Migraine Associated Vertigo

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Case (patient DA)

- 43 y.o. F, episodes of dizziness for 5 years
- Attacks begin with headache, nausea, dizziness, and severe ear pain.
- About 3/month, lasting 2-3 days.
- Severe motion intolerance

Case Study (patient DA)

- Tinnitus in both ears
- Denies hearing loss
- Physical exam normal
- Audiogram, 3 caloric tests, MRI of brain normal

MAV
Migraine Associated Vertigo

Headaches are common

- 90% lifetime prevalence
- 25% annually report recurrent episodes of severe headache
- 3-4% daily or near-daily headache
- Medications used by 9% of US adults each week to treat headaches

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Migraine

- Most common headache, about 10% of entire population (Stewart, 1992)
- 20-30% of women of childbearing age have migraine
- 90% of “sinus” headaches meet criteria for migraine diagnosis.

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EPIDEMIOLOGY

Epidemiological Observations of Migraine Prevalence in Industrialized Countries[3]

Study (Authors)	Sample Source	Number of Respondents	Age of Respondents	Time period	Prevalence % Males	% Females	% All
Breslau et al. USA	HMO	1,007	21–30	Lifetime One-year	7 3	16 13	13
D'Alessandro et al. Italy	General Population	1,144	>7	One year	9	18	16
Edmeads et al. Canada	General Population	2,737	>15	Lifetime	9	23	16
Henry et al. France	General Population	833	>15	Few years	6	18	12
Linet et al. USA	General Population	10,169	12–29	One-month	3	7	NR*
Merikangas et al. Switzerland	Results from screening scores	457	27–28	One-year	6	20	13
Rasmussen et al. Denmark	General Population	740	25-64	Lifetime One-year	8 6	25 15	16 10
Stewart et al. USA	General Population	20,468	12–80	One-year	6	18	NR*

*NR=not reported

Reference: 3. Rasmussen, B.K. et al.: Epidemiology of migraine, in Towards Migraine 2000, ed. Rose, F.C., Elsevier Science B.V., 1996, pp.1–11.

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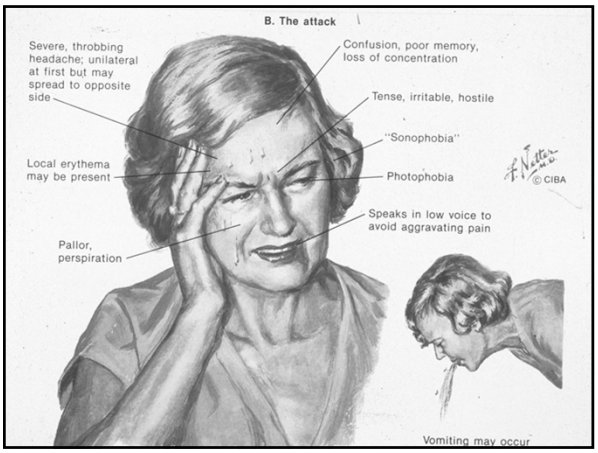

Migraine (IHS) criteria:

recurrent headaches separated by symptom-free intervals and accompanied by any three of the following:

- abdominal pain
- complete relief after sleep
- nausea or vomiting
- aura (visual, sensory, motor)
- hemicrania
- throbbing, pulsatile quality

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Vestibular Migraine (Neuhauser) strict criteria:

- Migraine meeting IHS criteria (this is hard part)
- Episodic vestibular symptoms
- At least one of following during 2 attacks
  - Migraine headache
  - Photophobia
  - Phonophobia
  - Visual or other aura
- Exclusion of other causes

Neuhauser, H., M. Leopold, et al. (2001). "The interrelations of migraine, vertigo, and migrainous vertigo." Neurology 56(4): 436-441.

