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Vertigo and migraine

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Disclosure

- I do not have any conflict of interest relevant to the topic of this presentation.

Case 1

53 year old woman who noted sensation of her

right ear ‘being blocked’ acutely.

- Now has ringing and decreased hearing. Then she noticed severe vertigo. She became diaphoretic, nauseated and vomited.
- The spinning lasted about 60 minutes, then abated.
- She now has a sensation of dysequilibrium several hours later.

Case 2

- A 25 year old woman presented with episodes of dizziness for 5 years, episodic dizziness and migraine headaches. Episodes of dizziness mainly is of 5-10 minutes duration. No associated neurologic symptoms were present. Sometimes the attacks begin with headache, nausea, dizziness, and severe ear pain.
- Attacks of dizziness of about 3/month, lasting 2-3 days
- Severe motion intolerance
- Tinnitus in both ears
- Mild hearing loss

No history of vascular risk factor, family history of migraine

Physical exam: normal

Audiogram, 3 caloric tests, MRI of brain: normal

Case 3

A 40 year old lady with history of episodic headaches with migrainus features with visual area

Occasional history of diplopia, vertigo and mild dysartheria lasting 20-40 min. before/accompanied the headaches

Negative vascular risk factors

Negative family history of migraine

Normal N/E

Normal Brain MRI and MRA

The association of vertigo and migraine

- From several years ago the practitioners knew that vertigo is more common among migrainures and it seems that its prevalence is growing by increasing the age of migraine sufferers.
- Symptoms can occur before the onset of headache, during a headache, or, as is most common, during a headache-free interval. Consequently, many patients who experience migraines have vertigo or dizziness as the main complaint rather than headache

Vertigo and Migraine

- Migraine sufferers may complain of a spectrum of balance disorders, includes dizzy state, feeling of imbalance and lightheadedness. These subjective feelings could extended to motion sickness, positional vertigo and episodic vertigo that have vestibular origin.

Vestibular Migraine

- Although about 25-35% of patients with migraine may experience episodic vertigo, only **in 2003 the first operational definition of vestibular migraine(VM) was proposed**, which was an important step for conducting comparable research on epidemiology, natural history, pathophysiology and treatment. It seems that **vestibular migraine is more common than Meniere syndrome** which causes vertigo and considered as the second most common cause of spontaneous episodic vertigo. The duration of attacks varies from seconds to days, usually lasting minutes to hours, and they mostly occur independently of headaches.

Evaluation of the Dizzy Patient

What type of dizziness is it?

How long does it last? Continuous or episodic

Spontaneous or positional?

Duration of vertigo if episodic?

Are there otologic symptoms?

Are there focal neurological symptoms?

Characterizing dizziness

Types of Dizziness

- Presyncope: impending faint, often describe ‘spots’ in vision
- Disequilibrium: impaired balance and gaze
- Nonspecific: Light-headedness, fogginess, confusion
- **Vertigo:** perception of motion (either linear or rotating) in absence of movement

Timing of dizziness

- Less than 1 minute
  - Due to peripheral vestibular system/BPPV
- Minutes to hours
  - Meniere disease, transient cerebral hypoperfusion, migraine, psychiatric disorders, otic syphilis
- Hours to days
  - Migraine, Meniere, labyrinthitis

Meniere's disease

Peak age 4th & 5th decades, more prevalent in Caucasians, 1:1 male to female ratio, may be familial component

- Cause: over accumulation of endolymph within vestibular system
- Signs/symptoms
  - **Spontaneous episodic attacks of vertigo, Sensorineural hearing loss that fluctuates**
  - **Tinnitus +/- Aural fullness**
- Diagnosis
  - Clinical history: Triad of Vertigo + Hearing loss + Tinnitus
  - Vestibular testing helpful

Diagnosis of Meniere's

- Two or more definitive spontaneous episodes of vertigo 20 minutes or longer
- Audiometrically documented "hearing loss" on at least one occasion
- Tinnitus or aural fullness
- Other causes excluded

cont. Meniere's Disease

- Often patients have eaten a salty meal prior to attacks
- May occur in clusters and have long episode-free remissions
- Usually low pitched tinnitus
- Symptoms subside quickly after attack
- No CNS symptoms or positional vertigo are present

cont. Meniere's and Migraine

- Migraine is more common in patients with Meniere's disease than in healthy controls. Many patients with features of both Meniere's disease and Vestibular migraine have been reported. In fact, migraine and Meniere's disease can be inherited as a symptom cluster. Fluctuating hearing loss, tinnitus and aural pressure may occur in Vestibular migraine, but hearing loss does not progress to profound levels. Similarly, migraine headaches, photophobia and even migraine auras are common during Meniere's attacks

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right ear ‘being blocked’ acutely.

