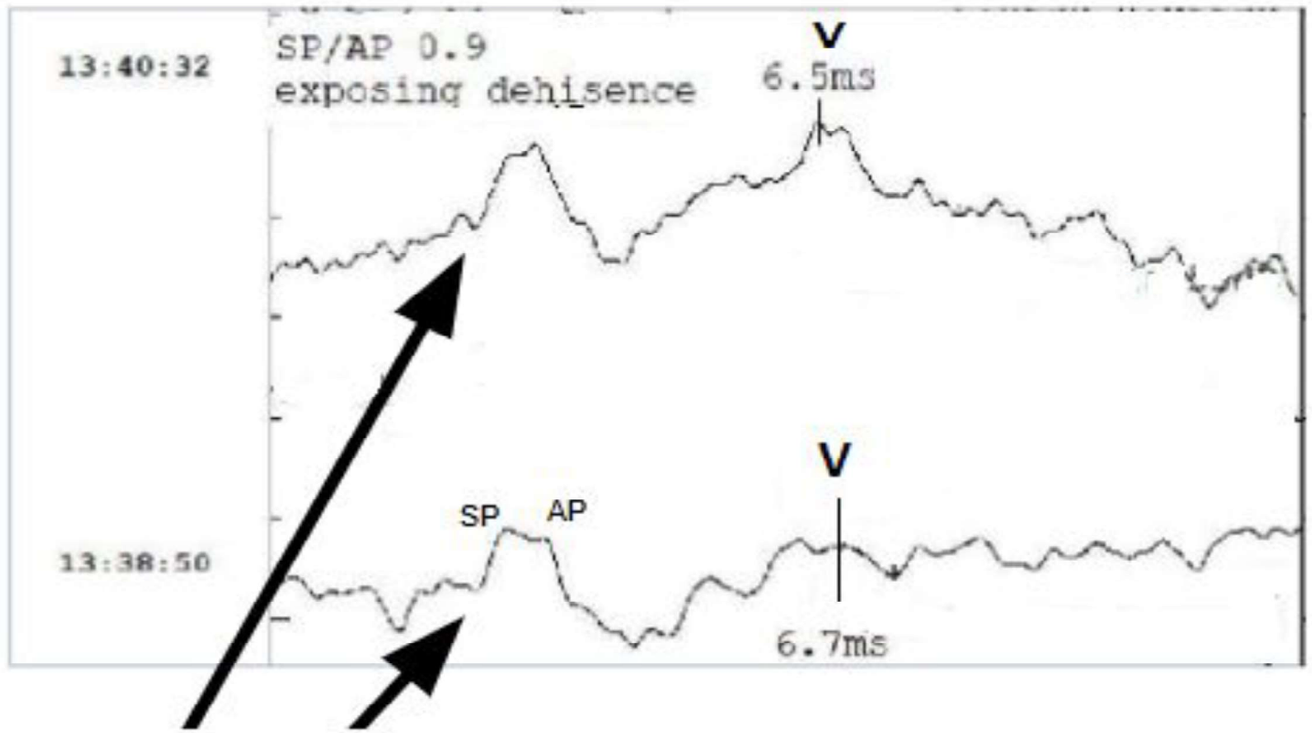


Exposing dehiscence

SP/AP ratio = 0.9

When the dehiscence is exposed and widened, it is common to see the SP/AP ratio increased (sometimes even greater than 1.0)!