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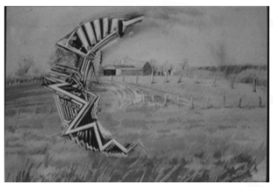
Migraine Variants

- Common migraine (just headache – 90%)
- Classic migraine (with aura – 10%)



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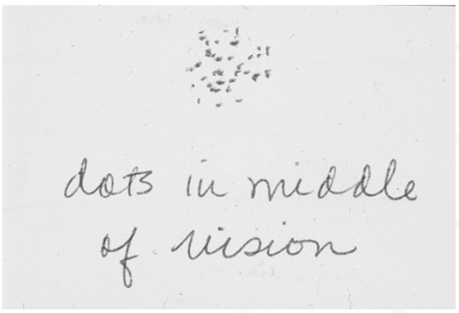

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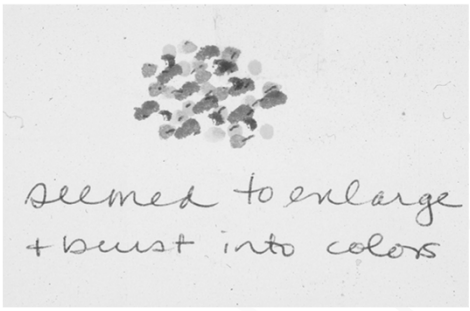

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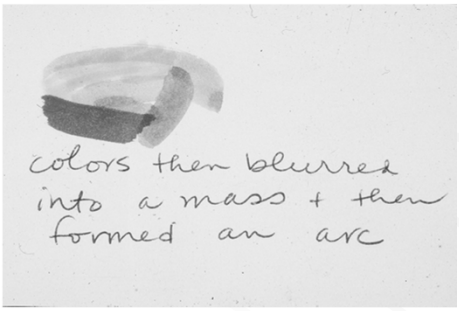

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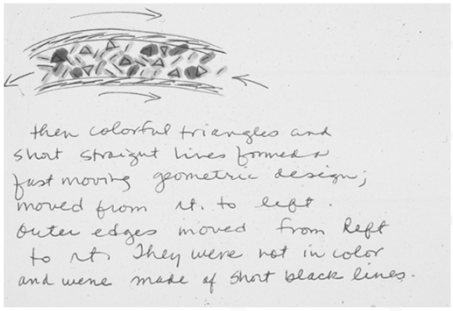

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Migraine Art

Ina Rubloff (migraine patient of Dr. Hains)

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Migraine Variants

- Acephalgic migraine: Aura without headache (a tough call).
- Usual story is transformation of headache with aura into aura alone.
- About 1% of migraine population*

*Kayan/Hood, 1984; Selby/Lance, 1960 Kuritzky, et al, 1981

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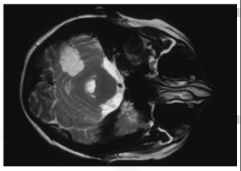
Migraine Variants



- Complicated migraine is accompanied by a neurological deficit.
  - About 1% of migraine patients
  - About 25% of patients with migraine have “small vessel disease” on MRI.
  - Prevention is important here

(Evans and Olesen, 2003; De Benedittis and Lorenzetti, 1995).

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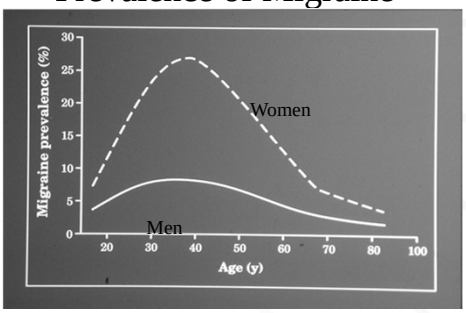
Prevalence of Migraine



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(Stewart et al, 1994)

Migraine in Women

- 3:1 ratio of women:men.
- Peak age is 30-45.
- 10:1 increase in frequency of migraine around time of menses.
- Attributed to fluctuations in estrogen level. Can treat by eliminating fluctuations (BC pills – "seasonale").
- 75% stop while pregnant
- Often flares for a few years near menopause

