



AUDIOVESTIBULAR PROFILE IN MIGRAINOUS VERTIGO (MV)

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Abstract : Objective- To study the Audiovestibular profile in patients with Migrainous vertigo (MV). Materials and methods- A retrospective chart review was done on patients who presented to the audiovestibular clinic in a tertiary referral centre between march 2010 to June 2011 diagnosed to have MV according to Neuhauser (2001) criteria and also fulfilled the inclusion and exclusion criteria of the study . Information was gathered from a standard proforma that is being regularly used in the audiovestibular clinic for evaluating patients with vertigo, that contains details of history, clinical features, results of pure tone audiometry, impedance audiometry and electronystagmography (ENG). Results- Of the 52 patients recruited, 23 (44) had true head rotatory vertigo while 29 (56) had non specific dizziness and 31 (60) had positional dizziness and in 75 the duration of attacks (vertigo) lasted for seconds to minutes. Forty two (81) patients experienced headache along with vertigo. Phonophobia and photophobia were the commonest associated symptoms after headache and nausea. Eleven (21.2) patients complained of hearing loss and 17 (32.7) patients complained of tinnitus. On audiometric testing, 35 of the 52 patients had abnormal hearing all of them had a sensorineural type of hearing loss except one. On ENG testing, hyperactive response was seen in 20 of patients, canal paresis in 48 of which 28 had unilateral and 12 were bilateral canal paresis. Conclusion- Audiovestibular abnormalities are common in MV when it is looked for. In this study, out of the 35 patients who had abnormal hearing on pure tone audiogram 80 were asymptomatic.

Keyword : Migrainous vertigo, audiovestibular profile

AUDIOVESTIBULAR PROFILE IN MIGRAINOUS VERTIGO INTRODUCTION:

The association between hearing, balance disorders and migraine is known ever since the times of the ancient Greeks. Aretaeus in 131 B.C. gave a detailed description of the occurrence of vertigo during a migraine episode (1). One fifty years back, Edward Living highlighted how 6 out of 60 patients with migraine suffered spontaneous acute attacks of vertigo (2). Migraine is generally under diagnosed in the general population and has a considerable personal and health care impact (3)

Vertigo is an illusion of movement caused by asymmetrical involvement of the vestibular system by various causes and up to 25% of patients with migraine experience vertiginous symptoms (4).

Migraine is known to be the most common cause of spontaneous episodic non-positional vertigo (1). This entity known as Migrainous vertigo (MV) has been given different nomenclature by different authors such as vestibular migraine, migraine related vestibulopathy and migraine associated dizziness (5). MV presents as episodic vertigo and is being increasingly recognized among neuro-otologists and migraine specialists and has varied clinical presentations (3). Vertiginous symptoms in MV can present as spontaneous or positional vertigo lasting from seconds to days and has inconsistent temporal relationship to headache and other migrainous features. Migraine is defined by International Headache Society (IHS) as a benign and recurring syndrome of unilateral throbbing headache, associated with nausea, vomiting, phonophobia and photophobia (6). The 2004 International Headache Society (IHS) classification of migraine does not consider MV as a clinical entity and refers to vertigo as a migrainous symptom only in the basilar-type migraine (7). Neuhauser et al and Furman et al (8,9) have attempted to develop operational criteria for MV as listed below

History of

(i) Episodic vestibular symptoms of at least moderate severity (rotational vertigo, other illusory self or object motion, positional vertigo and head motion intolerance);

(ii) Migraine that meets the International Headache Society (IHS) criteria;

(iii) At least one of the following migrainous symptoms during at least two vertiginous attacks: migrainous headache, photophobia, phonophobia, visual or other auras; and

(iv) Other causes ruled out by appropriate investigations

Migrainous vertigo is also known to have auditory involvement such as sudden hearing loss, asymmetrical hearing loss, tinnitus and phonophobia (10,11). Various hypotheses have been proposed for audiovestibular involvement in MV such as vasospasm of the vestibular branches of the internal auditory artery (12),

abnormalities in the ion channels of the inner ear which are critical for maintaining the potassium-rich endolymph and neuronal excitability (12) and involvement of the vestibular pathways by spreading wave of depression(13) The actual prevalence of this disorder is difficult to determine because of the varied clinical picture it can present and is usually diagnosed by exclusion of other causes. Very few studies have been done to document and characterise the audiovestibular profile of patients with MV and very few studies have been done from the Indian population (6). In this study we have attempted to describe the audio-vestibular profile of patients who have been diagnosed with MV.

