

Migrainous vertigo (Migraine-associated dizziness) in adults - clinical and audiological profiles in patients suffering from chronic recurrent vertigo and headache: An original research.

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ABSTRACT

Background: Half of patients who suffer from Migraine also concurrently suffer from vertigo. Migrainous vertigo is emerging as a distinct entity related to Common migraine but having a number of distinctive clinical features. This study aims to highlight the novel clinical and audiological features of Migrainous vertigo. **Methods:** In this study 53 patients who suffer from Migrainous vertigo were analyzed. **Results:** It was found the most clinical features of Migrainous vertigo parallel Common migraine like Long history of headache typically 4.3 years, episodes lasting few hours, absence of Aura, female preponderance, sleep relief and phonophobia. **Conclusion:** Audiological features of Migrainous vertigo are a distinctive 5 to 10 dB decrease in Air-conduction curves in frequencies 2,000 to 4000Hz, during an attack of Migrainous vertigo is found in 63% of cases.

Keywords: Migraine, vertigo.

INTRODUCTION

This study aims to elucidate the clinical and audiological features of Migrainous vertigo (Migraine-associated dizziness) in Indian population.

Background

Most (50%) migraine headache patients also suffer from concurrent episodes of vertigo.^[1] The most common type of vertigo encountered in clinical practice is Benign positional paroxysmal vertigo. This type of vertigo has a tumultuous onset likened to a “Paroxysm” and a benign course. This is stark contrast to Migrainous vertigo which is characterized by moderate vertigo lasting few hours, a protracted recurrent course.^[4] The main similarity and highlighting diagnostic feature is the absence of any hearing impairment. This differentiates Migrainous vertigo from other causes of Chronic recurring vertigo like Meniere’s disease.^[2]

Diplopia, vertigo, incoordination, ataxia, and dysarthria, are neurologic components of the migraine attack in Basilar migraine, which is again a distinct pathological entity.^[2] Continuous rotatory vertigo (lasting for days to weeks), spontaneous nystagmus (with fast phase components beating toward the normal ear), and postural imbalance, typically following an upper respiratory tract infection (URTI) are features of Vestibular neuritis, (Vestibular Neuronitis) which is different, were excluded from this study.

It has been traditionally assumed that hearing impairment is absent in Migrainous vertigo, while there are no previous studies to verify this claim. Further no studies have been done to record an Audiogram during an attack of Migrainous vertigo hence the need of such a research.

Objectives of this research

In this study we try to characterize the main clinical and Audiological features of Migrainous vertigo and relevant signs and symptoms in Indian population. Such a study has not been reported in literature for Konkani (Coastal area of Central/ Central-western India) population and Audiological evaluation of this disease has not been reported in any previous studies in this sub-continent.

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MATERIALS AND METHODS

A total of 53 adult patients were chosen for the study from the cohort of cases presenting in our vertigo clinic.

Type of research

This is a type of observational studies in epidemiology among cohort of cases presenting in our vertigo clinic. Study follows the guidelines broadly set out by strengthening the reporting of observational studies or STROBE consortium Reporting Guidelines.^[7]

Study design

Case-control type of observational study design was used for clinical profiling of cases. In addition, audiological component of this research a cohort study with the subtype being prospective cohort or forward cohort study design. Data was obtained in a paired fashion by this cohort study. While the epidemiological data for association. All controls were other patients with headache attending our weekly clinic.

Settings of study

Study was conducted in Otorhinolaryngology clinic of a tertiary care hospital, based in a rural area and serving three adjacent districts. Participants were patients attending our headache/ speciality clinic and fulfilling the criterion that follows.

Inclusion of case

The inclusion criteria based on Lembert and Neuhauser who have defined the following criteria for diagnosis of Migraine-associated vertigo^[5].

- Definite Migraine-associated vertigo^[5]
 1. Episodic moderate vertigo lasting few hours with imbalance and dizziness
 2. Current or previous history of migraine in accordance with definition given in International Classification of Headache Disorders (ICHD-2) released in year 2004.
 3. Headache or Migraine symptoms during two or more attacks of vertigo like photophobia, irritability, tinnitus
 4. Other causes ruled out by investigations like X-ray Paranasal sinuses, Diagnostic nasal endoscopy, Computed tomography of Brain and Paranasal sinuses
- Probable migraine-associated vertigo^[5]
 1. current or previous history of migraine
 2. Headache or Migraine symptoms during two or more attacks of vertigo like photophobia, irritability, tinnitus
 3. Positive history of precipitating factor like female gender, dark, flashes of light, fatigue, certain foods, menstruation

4. response to migraine medications in more than half of attacks
 5. Other causes ruled out by investigations
- Headache per se is not needed for diagnosis of a Migrainous vertigo.^[5] Slater previously coined the term “Benign recurrent vertigo” for similar set of clinical features, like female gender, recurrent episodes, similar precipitating factors and headache.^[6]

Audiological evaluation during an attack of Migrainous vertigo

A routine screening of cases was done to establish any concurrent pathology like Presbycusis in all cases included in this study. And a second audiogram was recorded during the attack of Migrainous vertigo. Out of 53 patients selected, we were able to convince 19 patients to get come get admitted during an attack of vertigo and headache, hence were able to document an Audiogram during an actual attack of vertigo.

