

## Unilateral vestibular loss and fluctuating vestibular disorders

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## Unilateral disorders

- Vestibular neuritis
- Meniere's disease
- Acoustic Neuroma
- Vestibular Paroxysmia

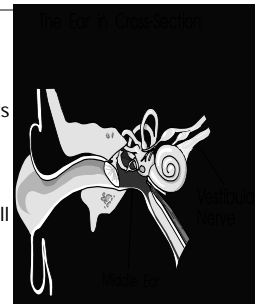
## Vestibular Neuritis: Case

56 y/o woman began to become dizzy after lunch. Dizziness increased over hours, and consisted of a spinning "merri-go-round" sensation, combined with unsteadiness.

Vomiting ensued 2 hours later, and she was brought by family members to the ER.

## Vestibular Neuritis

- Viral infection of vestibular nerve or ganglion (Herpes).
- Disability typically lasts 2 weeks.
- Typically affects the superior division of 8
- These patients can still get BPPV (inferior division of 8)!



## Menieres Disease

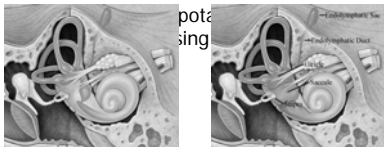
- GG is a 34 y/o male who developed fluctuating SNHL on the left 3 yrs ago and now has vertiginous spells three times a week that necessitate his leaving work. Work-up has been negative and has been treated with a low salt diet and a diuretic over the past 2 yrs, yet symptoms have progressed. Hearing in the left ear is good (SRT 20, SD 100%) and excellent on the right (SRT 0, SD 100%).

## Meniere's disease

- Prosper Meniere 1861
- Disorder of the membranous labyrinth that consists of:
  - Fluctuating SNHL
  - Episodic Vertigo
  - Fluctuating Tinnitus
  - Aural Fullness

## Etiology dogma

- Meniere's disease is caused by dilation and episodic rupture of inner ear membranes (Endolymphatic Hydrops)
- As endolymph volume and pressure increases, the utricular/saccular and Reissner's membranes



## Menieres: a common and chronic ear condition

- 0.2% of US (Wladislavosky et al, 1984).
- 2% THINK they have Menieres (Mosciki, 1985)
- Spontaneous cure is rare
- 30-50% will become bilateral within 10 years of onset
- Avg. attack lasts 2-3 hours

## Diagnosis - clinical

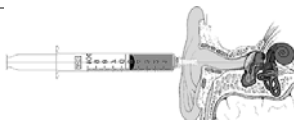
- Fluctuating SNHL, Vertigo, Tinnitus, Fullness
- "Cochlear M.D." - SNHL with tinnitus
- "Vestibular M.D." - Vertigo with fullness (?)
- "Lermoyez Syndrome" - 1919, Increasing tinnitus, SNHL and fullness that is relieved after attack of vertigo.

## Tumarkin Crisis

- "Crisis of Tumarkin" - 1936, Advanced phenomenon in 2% of pts. Drop attack, no LOC, no vertigo, "abrupt otolith input."



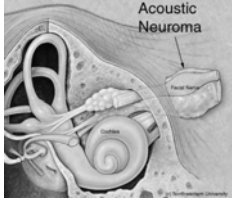
## Gentamicin Treatment



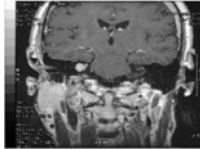
- Very effective treatment
- May create a unilateral vestibular loss or paresis

## Diagnosis - testing

- Bedside
  - During attack: Strong spontaneous nystagmus
  - Between attack's, weak spontaneous or no spontaneous, minor positional nystagmus
  - After gentamicin - strong vibration induced nystagmus
- Electronystagmography
  - Not diagnostic - main role is to look for alternative diagnoses such as BPPV or vestibular neuritis/labyrinthitis, which are more common
  - Variable nystagmus, spontaneous nystagmus is usually "Paretic" (Away from affected ear)

