

Vertigo and Hearing Loss -- Could it be Menieres Disease?

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Case CB

A 71 year old man began having spells of vertigo accompanied by nausea and vomiting, a roaring sound in one ear and a plugged sensation. One spell lasting 7 hours occurred while he was on a small boat in Lake Michigan- he was unable to navigate the boat for hours.

A diagnosis of Meniere's disease was made

Lecture Goals

- n 1. What is Meniere's disease
- n 2. How common is it ?
- n 3. How is Meniere's disease diagnosed ?
- n 4. How is Meniere's disease treated ?

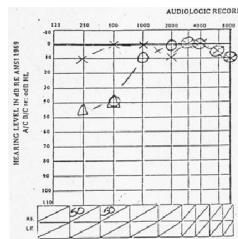
Menieres Disease consists of four symptoms

- n Fluctuating hearing
- n Tinnitus (hissing or roaring during attack)
- n Episodic vertigo (spinning)
- n Ear fullness

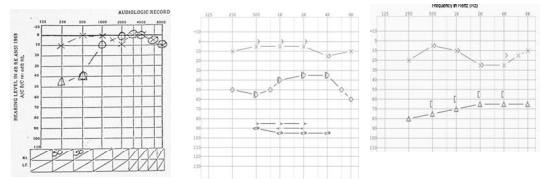
Typical duration of symptoms is 2 hours

Fluctuating Hearing

- n The first sign of Meniere's is usually a low-frequency hearing loss
- n Hearing usually returns to normal between attacks initially



Hearing worsens slowly over decades

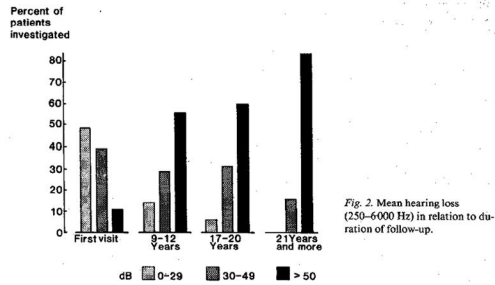


"tinny" hearing

Moderate (Bad) hearing

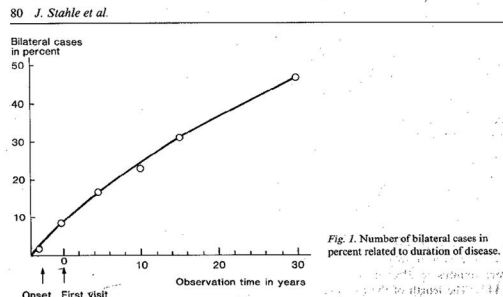
Profound -- No useful hearing

After 20 years, most persons with Meniere's are deaf in one ear



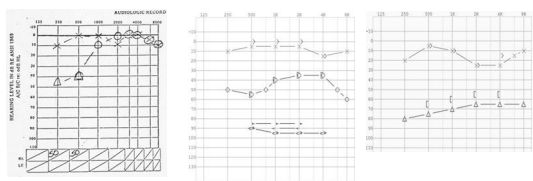
Stahle et al. Acta Otolaryngol 1991;78-83

Menieres hearing loss often goes to other ear too



Stahle et al. Acta Otolaryngol 1991;78-83

Hearing aids help in the middle



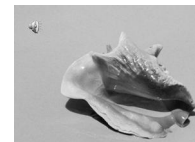
Hearing aid not needed

Hearing aid helpful

Hearing aid not helpful

Tinnitus fluctuates too

- n Ringing – between attacks
- n Hissing/roaring (sea shell sound to aircraft taking off) – during attacks



Vertigo attacks in Menieres

- n Vertigo (sensation of motion)
 - In Meniere's the sensation is usually spinning around the up-down axis (not rolling or tumbling). As a merri-go-round

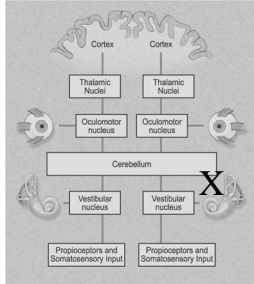


Vertigo attacks in Menieres

- n Vertigo causes nystagmus
 - The eyes usually jump horizontally during the vertigo (as they do on a merri-go-round).



Vertigo is caused by imbalance between the two ears



Vertigo “burns out”

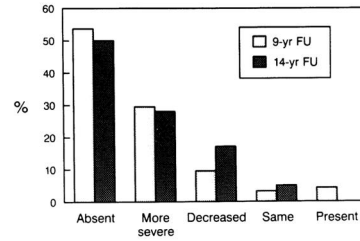


Fig. 2. Vertigo at 9 and 14 years of followup (FU).