- Now has ringing and decreased hearing. Then she noticed severe vertigo. She became diaphoretic, nauseated and vomited
- The spinning lasted about 60 minutes, then abated.
- She has a history of two same attacks in the last 3 years.

Impression

Meniere’s Disease

Vestibular migraine

A. At least five episodes fulfilling criteria C and D

B. A current or past history of 1.1 Migraine without aura or 1.2 Migraine with aura

C. Vestibular symptoms of moderate or severe intensity ,

lasting between 5 minutes and 72 hours

D. At least 50% of episodes are associated with at least one of the following three migrainous features:

1. headache with at least two of the following four:

nilateral location

pulsating quality

oderate orsevere intensity

ggravation by routine physical activity

2. photophobia and phonophobia

3. visual aura

Points in Vestibular Migraine

- 3. Vestibular symptoms are rated moderate when they interfere with but do not prevent daily activities and severe when daily activities cannot be continued.
- 4. Duration of episodes is highly variable. About 30% of patients have episodes lasting minutes, 30% have attacks for hours and another 30% have attacks over several days. The remaining 10% have attacks lasting seconds only, which tend to occur repeatedly during head motion, visual stimulation or after changes of head position. In these patients, episode duration is defined as the total period during which short attacks recur. At the other end of the spectrum, there are patients who may take 4 weeks to recover fully from an episode. However, the core episode rarely exceeds 72 hours.
- 5. One symptom is sufficient during a single episode. Different symptoms may occur during different episodes. Associated symptoms may occur before, during or after the vestibular symptoms.

Diagnosis of vestibular migraine 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

Case 2

- 25 year old woman presented with episodes of dizziness for 5 years, episodic dizziness and migraine headaches. Episodes of dizziness mainly is of 5-10 minutes duration. No associated neurologic symptoms were present. Sometimes the attacks begin with headache, nausea, dizziness, and severe ear pain.
- About 3/month, lasting 2-3 days.
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Impression

Vestibular migraine

Migraine with brainstem aura

th migraine aura and migraine with brainstem aura
ormerly: basilar-type migraine) are terms defined by ICHD-
beta. Although vertigo is reported by more than 60% of
tients with Migraine with brainstem aura, ICHD-3 beta
quires at least two brainstem symptoms in addition to
sual, sensory or dysphasic aura symptoms for this
agnosis.

Therefore, A1.6.5 Vestibular migraine and 1.2.2 Migraine with brainstem aura are not synonymous, although individual patients may meet the diagnostic criteria for both disorders.

Migraine with aura

A. At least two attacks fulfilling criteria B and C

B. One or more of the following fully reversible aura symptoms: 1. visual 2. sensory 3. speech and/or language 4. motor 5. brainstem 6. retinal

C. At least two of the following four characteristics:

1. at least one aura symptom spreads gradually over 5 minutes, and/or two or more symptoms occur in succession
2. each individual aura symptom lasts 5-60 minute 3. at least one aura symptom is unilateral
4. the aura is accompanied, or followed within 60 minutes, by headache

Migraine with brainstem aura

- Description:
- Migraine with aura symptoms clearly originating from the brainstem, but no motor weakness.

Diagnostic criteria:

- A. At least two attacks fulfilling criteria B-D
- B. Aura consisting of visual, sensory and/or speech/language symptoms, each fully reversible, but no motor or retinal symptoms
- C. At least two of the following brainstem symptoms:

cont. Migraine with brainstem aura

1. dysarthria, vertigo, tinnitus, hypacusis, diplopia, ataxia, decreased level of consciousness

- D. At least two of the following four characteristics:

1. at least one aura symptom spreads gradually over _5 minutes, and/or two or more symptom occur in succession

2. each individual aura symptom lasts 5-6 minutes

3. at least one aura symptom is unilateral

4. the aura is accompanied, or followed within 60 minutes, by headache

- E. Not better accounted for by another ICHD-3 diagnosis, and transient ischaemic attack has been excluded.