	<b>Acoustic Neuroma</b>
<ul style="list-style-type: none"> <li>■ Rare source of unilateral loss</li> <li>■ Starts with irritable nerve</li> <li>■ Progresses to dead nerve</li> <li>■ Long course</li> </ul>	

	<b>Acoustic Neuroma -- Bedside</b>
	<ul style="list-style-type: none"> <li>■ Unilateral hearing loss – not 100%</li> <li>■ Spontaneous nystagmus – gradually is lost over time</li> <li>■ Vibration induced nystagmus – works very nicely !</li> <li>■ Hyperventilation induced nystagmus – see later section</li> <li>■ Head-shaking nystagmus – can be very brief, may miss it.</li> </ul>

	<b>Acoustic on ENG</b>
<ul style="list-style-type: none"> <li>■ Unilateral weakness</li> <li>■ Spontaneous nystagmus</li> </ul> <p>Ultimately dx is made from MRI</p>	

	<b>Vestibular Nerve Hyperexcitability</b>
	<b>Vestibular Neuralgia</b> <b>Microvascular compression</b> <b>Vestibular paroxysmia</b> <b>Quick spins</b>

	<b>Case</b>
	<ul style="list-style-type: none"> <li>■ A 49-year-old female had had multiple daily brief spells of vertigo. She termed these symptoms a “zap” inside of her head. Her symptoms were not affected by position.</li> <li>■ Brain MRI, EEG, ENG and audiometry were normal.</li> <li>■ She had a spell while wearing the video Frenzel goggles. She cried out and her eyes vibrated for 1/3 second.</li> <li>■ Oxcarbazepine 300 mg TID reduced the frequency and intensity of her symptoms.</li> </ul>

	<b>Vestibular nerve hyperexcitability</b>
	<ul style="list-style-type: none"> <li>■ Many brief spinning spells/day</li> <li>■ Respond to anticonvulsants</li> </ul>


	<b>Bedside</b>
	<ul style="list-style-type: none"> <li>■ Spontaneous nystagmus (usually paretic)</li> <li>■ May reverse with hyperventilation</li> </ul>

	<b>Pathophysiology</b>
	<ul style="list-style-type: none"> <li>■ Irritable vestibular nerve <ul style="list-style-type: none"> <li>– Previous 8<sup>th</sup> nerve surgery (delayed)</li> <li>– Previous vestibular neuritis (Herpes)</li> <li>– Microvascular compression</li> </ul> </li> </ul> <p>Moon I, Hain TC Delayed Quick Spins following Vestibular Nerve Section Respond to Anticonvulsant Medication. Otol Neurotol 26:82-85 (2005)</p>

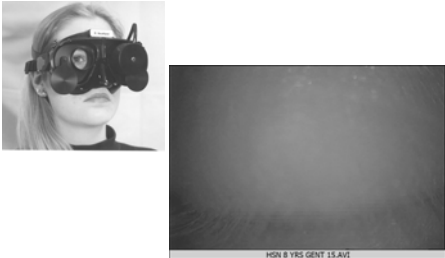
	<b>ENG findings are nonspecific</b>
	<ul style="list-style-type: none"> <li>■ Usually largely normal</li> <li>■ Spontaneous nystagmus</li> </ul> <p>Ultimately diagnosis is made from response to medication</p>


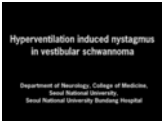
	<b>Bedside testing for unilateral vestibular loss</b>
	<ul style="list-style-type: none"> <li>■ Spontaneous Nystagmus</li> <li>■ Vibration</li> <li>■ Head-thrust</li> <li>■ Head-shake</li> <li>■ Hyperventilation</li> <li>■ Positional</li> </ul>

	<b>Bedside testing for unilateral vestibular loss</b>
Spontaneous Vibration Head thrust Head shake HVT Positional	  <p>Strong R beating nystagmus</p>