Green et al (1991) Otol HNS 104, 783

Otolithic Crises of Tumarkin



Tumarkin Crisis

- n “Late” Menieres – usually 10 years+
- n “Drop” attack
- n Person throws themselves to floor because world “flips”
- n Mechanism – dilated inner ear membrane “pops” into new position ?

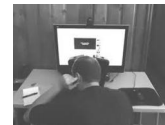
Tumarkin Crisis

- n Very dangerous !!!
- n Imagine – this happening driving in car !



Aural Fullness

- n Full or “Plugged” feeling in ear
- n Can’t clear it with yawning



Meniere's and Migraine

- n 56% of people with Meniere's disease have migraine headaches too. (Radtke and Lempert, 2002)
- n As migraine can cause dizziness, and can be effectively treated with many medications, a combined approach is often helpful.



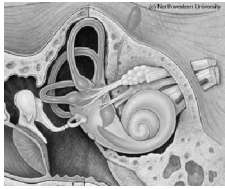
Radtke, A., T. Lempert, et al. (2002). "Migraine and Meniere's disease: is there a link?" *Neurology* 59(11): 1700-1704.

Impact of Meniere's Disease

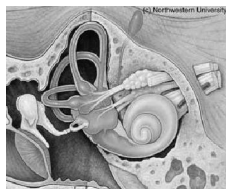
- n 1/2000 people have Menieres in the US population
- n Chronic disorder
- n Gradual progression to hearing loss.
- n 30-50% of the time Meniere's eventually affects both ears (bilaterality)

http://www.dizziness-and-balance.com/disorders/menieres/men_epi.html
 Wladislavosky-Waserman P, Facer G, et al. Meniere's disease: a 30-year epidemiologic and clinical study in Rochester, MN, 1951-1980. *Laryngoscope* 94:1098-1102, 1984

Meniere Disease Dogma: Endolymphatic Hydrops



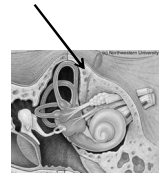
Normal



Swollen
(Hydrops)

Menieres Disease Mechanism

- n Bad plumbing – pipe too small
- n Blockage of drainage of inner ear fluid leads to Endolymphatic Hydrops
- n Dilatation and periodic rupture of membranes of inner ear
- n Rupture causes electrical shutdown of inner ear, vertigo, hearing loss.

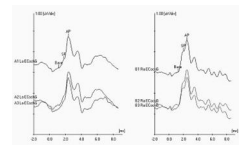
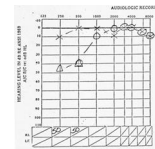


Clinic Evaluation

- n History -- the diagnosis is mainly based on symptoms
- n Physical exam - check the ears, the balance, the hearing, coordination
- n Tests may be suggested
 - Hearing tests (required)
 - ECOG (confirms)
 - ENG or VEMP
 - MRI, Blood tests

Diagnosis of Menieres

- n Hearing tests – must show reduced hearing
- n ECOG – Electrocochleography
 - If abnormal, you have Menieres
- n Vestibular testing – which ear is making you dizzy ?



Treatment of Menieres

What the doctor can do

- n Confirm the diagnosis
 - 2% population thinks they have Menieres, only 0.2% of population really has it.
- n Suggest lifestyle changes (30% of time)
- n Medications (work 80% of the time)
- n Surgical procedures if all else fails

The Low-Salt Diet

- n Limit sodium to < 2 gms (2 grams = one teaspoon)
- n Don't add salt to food while cooking
- n Don't use the salt shaker
- n Choose low-salt snacks
- n Avoid high-salt condiments
- n READ LABELS, make a diary



<http://oto2.wustl.edu/men/sodium.htm>

Preventing Menieres attacks

- n Diuretics – commonly used but unproven
(Thirlwall and Kundu, 2006)
 - Dyazide (Triamterine-HCTZ)
 - HCTZ + KCL
- n Take in morning
- n Don't combine with aggressive low salt diet (or you will get dehydrated)

Thirlwall and Kundu. Diuretics for Meniere's disease or syndrome (Cochrane Review), May 2006

Preventing Menieres attacks

- n Less common medicines (none are proven to work)
 - Verapamil (good migraine drug)
 - betahistine (most popular medication for Meniere's world-wide, not FDA approved)
 - Oxcarbamazine (used to lower sodium)

Other lifestyle changes may help control Menieres Disease

- n Avoid Caffeine -- Caffeine makes tinnitus louder
- n Avoid Alcohol -- Alcohol impairs balance
- n Stop Smoking -- Smoking damages blood vessels

Placebos?