Variable studied in this research

Epidemiological data was collected in the following headers age, sex, reported mean number of years of suffering headache, occupation, number of attacks of Migrainous vertigo per week or month, average duration of headache, presence aura, frequency of attacks of vertigo along with migraine, Visual analogue score from 0 to 5 for severity of pain and vertigo. Pure tone average threshold at normal time and second recording during an attack of Migrainous vertigo was recorded.

Biostatistical methods

Various statistical tests were carried out using GNU-PSP Open source software package released under LGPL Licence. A confidence interval of 95% ($p=0.05$) was employed for hypothesis tested in this study. Analysis of variance test (ANOVA), Pearson's Chi-square test and Linear regression modelling were employed in order to compare the Audiological data, demographic and clinical characteristics. When condition of normality of data was doubtful, we used a non-parametric test to compare two samples such as the Mann-Whitney (Non parametric data like Visual analogue score for pain and vertigo) or Wilcoxon signed-rank test (Paired non parametric data). Members of the cohort were normal patients who were tested and found free of this disease. Paired Student's t test was used at 95% confidence interval to conclude statistical difference in before and after quantitative data like Pure tone audiometric threshold mean.

RESULTS

On an average 120 patients attend our headache clinic per week (480 per month) we screened 170

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patients who were found potentially eligible for inclusion. Further evaluation led to discovery of some other cause of headache/ vertigo like sinusitis or Meniere's disease. Final tally of 53 adult patients were chosen for the study and we were able to acquire before after Pure tone audiometric findings in 19 such cases during an attack.

Demographic data

The demographic characteristics of the patients are summarized in the table shown below.

Table 1: Observed demographic and clinical characteristics of Migrainous vertigo patients attending our clinic

S. No	Variable	Data												
	Median average age of patient	23.5 years (youngest adult 14 years to eldest 57 years)												
	Sex	M 14 (26.415 %) / F 39 (73.585 %) p=0.0078 Statistically significant difference												
	Reported mean number of years of suffering headache	4.3 years (4 years 3 months and 18 days)												
	Occupation	<table border="1" style="width: 100%;"> <tr><td>Farmers</td><td>21</td></tr> <tr><td>Fishermen</td><td>16</td></tr> <tr><td>Workman/ Carpenter/Black-smith</td><td>9</td></tr> <tr><td>No specific type of work</td><td>4</td></tr> <tr><td>Others</td><td>3</td></tr> <tr><td>Total</td><td>53</td></tr> </table>	Farmers	21	Fishermen	16	Workman/ Carpenter/Black-smith	9	No specific type of work	4	Others	3	Total	53
Farmers	21													
Fishermen	16													
Workman/ Carpenter/Black-smith	9													
No specific type of work	4													
Others	3													
Total	53													
	Mean number of attacks of Migrainous vertigo per week or month,	<table border="1" style="width: 100%;"> <tr><td>Week</td><td>(2 to 7) 2.812 attacks per week</td></tr> <tr><td>Months</td><td>(5 to 18) 12.033 attacks per month</td></tr> </table>	Week	(2 to 7) 2.812 attacks per week	Months	(5 to 18) 12.033 attacks per month								
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Months	(5 to 18) 12.033 attacks per month													
	Average duration of headache in hours	3 hours to 9 hours (4.61 hours)												
	Presence aura,	<table border="1" style="width: 100%;"> <tr><td>Aura present</td><td>14 (26.42%)</td></tr> <tr><td>Aura absent</td><td>39 (73.58%)</td></tr> </table>	Aura present	14 (26.42%)	Aura absent	39 (73.58%)								
Aura present	14 (26.42%)													
Aura absent	39 (73.58%)													
	Reported mean frequency of attacks of vertigo along with migraine	<table border="1" style="width: 100%;"> <tr><td>Week</td><td>(0 to 7) 0.34 attacks per week</td></tr> <tr><td>Months</td><td>(3 to 17) 7.33 attacks per month</td></tr> </table>	Week	(0 to 7) 0.34 attacks per week	Months	(3 to 17) 7.33 attacks per month								
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Months	(3 to 17) 7.33 attacks per month													
	VAS Visual Analogue Score from 0 to 5 for pain severity	Average 3.2												
	VAS Visual Analogue Score from 0 to 5 for vertigo severity	Average 2.1												
	Does Sleep relieve the attack of headache and vertigo?	Yes 86.79% / No 13.21% Statistically Significant p=0.0082												
	Phonophobia or Hypersensitivity to loud sound during an attack	Present 67.92% / Absent 32.08% Statistically Significant p=0.0029												

Audiological findings

To acquire a baseline measurement, Pure tone audiogram was done in all cases. This was followed by Pure tone audiogram during an attack of vertigo this is a unique feature of this study.