Points on Migraine with brainstem aura

- Originally the terms basilar artery migraine or basilar migraine were used but, as involvement of the basilar artery is unlikely, the term migraine with brainstem aura is preferred.
- There are typical aura symptoms in addition to the brainstem symptoms during most attacks.
- Many patients who have attacks with brainstem aura also report other attacks with typical aura and should be coded for both 1.2.1 Migraine with typical aura and 1.2.2 Migraine with brainstem aura.

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40 min, before/accompanied the headaches

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Impression

Migraine with brainstem aura

Pathophysiology of vertigo in migrainures

- It seems that both peripheral and central vestibular mechanisms are involved

Boldingh, M. I., Ljøstad, U., Mygland, Å., & Monstad, P. (2013). Comparison of interictal vestibular function in vestibular migraine vs migraine without vertigo.*Headache: The Journal of Head and Face*

- In the study on 38 patients diagnosed with definite vestibular migraine (VM) and 32 patients with migraine without vertigo according to the IHS criteria different vestibular tests were performed between patients 'attacks. In this study, overall, 70% of the VM patients and 34% of the migraine without vertigo(M) patients showed abnormalities on one or more of the 14 performed vestibular tests ($P = .006$). Abnormal findings were more frequent in VM than in M patients on Romberg's test, test for voluntary fixation suppression of the vestibular ocular reflex and test for static positional nystagmus ($P = .03$, .01 and .04, respectively). There were no differences in the distribution of central and peripheral vestibular signs between VM and M patients and the authors conclude that vestibular abnormalities were present interictally among both VM and M patients, but were found about twice as frequently among VM patients. This may indicate that subclinical vestibular dysfunction is an integral part of migraine pathology in general, and not solely in VM.

Momtaz, S., Hajiabolhassan, F., Togha, M., **Jalaie, S., & Almasi, A.** (2014). Quantitative oculomotor findings in migrainous patients. *Iranian journal of neurology*, *13*(4), 250.

- We did a study to investigate some parts of the central vestibular system in patients with migraine who did not have dizziness or feeling of imbalance to clarify if central vestibular system is different to normal population.

In this case–control study, 30 patients with migraine and 38 healthy volunteers within the age range of 18-48 years old were included. spontaneous nystagmus; gaze-evoked nystagmus in right, left and up sides, smooth pursuit, optokinetic nystagmus using three different velocities and saccade test performed in both groups. Some parameters of gain and phase and also morphology of the smooth pursuit, velocity of the saccade and slow phase velocity of optokinetic were significantly different in migrainures, although the statistical differences of these parameters were not clinically important as they were in the normal range of a defined device. These results may suggest the presence of subtle otoneurologic abnormalities in migrainous patients.

How is migraine associated dizziness treated?

with all types of migraine, migraine associated dizziness can be iggered or worsened by certain types of foods, activities, or stress.

gular sleep

gular meals

w blood sugar can trigger attacks

oderate amounts of routine exercise

ehydration can cause migraine attacks

mit caffeine and alcohol

educe stress

laxation and stress management may help reduce attacks

Abortive medication for vertigo associated with migraine

- In general, drugs used to abort migraine headaches have not been found effective in treating dizziness secondary to migraine.

- Antivertiginous drug and antiemetics could be helpful.

Prophylactic pharmacotherapy

hylactic medical therapy should be used when migraine-associated igo occurs several times a month, is continuous over several weeks or ths, or has severely affected the patient's lifestyle. First-line rophylactic ications include calcium channel blockers (verapamil), tricyclic depressants (nortriptyline), and beta blockers (propranolol). Second-line tments include topiramate, valproic acid, venlafaxine, and ethysergide.

tazolamide and lamotrigine have also been reported as an effective tment by several authors. However, these 2 medications seem to be arily effective for only the vestibular symptoms and not headaches.

