

## Post head injury vertigo

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**Abstract:** Post Head Injury Vertigo (PHIV) is a common symptom after head trauma and is a part of post-concussion syndrome. The causes of vertigo can be varied. A study was aimed to: (a) Clinically classify pure PHIV into various groups depending on the severity of disability produced by the vertigo and, (b) To evolve a treatment protocol for PHIV.

A new classification of PHIV was proposed, based on its severity, ranging from Grade I to Grade IV, Grade IA being of least severe manifestation. A total of 53 patients of mild head injury having PHIV were analysed, consisting of 32 males and 21 females with age ranging between 18 and 62. Eight patients of PHIV fell in Grade IA, 10 in Grade IB, 26 in Grade II, 8 in Grade III and 1 was in Grade IV. The mean number of hospital visits increased with the severity of vertigo with Grade IA having a mean of 1.5 visits and Grade IV having a mean of 24 visits. Though the dosage of medication and its duration was not always proportional to the grade of vertigo but Grade III and IV patients needed prolonged medications, sometimes with more than one drug. The higher grades of PHIV were supplemented with vestibular rehabilitation exercises.

In conclusion, the present study is the first one of its kind attempting to classify PHIV into various grades depending on its severity. The grading system can help the clinician to plan the approximate duration of treatment and also prognosticate PHIV.

**Keywords:** head injury, vertigo

### INTRODUCTION

Post head injury vertigo (PHIV) is a well known sequelae of head injury (HI), the etiopathology being multifactorial<sup>1</sup>. This entity is recognised in all types of HI, be it mild or severe. However the condition is at times more difficult to treat than benign positional vertigo<sup>2-3</sup>. It is an important component of post concussion syndrome, which presents with a vague cluster of symptoms, establishing its organicity.

The spectrum of manifestation varies from a short lasting symptom to severe disabling vertigo which may remain refractory to symptoms. Vertigo at times may be the sole disabling symptom after HI disturbing the social as well as the routine activities of the patient resulting in immense loss of man power as well as economic resources.

Though disturbances of vestibular function has been the commonest cause of vertigo after HI there remains a distinct group of patients who have a different etiology which might have a direct or indirect bearing on the causation of vertigo e.g. exaggeration of silent cervical spondylosis, vertebrobasilar insufficiency, vertiginous seizures. Depending on the etiology of the symptoms the approach and management protocol would differ. So a study needs to be carried out in this field.

### Aims of the study

The aims of the study were to:

1. Clinically classify pure PHIV, having no obvious unrelated cause, into various groups depending on the severity of vertigo and disability
2. To evolve a treatment protocol for PHIV depending upon the severity of symptoms and etiology.

### MATERIAL & METHODS

All patients of mild HI who persisted to have vertigo after 24 hours of head injury, were included in the study. Exclusion criteria included patients with (i) Past history of vertigo, (ii) Any documented symptomatic cervical spondylosis, (iii) History of ear disease or labyrinthitis & (iv) History of vertebrobasilar insufficiency.

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The study was planned in the following manner:

Once a patient of mild head injury was received the patient was clinically evaluated with a general as well as detailed neurological examination. All patients with PHIV were screened for any lesion following HI with a CT scan of the head and high resolution CT scan of the temporal bone to see for any injury to the temporal bone and its contents. A plain x-ray of the cervical spine was also performed to find out changes of cervical spondylosis. Patients who persisted with vertigo after 24 hours were included in the study provided they had no past history of vertigo, symptomatic cervical spondylosis, vertebrobasilar insufficiency or ear disease.

The patients were asked to grade the intensity of their vertigo as per visual analog scale ranging from 0 to 10, 0 meaning no vertigo and 10 being considered as severely disabling vertigo. Symptomatic treatment was provided with medications if the patient could not manage to take care of his / her needs

The disability produced by the severity of vertigo was classified into:

- Grade IA Mild vertigo, often incontinuous, does not need medications. Patient can carry out all routine activities or occupation.
- Grade IB Mild vertigo, needs intermittent medications for relief of symptoms or carrying out routine activities or occupation.
- Grade II Can perform routine activities or occupation with difficulty but only with help of round the clock medications
- Grade III Cannot perform routine activities or occupation even on medications but able to take care of personal needs.
- Grade IV Severely disabled. No relief on medications. Lacks confidence in carrying out routine chores. Prefers to lie in bed and needs support of attendant.

The patients were then examined by a neuro-otologist and necessary investigations carried out as per the requirement of the case. The patients were followed up in the OPD at 7 days interval. Each time, severity of vertigo was assessed by the patient using the visual analog scale. The patients falling in the IB or above were given medications for vestibular suppression. Once the symptoms were under control the patients were introduced into vestibular rehabilitation program and

the drugs were gradually tapered off.

## RESULTS

A total of 53 patients of mild HI (GCS13-15) who presented with vertigo were included in the study. The inclusion criteria was vertigo persisting after 24 hours of HI with no preexisting history or cause of vertigo or otogenic cause of vertigo. There were 32 males and 21 females. The age ranged between 18-62, the median being 38. Twenty eight patients fell within the age range of 31 and 45 years while 3 patients were above 45 years of age. Forty one patients sustained HI in road side accident, while 8 had fall from height and 4 were assaulted on the head. CT scan of the head was normal in 46 patients while out of the remaining 7 patients, 4 had post traumatic subarachnoid haemorrhage, 3 had contusions (2 in right frontal and one in left temporal lobe). All the patients were treated conservatively. The mean hospital stay was 1.32 (range 1-4) days. Patients were classified as per the intensity of vertigo. Accordingly, 8 patients fell in Grade IA, 10 patients were in Grade IB, 26 fell in Grade II, 8 were in Grade III and 1 was in Grade IV. Mean number of visits for patients in Grade IA was 1.5 (range 1-2 visits), that for Grade IB was 2 (range 1-3 visits), for Grade II was 3.92 (range 1-9 visits), for Grade III was 3.5 (range 1-12 visits) and for Grade IV was 24. All but 4 patients were relieved of vertigo at the end of their treatment schedules and did not need any therapy subsequently. Of the 4 who did not have a complete remission 1 had residual Grade II vertigo, 2 had Grade III vertigo and the last one persisted to have Grade IV. These patients needed a long term medication which enabled them to carry on their activities. The patient in Grade IV vertigo had a left sided temporal contusion with subsequent vertiginous seizures, proved on EEG, and had significant relief on anti epileptic drugs.