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Migraine & Vertigo: Prevalence

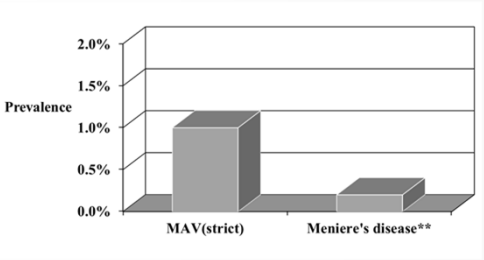
- Migraine:
  - 10% of U.S. pop†
  - 20-30% of women childbearing age
- Vertigo: 35% of migraine population.*
- Migraine + vertigo (loose criteria):
  - ~ 3.5% of U.S. pop.
  - ~ 10% of women of childbearing age
- Strict criteria
  - 0.89% of German population (Neuhauser, 2006)

† Lipton and Stewart 1993; Stewart et al, 1994

*Kayan/Hood, 1984; Selby/Lance, 1960; Kuritzky, et al, 1981

Neuhauser, H. K., A. Radtke, et al. (2006). "Migrainous vertigo: prevalence and impact on quality of life." Neurology **67**(6): 1028-1033.

There is more migrainous vertigo than there is Meniere's disease !

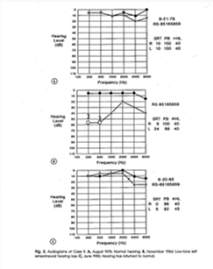


Neuhauser, H. K., A. Radtke, et al. (2006).

**Waserman et al., 1984 (2/1000 prevalence of Menieres)

Hearing in MAV can look like Menieres

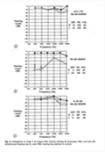
- Fluctuating low-tone SN hearing loss is common
- Both ears can fluctuate together
- 50% of Menieres have migraine too.



Harker, L. A. and C. Rassekh (1988). "Migraine equivalent as a cause of episodic vertigo." Laryngoscope **98**(2): 160-164.

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

Dr. Hain's opinion is that migraine prophylaxis should be used prior to any invasive treatment for Meniere's



Headache (HA) and dizziness don't have to occur at same time in MAV.

- Cutrer/Baloh (1992)
  - 5% (5/91): vertigo time-locked to HA
  - 25%: vertigo always independent of HA
- Johnson (1998): 91% (81/89) vertigo independent of HA

Cutrer, F. M. and R. W. Baloh (1992). "Migraine-associated dizziness." Headache **32**(6): 300-304.
Johnson, G. D. (1998). "Medical management of migraine-related dizziness and vertigo." Laryngoscope **108**(1 Pt 2): 1-28.

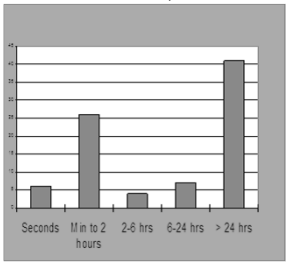
Even intermittent headache is not necessary to diagnose migraine

Migraine variants with vertigo but without headache (acephalgic migraines)

- Benign Positional Vertigo of Childhood (BPV)
- Cyclic vomiting syndrome – periodic vomiting for several days.

MAV symptoms may last for days (or even months)

- Cutrer and Baloh, 1992 : Bimodal distribution
- 31% min-2 hrs
- 49% longer than 24 hours
- Chronic migraine – about 0.2%.



Straube, A., V. Pfaffenrath, et al. (2009). "Prevalence of chronic migraine and medication overuse headache in Germany-the German DMKG headache study." Cephalalgia.