- n Many unproven medications are advocated for Meniere's disease
 - Lipoflavonoids (mainly vitamin C)
 - “John of Ohio” regimen (a collection of placebos)
<http://www.menieresfoundation.org/johnsregimen.htm>
 - Lysine (for Herpes)
 - 100's more
- n Do they work ? Probably not, but usually no harm.



Menieres: Acute Treatments that work

- n Acute (emergency) situations
 - Stop the vomiting !
 - » Ondansetron, phenergan, compazine
 - Stop the spinning !
 - » Meclizine (Bonine – over the counter)
 - » Benzodiazepines (such as lorazepam)

What to do during a vertigo attack

- n Lie down on a firm surface
- n Stay as still as practical
- n Keep your eyes open
- n Take your medications for an attack
- n Don't get up until the spinning passes (this may take a few hours).



SURGICAL TREATMENT FOR MENIERES

Non-destructive treatments

- n Steroid injections
 - Steroids can “calm down” disease for a few months.
 - Steroids are not “for life”. Effects last 3 months or less.



Meniett device

<http://www.meniett.com/>



Meniett device (\$5000)



Aquarium pump (\$35)

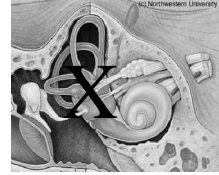
Meniett Device

- n Minimally effective device
- n High cost (\$5000).
- n We don't recommend.



Destructive Treatments for Menieres

- n Total Destruction really works !
 - No inner ear function means no dizziness
- n Labyrinthectomy
- n Vestibular Nerve section



Destructive Treatment for Menieres Collateral Damage

- n Labyrinthectomy --> Deaf, nothing left on one side for balance
- n Vestibular Nerve section à still can hear, but nothing left, and undergo brain surgery
- n Menieres eventually goes to other ear
 - Fix may fail after a decade
- n Low dose gentamicin ->



Gentamicin Treatment for Menieres Partially destructive treatment

- n Low dose (new!)
- n High dose used in past no longer common
- n 85% effective for Vertigo, 5% risk to hearing



Gentamicin is an antibiotic that selectively damages the vestibular (dizziness producing) part of the ear. Injections of Gentamicin through the ear drum can often permanently cure the dizziness associated with Meniere's disease. It does not treat hearing loss or tinnitus.

Gentamicin treatment advantages

- n Selective for one ear and for vestibular system
- n 85% effective for vertigo
- n Not a life threatening procedure per se. (unlike vestibular neurectomy)
- n Relatively inexpensive
- n Can be "titrated" and repeated



Other surgical treatments for Meniere's disease probably placebos

- n Endolymphatic shunt
- n Endolymphatic Sac Decompression (not effective at 5 years)



Endolymphatic shunts don't work – Danish Sham study

- n Thomsen JP et al. (1983). "Placebo effect in surgery for Meniere's disease: three-year follow-up." *Otolaryngol Head Neck Surg* **91(2): 183-186.**
- n Double-blind, placebo-controlled study
- n Endolymphatic shunt was compared with a placebo operation (mastoidectomy)
- n 70% improvement in both groups was most likely caused by a placebo effect.

Vestibular "Pacemaker"



- n Dr. Jay Rubenstein at U. Wash
- n Implanted device to "pace" the inner ear during a Meniere's attack.
- n Impractical - might reduce vertigo, but extremely invasive, and cannot restore normal function.

Vestibular Exercises

- n Balance can be improved by practice.
- n Physical Therapy
- n Sports activities



Balance can be improved by practice



Vestibular Exercises

- n Physical therapists can coach you to improve your balance.
- n Challenge balance
 - standing on foam
 - eyes closed balancing
 - "museum walking"



Recreational exercises



Coping with Meniere's Disease

- n Work -- Menieres may interfere with your job. If your job can't be adapted, think about changing
- n Home -- move sharp or breakable objects out of the way. Carpeting is recommended.
- n Car -- attacks may occur without warning. Use public transportation whenever possible.

The future for Meniere's Disease

- n Little research is being done on Meniere's
- n Promising areas:
 - Hair cell regeneration - -birds can do it, researchers have gotten mice to regrow their inner ear.
 - Basic research concerning mechanism - - inner ear pressure may be a symptom rather than cause.

More information

- n Our web site- www.dizziness-and-balance.com/disorders/menieres/menieres.html has far more information
- n Chicago Dizziness and Hearing (645 N. Michigan, Chicago)