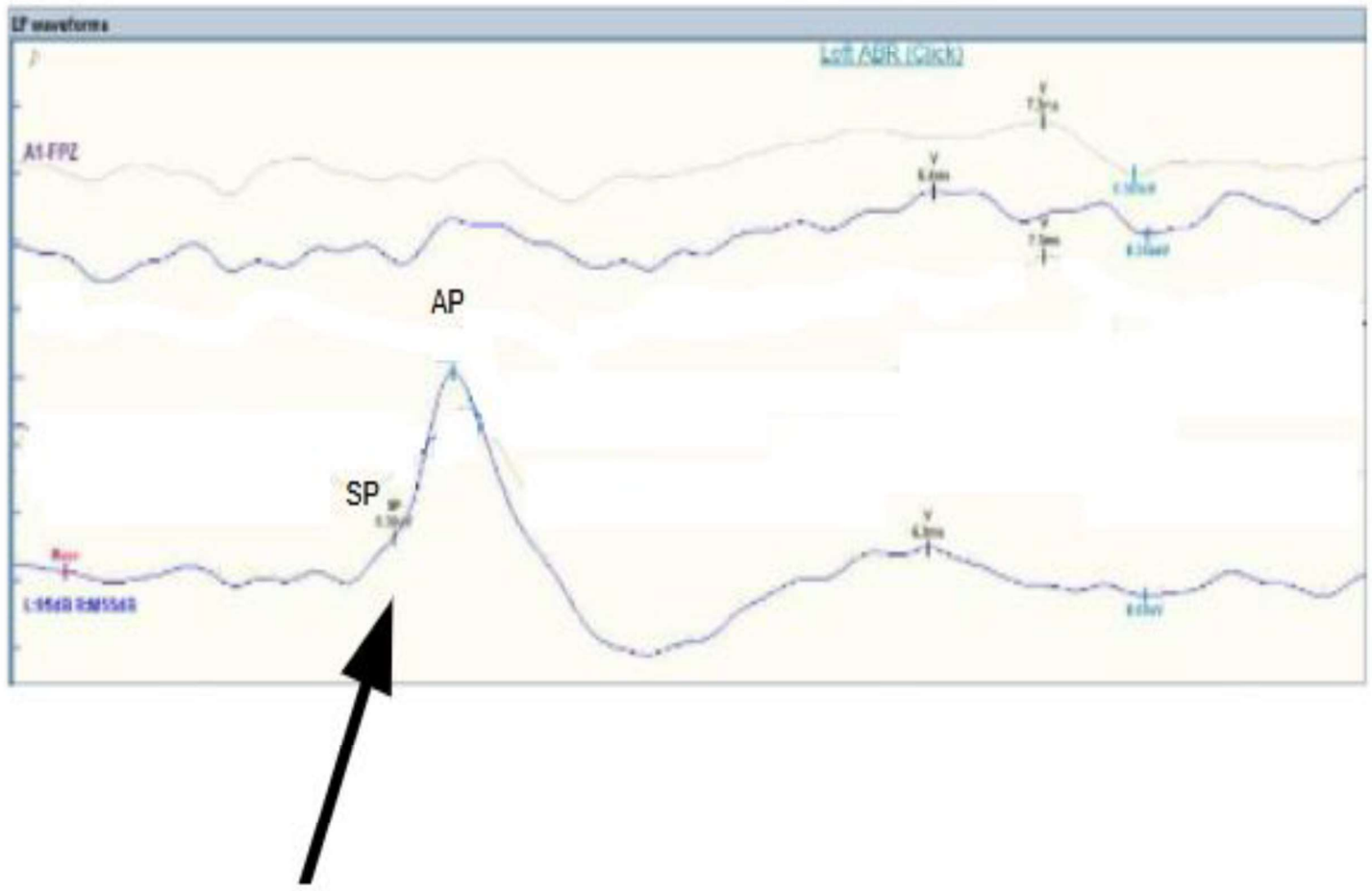
Time ECochG recordings



Plugged canal, end of surgical case:

SP/AP ratio = 0.2

It became challenging to differentiate
SP from AP. The display window was changed and elongated to better view SP.



Case Wrap Up

- SP/AP ratio remained stable at 0.2 during closure
- Case represents a classic ECochG pattern during canal dehiscence repairs:
  1. Baseline: Elevated SP/AP ratio
  2. Exposing canal dehiscence: Increased SP/AP ratio
  3. Canal plugged/repaired: Normalized SP/AP ratio

- Post-Op Symptoms:
  - No imbalance, but using walker outside of house 2 weeks post-op
  - No autophony, own voice pleasant
  - Postoperative audiogram awaits, patient has no complaints of hearing loss

References

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Thank you