Migraine is often accompanied by strong motion sensitivity

10% normals have "motion sensitivity"

Percent of migraine patients with motion sickness

	Group	Authors
49%	Children	Bille (1962)
45%	Children (60)	Barabas et al (1983)
50.7%	Unselected	Kayan and Hood (1984)

Diagnosis of MAV is Based on Clinical judgment

- Headaches and dizziness
- Lack of alternative explanation (normal otological exam, neurological exam, CT)
- High index of suspicion in women of childbearing age. Perimenstrual pattern.
- Family history in 50%
- Response to prophylactic medication or a triptan

Differential Diagnosis

- Independent headache/dizziness
  - HA responds to treatment, dizziness persists – might have BPPV…
- Structural lesion (very rare)
  - No response to treatment
- Sleep apnea (AM headache)
- Psychogenic headache and dizziness
- Anti-phospholipid antibody syndrome
  - Refractory headaches
  - May need anticoagulation because of stroke risk

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I usually treat first – but if severe headaches do not respond …

- MRI or CT scan of brain/sinuses, possibly neck also. Makes most sense for non-triptan responders.
- Sed-Rate (for temporal arteritis)
- Sleep study
- Anti-phospholipid antibodies

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Migraine Treatments

- Life style change (diet, sleep, BC pills)
- Analgesics and antiemetics
- Abortive agents (triptan family)
- Prophylactic agents
- Alternative agents (e.g. Butterbur, magnesium supplements)
- Last resorts (MAO inhibitors)

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Recent reviews, although flawed, have useful info.

- Silberstein, S. D., S. Holland, et al. (2012). "Evidence-based guideline update: Pharmacologic treatment for episodic migraine prevention in adults: Report of the Quality Standards Subcommittee of the American Academy of Neurology and the American Headache Society." Neurology **78**(17): 1337-1345.
- Holland, S., S. D. Silberstein, et al. (2012). "Evidence-based guideline update: NSAIDs and other complementary treatments for episodic migraine prevention in adults: Report of the Quality Standards Subcommittee of the American Academy of Neurology and the American Headache Society." Neurology **78**(17): 1346-1353.

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Most useful non-drug treatments

- Migraine diet (these patients LOVE diets)
- Withdraw birth control pills if possible
- Regular sleep patterns
- Withdraw vasodilators if possible (e.g. nitrates, some calcium channel blockers)

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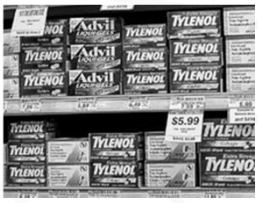
Dietary Factors in Migraine

- Monosodium glutamate (MSG)
- Cheese, especially blue cheese
- Alcohol
- Chocolate
- Caffeine

Analgesics and anti-emetics

- Acetaminophen, ASA
- NSAIDS
- Metoclopramide (Reglan)
- Phenergan



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Prophylaxis most important

- Unpredictable vertigo spells may prevent driving or be dangerous
- Migrainous vertigo rarely responds to suppressant medications

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Prophylaxis of Migraine - 2012

80% of those who get headache relief also get vertigo relief (Bikhazi et al, 1997)

- Antidepressants
- Anticonvulsants
- L-channel Calcium channel blockers
- Beta blockers
- Botox

BikBikhazi, P., C. Jackson, et al. (1997). "Efficacy of antimigrainous therapy in the treatment of migraine-associated dizziness." Am J Otol **18**(3): 350-4.

Pregnancy Categories

(Almost all are Pregnancy C or D)

- A: Proven safe
- B. Probably safe
- C. Use caution
- D. Dangerous
- X. Don't use

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L-channel Calcium Channel Blockers

- Verapamil 120-240 SR.
- 1 mg/pound initial dose
- Takes 2 weeks to work
- No sedation – great drug for this reason
- Hypotension rarely a problem
- Constipation main side effect – increase dose if not constipated after 2 weeks.
- Cheap ($19/month). Pregnancy category C.

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Other calcium channel blockers

- flunarizine (Sibelium) 5 mg.
- Not FDA approved.
- Has a 30 day half-life and also various other effects (dopamine blocker).
- Most other calcium channel blockers just don't work or make headache worse due to vasodilation.