Table 2: Observed audiological features of Migrainous vertigo patients attending our clinic

S. No	Pure Tone Audiological findings	Data
1	Normal audiogram Criteria 1. Air conduction curve less than 30-35 dB 2. Air bone gap less than 20 dB 3. Normal Pure Tone Average	79.25% cases (42/53) Average P.T.A was 23.45 dB HL
	Abnormal Baseline Audiogram	
2.	Sensorineural Hearing loss	13.20% cases (7/53)
3.	Conductive Hearing loss	7.56% Cases (4/53)
4.	Audiometric findings during an attack 11	5 to 10 dB Decrease in Air-conduction curves in frequencies 2,000 to 4000Hz During an attack of Migrainous vertigo 63.16% Average PTA was 32.44dB Paired t Test has p=0.023 Statistically significant difference is found during an attack.
5.	Tinnitus during attack 11	47.37% (9/19 cases) Statistically not significant p=0.98

DISCUSSION

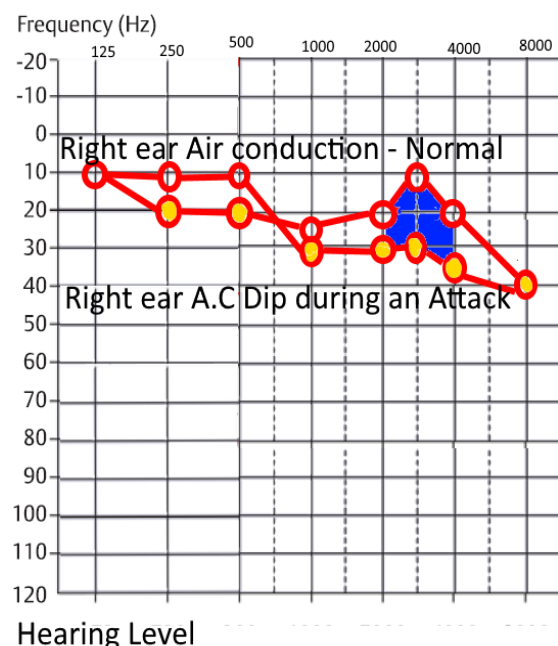


Figure 1: Pure Tone Audiogram from a typical case showing characteristic Decrease in Air-conduction curves in frequencies 2,000 to 4000Hz during an attack of Migrainous vertigo was seen in many patients

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Most Inner ear diseases have a characteristic feature in Pure Tone Audiogram, for example Presbycusis presents with a sloping High frequency hearing loss, while Meniere's disease presents with a 500 Hz tenting. This is seen in majority of cases.

Migrainous vertigo seems to a disease spread across all ages from 14 years to eldest 57 years. Similar to Common Migraine, this disease seems to be more common in females ($p=0.032$ statistically significant difference). This feature has been reported in literature as 3 times more common in females as males^[8]. Typical patient suffers on an average 4.3 years' history of headaches and suffers from 3 attacks per week to 12 attacks per month. Duration of attacks is around 4.6 hours per attack. Aura is absent like Common migraine in 74% cases. vertigo and headache are simultaneously present in 7 attacks per month

The Pure tone audiogram features of Migrainous vertigo have not been described in literature before. The characteristic feature of Audiogram of Migrainous vertigo patient is the 5 to 10 dB decrease in Air-conduction curves in frequencies 2,000 to 4000Hz during an attack of vertigo. Phonophobia (Hypersensitivity to sounds) is a common feature during the attacks. This was found to be statistically significant.^[11]

Exact pathological mechanism that leads to association between Meniere's disease and Migraine or Benign Paroxysmal Positional vertigo and Migraine is still unknown.^{[9] and [12]}

CONCLUSION

Migrainous vertigo attack has some unique Audiological features worthy of further research. Clinical features of Migrainous vertigo are parallel to that of Common migraine. Most patients of Migrainous vertigo have a normal audiogram in between attacks.

Clinical significance of this study

The characteristic feature of Audiogram of a Migrainous vertigo patient is the 5 to 10 dB decrease in Air-conduction curves in frequencies 2,000 to 4000Hz during an acute attack. In addition, a history of Phonophobia or hypersensitivity to sounds is a strong point for diagnosis of Migrainous vertigo.

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