METHODOLOGY

Retrospective chart review was done on patients who were clinically diagnosed to have MV according to Neuhauser criteria (2001) and who presented to audiovestibular clinic in a tertiary referral centre between march 2010 to June 2011. Patients with other causes of vertigo and headache such as Meniere's disease, BPPV, allergic rhinitis, Eustachian tube dysfunction, chronic suppurative otitis media (CSOM) and past history of ear surgery and chronic sinusitis as well as other identifiable causes of hearing loss on audiological and imaging were excluded from the study. Information was gathered from a standard proforma used regularly in the audiovestibular clinic. It included the details of onset, duration, character, precipitating factors, associated features of each attack of vertigo and headaches as well as the trigger factors, reliving factors, history of associated hearing loss, tinnitus, and any other neurological features, details of investigations done like pure tone audiogram, impedance audiogram and electronystagmography (ENG) results were also collected from the patients' records. All the data were entered into an excel sheet and the results were analysed using SPSS version 16.0.

RESULTS:

Over the 16 month period, 240 patients were diagnosed to have MV. After applying the exclusion criteria, 52 subjects were eligible for the study. Of these 28 were females and 24 were males. There were 32 subjects (17 females and 15 males) in the age group between 30 - 50 years. Figure 1 shows the type of vertiginous attacks in 52 patients. Of the 52 patients, 23 (44%) had true rotatory vertigo (surrounding rotatory vertigo) while 29 (56%) had non specific dizziness which included 28(54%) with head rotatory vertigo and 1(2%) with light headedness. Out of 52 patients, 31(60%) had positional dizziness; in 75% the duration of attacks lasted for seconds to minutes. Figure 1 Type of vertiginous attacks in 52 patients Figure 2 shows the associated features with vertigo. Forty two (81%) patients had headache along with vertigo. Out of 52 patients, 23(44%) experienced headaches that were very severe, 14 (27%) had mild and 15(29%) had headaches of moderate severity. Eight (15%) patients had headaches that were triggered by exposure to sunlight and 18(35%) patients on exposure to loud noise. Phonophobia and photophobia were the commonest symptoms after headache and nausea. Other neurological symptoms were found in 20 (38%)patients which consisted of scotoma, loss of consciousness and black outs and pins and needle sensation, burning sensation, tingling and numbness of hands and feet.

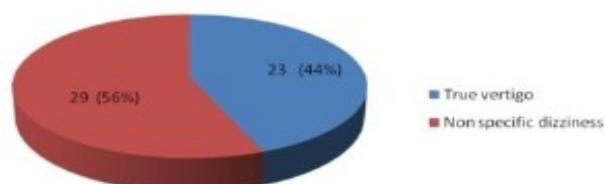
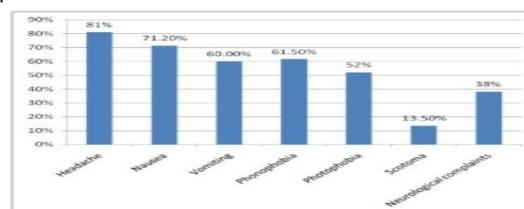


Figure 2 Associated features with MV episodes in 52 patients * Each patient had more than one associated feature. Out of 52 patients, 19 (37%) had relief of symptoms on taking rest, or after sleep and 13 (25%) had relief on taking medications. Eleven (21%) patients presented with a history of hearing loss, of these 7 (63.64%) patients had a documented hearing loss by audiometry. Seventeen (32.7%) patients complained of associated tinnitus. Figure 3 shows the audiogram results. On pure tone Audiometry testing, 35 of the 52 patients had abnormal hearing. Out of 35 patients with documented hearing loss, 24 had bilateral and 11 had unilateral hearing loss; 28 had minimal, 3 had mild, 1 had moderate, 1 had moderately severe and 2 had profound hearing loss. All of them had a sensorineural hearing loss (SNHL) except one, who had a mixed type of hearing loss which was of moderately severe degree in one side and mild in the other ear. Out of 34 patients with SNHL, 3 had asymmetrical hearing loss. Out of these three, two patients



had profound hearing loss in one ear and minimal hearing loss in the opposite ear; one patient had moderate SNHL in one ear and minimal SNHL in the opposite ear.

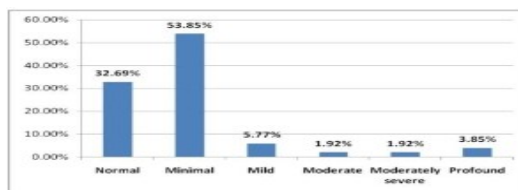


Figure 3. Pure Tone Audiometry results in 52 patients Table 1 shows the results of ENG testing. Saccadic intrusions were seen in 5 patients; spontaneous nystagmus of peripheral type in 6 patients and abnormal caloric tests in 31 patients. Optokinetic testing was normal in all the patients.