	<b>Bedside testing for unilateral vestibular loss</b>
Spontaneous <b>Vibration</b> Head thrust Head shake HVT Positional	  <p>No vibration</p> <p>vibration menieres left gent mz.avi</p>

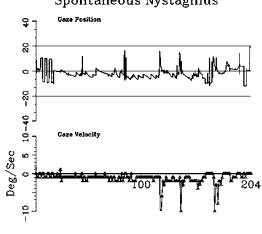
	<h2>Bedside testing for unilateral vestibular loss</h2>
Spontaneous Vibration <b>Head thrust</b> Head shake HVT Positional	

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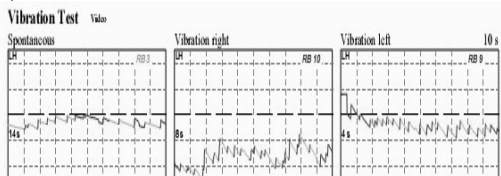
	<h2>Bedside testing for unilateral vestibular loss</h2>
Spontaneous Vibration Head thrust Head shake HVT <b>Positional</b>	<ul style="list-style-type: none"> <li>■ Many patients have a modest parietic horizontal nystagmus, elicited by positional testing.</li> <li>■ It is never symptomatic and has no diagnostic utility</li> </ul>

	<h2>ENG testing in Unilateral Vestibular lesions</h2>
	<ul style="list-style-type: none"> <li>■ Spontaneous Nystagmus</li> <li>■ Vibration</li> <li>■ Head-thrust</li> <li>■ Head-shake</li> <li>■ Hyperventilation</li> <li>■ Positional</li> </ul>

	<h2>ENG testing in Unilateral Vestibular lesions</h2>
Spontaneous Vibration Head shake Caloric testing Rotatory Chair	<p>Spontaneous Nystagmus</p> 

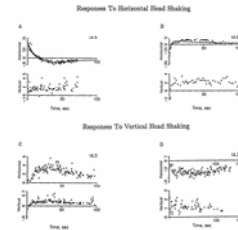
## ENG testing in Unilateral Vestibular lesions

Spontaneous  
Vibration  
Head shake  
Caloric testing  
Rotatory Chair



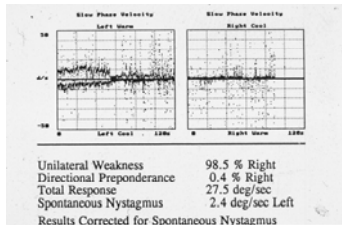
## ENG testing in Unilateral Vestibular lesions

Spontaneous  
Vibration  
Head shake  
Caloric testing  
Rotatory Chair



## ENG testing in Unilateral Vestibular lesions

Spontaneous  
Vibration  
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Rotatory Chair

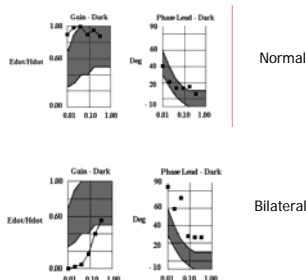


## Caloric diagnostic criteria for UL (Chicago Dizziness and Balance)

	Normal	U-weak	BL
RVR	Normal <25	25-100 Has ice	90-100 No ice
Total Resp	> 19	> 19	<= 19

## Rotatory Chair testing can sort patients into 3 groups

- Normal
- Unilateral
- Bilateral



## Rotatory Chair criteria for Unilateral Loss

	Normal	UL	BL
Gain	Normal (> 0.7)	Reduced at low freq.	Greatly reduced (< 0.4)
Phase	Normal, Tc of 15	Lead, Tc of 7-10	Lead or no data, Tc < 7

	<b>Summary</b>
	<ul style="list-style-type: none"><li>■ There is a large repertoire of tests for Unilateral Vestibular Loss</li><li>■ Combining these together, it is usually easy to diagnose loss of lateral canal function.</li></ul>