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Beta Blockers

- Any beta blocker works – so pick an inexpensive one in a good pregnancy category. $20/month
- Propranolol 60 LA (category C)
- Metoprolol 50 XL (category C)
- Bisprolol (Bystolic) Low side effect
- Side effects
  - Fatigue, Slow pulse, Hypotension, sexual
- 1 month to work

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Anticonvulsants

(Don't affect BP, cognitive issues)

- Gabapentin (Neurontin) – category C
- Sodium Valproate (Depakote) – category D
- Topirimate (Topamax) – category D
  - 10% cleft palate
  - "dopamax" – can't talk or think
- Levetiracetam(Keppra)

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Gabapentin (Neurontin)

- Dose: 100 tid to 800 tid
- Extremely safe
- Not very effective – adjunctive agent
- Also suppresses vertigo and nystagmus
- Also useful for pain in general (arthritis)
- Pregnancy category C

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Anticonvulsants: Topiramate (Topamax)

- Dose: 25 mg to 150 mg, Start with 25, increase weekly
- 50% response
- Associated with weight loss !
- Moderate doses – speech disturbance
- Tingling in hands and feet too
- Pregnancy category D

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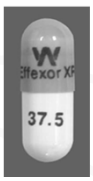
Antidepressants: Venlafaxine (Effexor XL)

- Very effective – 50 to 80%
- Start with 37.5 XL, 1/3. Increase to 37.5
- Side effects are minor:
  - A little activation – like a cup of coffee
  - Minor sexual side effects
  - No effect on weight
  - Pregnancy category C
- Warn patient about "cold turkey"



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Tricyclic antidepressants 75% effective

- Very cheap and very effective
- Amitriptyline, Nortriptyline
- Side effects are **major**:
  - Fatigue, weight gain, hair loss
  - Antihistamine AND anticholinergic (vest. Suppressant)
  - Not a good drug for older people
  - Pregnancy category D
- Start with 10 mg, increase weekly to 25-50

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SSRI antidepressants
?? effective ??

- Fluoxetine, citalopram, Paroxetine
- In our experience, SSRI's don't work for migraine associated vertigo. Some SSRI's cause tinnitus. All SSRI's cause nausea, at least on startup.

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ACE inhibitors
not effective

- Lisinopril (29-34% response)
- Candesartin (32-48% response)

Tronvik E, et al. Prophylactic treatment of migraine with an angiotensin II receptor blocker. A randomized controlled trial. JAMA January 1, 2003;289:65-9

Shrader et al, Prophylactic treatment of migraine … 2001 (BMJ)

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Abortive medications

- Triptans (sumatriptan, etc).
- Useful for diagnosis
- Some are expensive
  - Generic – sumatriptan
  - Powerful – Relpax/Maxalt
  - Long acting -- frovatriptan

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Alternative Medications

- Magnesium 200 mg/day
- Petadolex 50 mg TID (very questionable)

Holland, S., S. D. Silberstein, et al. (2012). "Evidence-based guideline update: NSAIDs and other complementary treatments for episodic migraine prevention in adults: Report of the Quality Standards Subcommittee of the American Academy of Neurology and the American Headache Society." Neurology **78**(17): 1346-1353.

Medications of last resort

- MAO inhibitors (e.g. tranylcypromanine – Parnate; phenelzine -- Nardil)
- Narcotics – dependence is common
- Botox for chronic migraine (only about 0.2%)

These medications have substantial potential for toxicity and are generally administered by neurologists or pain clinics.

Returning to our case

- Patient tried verapamil for 1 month. No response.
- Patient then tried on propranolol 60 LA. Headaches and dizziness greatly reduced.
- Plan is to continue on propranolol, with attempts to D/C every 2 years till menopause.

Summary

- Migraine associated vertigo is very common, more so than Menieres disease
- Meniere's and Migraine overlap substantially
- Diagnosis is via clinical judgment, combined with judicious tests to exclude dangerous alternatives.