Taghdiri, F., **Togha, M.**, Jahromi, S. R., & Refaeian, F. (2014). Cinnarizine for the prophylaxis of migraine associated vertigo: a retrospective study. *SpringerPlus*, *3*(1), 231

Our study included twenty-four subjects with VM (23 women, 1 man) and sixteen subjects with BM (12 women, 4 men).This was a retrospective, single-center, open-label, investigation of the effects of cinnarizine on vestibular migraine and migraine with associated with vertigo. We assessed the change in monthly frequency of vertigo and also frequency, duration and intensity of migraine attacks after one, two and three months of cinnarizine administration.

- The mean frequency of vertigo and also the mean frequency, duration and intensity of migraine headaches per month were reduced significantly after three months of cinnarizine therapy (all $p<0.001$).

Table 2 Headache characteristics before and after treatment with cinnarizine

Variable	Total vertigo population (n = 40)	Subgroups		p-value[1]
		Vestibular migraine (n = 24)	Migraine with brainstem aura (n = 16)	
Monthly frequency of migraine attacks (mean ± SD)				
At baseline	4.02 ± 1.2	3.92 ± 0.9	4.19 ± 1.5	0.845
12-week treatment period				
1st 4-week	2.35 ± 1.1*	1.92 ± 0.6*	3.00 ± 1.3*	0.001
2nd 4-week	1.30 ± 1.2*	0.71 ± 0.8*	2.19 ± 1.0*	<0.001
3rd 4-week	1.10 ± 0.9*	0.75 ± 0.7*	1.62 ± 1.0*	0.004
Monthly duration of migraine attacks, hours (mean ± SD)				
At baseline	26.20 ± 15.3	23.58 ± 15.8	30.12 ± 14.1	0.011
12-week treatment period				
1st 4-week	14.78 ± 6.3*	13.88 ± 7.0*	16.12 ± 4.9*	0.066
2nd 4-week	5.68 ± 5.1*	3.46 ± 4.1*	9.00 ± 4.6*	0.001
3rd 4-week	4.18 ± 3.6*	2.58 ± 3.0*	6.56 ± 3.2*	<0.001
Monthly intensity of migraine attacks, VAS (median, Max.-Min.)				
At baseline	8 (7–10)	8 (7–10)	9 (7–10)	0.087
12-week treatment period				
1st 4-week	6 (4–10)*	5 (4–9)*	7 (5–10)*	0.005
2nd 4-week	3 (0–9)*	1 (0–7)*	5 (2–9)*	<0.001
3rd 4-week	3 (0–8)*	1 (0–5)*	4 (2–8)*	<0.001

VAS Visual Analog Scale.

Table 3 Vertigo frequency before and after treatment with cinnarizine

Variable, mean ± SD	Total vertigo population (n = 40)	Subgroups		
		Vestibular migraine (n = 24)	Migraine with brainstem aura (n = 16)	p-value[1]
Monthly frequency of vertigo attacks				
At baseline	3.68 ± 1.05	3.79 ± 1.14	3.50 ± 0.89	0.372
12-week treatment period				
1st 4-week	1.30 ± 1.07*	1.54 ± 1.10*	0.94 ± 0.93*	0.079
2nd 4-week	0.60 ± 0.67*	0.79 ± 0.72*	0.31 ± 0.48*	0.016
3rd 4-week	0.35 ± 0.65*	0.42 ± 0.65*	0.25 ± 0.58*	0.402

*p < 0.05 compared with baseline.
[1]p-value for comparison between vestibular migraine and migraine with brainstem aura.

What is the role of physiotherapy?

- In some people with migraine associated dizziness, exercises can help with balance symptoms. However, in cases where migraines are very frequent, these exercises can make symptoms worse, so the timing of a balance exercise regime should be carefully considered

- Vestibular rehabilitation therapy may be of benefit in patients with movement-associated disequilibrium. either as the predominant symptom, or it may be a continuing symptom despite adequate vertigo control with prophylactic medication. In either case, vestibular rehabilitation is quite beneficial. However, this therapy is not indicated for the treatment of spontaneously occurring vertigo.

What is the role of psychological treatments?

- Many of the brain chemicals (like serotonin) thought to be important in migraine are also important in problems like anxiety or depression. Some people who have migraine associated dizziness can therefore also experience low mood and symptoms of anxiety. For these people, or where the physical symptoms are very distressing, seeing a psychological therapist can be beneficial.


Thanks