Table 1 ENG testing results in 52 patients
Pendulum track Spontaneous Nystagmus Optokinetic test
Caloric test Smooth Saccadic Present Absent Normal
Abnormal Normal Abnormal pursuit intrusions 6 (12%) 46(89%)
47(90%) 5(10%) Peripheral Central 52(100%) 0 21(40%)
31(60%)
60

Table 2 shows the results of caloric testing: 20% of patients had hyperactive response which was unilateral, 40% had canal paresis (CP) of which 28% had unilateral and 12% were bilateral .

Table 2 Caloric testing results
Unilateral hyperactive

10(20%)	Canal paresis	
	20 (40%)	
15(28%)	Unilateral	Bilateral
		6(12%)

DISCUSSION

Migraine is a commonly prevalent headache disorder and is seen in 4 - 6.5% of men and 11.2 -18.2% of women in both US and Europe. Women are diagnosed with MV 5 times more than men (5). In contrast to the literature which showed a predominance among females (Casani et al 16/22 females, Neuhauser et al 27/33 females), in this study we had an almost equal distribution of males and females. The majority of our patients (62%) were in the age group between 30 - 50 years in accordance with the literature (7,14). In most patients, migraine headaches begin earlier in life than vertigo, with years of headache-free periods before MV manifests (6). Symptoms can be quite variable among patients and within individual patients over time creating a diagnostic challenge. MV generally presents with attacks of spontaneous or positional vertigo lasting seconds to days with associated migrainous symptoms (3). The frequently observed absence of a definite temporal relationship between vertigo spells and migraine attacks indicates that diagnosis of MV must be based on a careful and complete historical evaluation (7). In this study, a higher frequency of patients 42 (81%) had headache along with vertigo when compared with Casani et al study (27%) and Neuhauser et al (24%) (6).

Patients with MV mainly complain of rotational vertigo and head motion intolerance (15,16). Spontaneous rotational vertigo of variable duration, motion-induced dizziness, chronic dizziness, and light-headedness are the other vestibular presentations in MV. In this study, non-specific dizziness was the most common type of vertiginous symptom 29 (56%), similar to findings in study by Dash et al (6).

Sensation of true vertigo was comparatively less frequent (44%) compared to that found by Casani et al (77%) and Neuhauser et al (67%). In this study, a higher percentage (60%) of patients had positional vertigo when compared with Neuhauser et al study (24%) and Casani et al (41%) The duration of symptoms in MV varies from few seconds to several days; most of them have attacks lasting minutes to hours. Vertigo lasting for seconds to minutes (75%) was the commonest finding in this study similar to Casani et al (63.6%). Phonophobia was found to be the most common auditory symptom in this study (61.5%) similar to Dash et al and Kayan and Hood et al studies (6,10). Patients complaining of hearing loss (21%) and tinnitus (33%) was less compared to Dash et al who found that 34% of their patients had complained of hearing loss and 50% had tinnitus.

Bayazit et al and Schinichi et al reported normal hearing on audiometry in all their patients with MV (17),(18). Dash et al found that although 17 out of 38 complained of hearing loss, only 7 had abnormal hearing on pure tone audiometry; which was SNHL (6). In this study out of 11 (21.2%) patients who complained of hearing loss, 7 had documented hearing loss by pure tone audiometry. This study also found that a high percentage of patients (35/52, 67%) with abnormal hearing on pure tone testing; 80% of them without complaining of hearing loss. Similar to Dash et al study, this study found the SNHL in all but one. This study being a retrospective study, it is quite possible that other etiological factors which we have not included in the exclusion criteria may have contributed towards hearing loss in some cases since a complete audiological or imaging investigation might not have been carried out in some patients by the attending doctors for various reasons. Mixed hearing loss was seen in one patient who had a history of allergic rhinitis but tympanometry was normal." Comparing to other studies (Dash et al (26%), Casani et al (18%), and Bayazit et al (15%)) this study group had a higher percentage of patients with canal paresis (CP) (40%). Similar to other studies this study found a higher proportion of unilateral (28%) than bilateral CP (12%). In this study, caloric hyper responsiveness was seen in less percentage (20%) compared to Casani et al study (31.8%).

Limitations of our study

This is a retrospective study. Since a complete audiological or imaging investigation may not have

been carried out in some patients by the attending doctors, other etiological factors which we have not included in the exclusion criteria may have contributed towards hearing loss especially with moderate, moderately severe and profound and mixed hearing loss could not be ruled out

CONCLUSION

Audiovestibular abnormalities are common in MV when it is looked for. In this study, 67% patients had abnormal hearing on pure tone audiogram; of which 80% did not complain of hearing loss. Studies looking at early identification and effect of early commencement of anti-migrainous prophylactic therapy may prevent this incapacitating component of migraine.

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