The dosage and response to medication was varied. In Grade IA, 5 out of 10 patients (50%) needed medicines for 5-7 days while in Grade IB again 50% (4 out of 8) needed medications for the same duration. In Grade II PHIV, 16 out of 26 patients required medications for 2-3 weeks. However in the remaining 10, only 5-7 days of medication was enough to produce remission. All the patients in Grade IB and II were followed up with vestibular rehabilitation exercises so as to enable them to come back to normalcy. In Grade III vertigo group, 6 patients required medication for more than 4 weeks, while 2 had relief after 3.5 weeks. The average dose requirement in this group was higher than Grade II

patients, and in 5 patients, two drugs were needed initially to control the acuteness of vertigo. All the patients of this grade were put on vestibular rehabilitation exercises as soon as their intensity of vertigo got reduced to Grade IB state. The sole patient in Grade IV was absolutely resistant to any medications and after 5 weeks of failure in response the patient was subjected to an EEG examination due to the suspicion of vertiginous seizures as he was having classical episodic attacks of debilitating vertigo. Subsequently he had major relief to carbamazepine as the episodic attacks of vertigo stopped.

Thus the clinical grading when applied to PHIV patients definitely demonstrate that the patients falling in Grades IA, IB, and II have more subdued symptoms which are amenable to medications and, if needed, vestibular rehabilitation exercises. However the patients in Grade III and IV in whom the symptoms are more severe may have a protracted course of recovery needing more vigorous treatment with multiple drugs at a higher dose. Moreover the vestibular rehabilitation exercises were a definite addendum to achieve control of vertigo in these patients. Once the PHIV is resistant to medications a thorough investigation needs to be carried out to look for the exact etiology, as was noted in the sole patient of Grade IV vertigo.

## DISCUSSION

Vertigo after HI is not an uncommon manifestation. PHIV and is most often due pathologies affecting the vestibular system, CNS or cervical structures which can be identified by detailed clinical examination and investigations. The incidence of PHIV is not established but has been found to be to the tune of 34% and 50% in mild to moderate head injuries<sup>4</sup>. These patients are difficult to treat due to chronicity of their symptoms and no guidelines exist as to decide about the duration and protocol for their treatment and return to work<sup>5</sup>.

The spectra of presentation varies from mild, short lasting symptoms to severe disabling vertigo which may be refractory to routine treatment. Even though the patients might not manifest with any major neurological deficit yet the vertigo can be severely disabling to produce disturbances in his / her routine activities and social life, resulting in loss of man hours and economic resources. The incidence of PHIV is no less common in children and it becomes difficult to differentiate between true vertigo versus functional complaints related to psychology of trauma, seeking of compensation or a

true organic cause<sup>6</sup>.

Though disturbances of vestibular function is the commonest course of vertigo after HI there remains a distinct group of patients who might harbour other predisposing factors which might manifest as PHIV in an exaggerated form. In the disturbance of the vestibular dysfunction one can have peripheral, central and combined vestibular deficit<sup>5</sup>.

Apart from a detailed clinical examination which may include clinical vestibular tests e.g. stepping test, reinforced Romberg, past pointing evaluation, positional tests using Nysten-Hellpike maneuver other investigations may include plain x-ray of the head and cervical spine, CT scan of the head, audiological tests, electronystagmography, EEG. In some cases MRI, MR angiography and diffusion weighted MRI may be helpful in detecting posterior fossa lesions causing vertigo<sup>8</sup>.

Study shows that vertigo of benign positional paroxysmal type is the commonest variety of PHIV with a minority of patients showing central vestibular abnormality<sup>7</sup>. However majority of these patients had post traumatic audiometric abnormalities, commonest being high tone sensori-neural loss.

Depending on the etiopathology of vertigo the management protocol of these patients has to be tailor made. In the acute stage the symptoms may be so dramatic that the patient may be bed ridden for the first few hours to days before the acuteness of the symptoms settle. However the majority show some spontaneous improvement in the intensity of vertigo. In our experience it is at this phase that the medication play an important role to calm down the symptoms and help the patient to return to normalcy. The role of vestibular rehabilitation techniques also need to be emphasized as they remain a mainstay of treatment along with medications<sup>1</sup>. They also help prevent PHIV from progressing to a chronic stage, which then becomes difficult to treat.

The present study highlights the importance of vertigo following HI. It also has made an attempt to clinically classify PHIV in various grades depending on the severity and disability produced by vertigo. The grading definitely helps to provide a guide as to the approximate duration of treatment expected for remission of symptoms. This can form a guideline for rehabilitation of the patients specifically for those who are in manual jobs. It is suggested that for Grade IA, IB and II vertigo,

medications alone can improve the symptoms. However for Grade II & IV PHIV a higher dose of single or double medications is needed with a back up of vestibular rehabilitation exercises in a programmed fashion. To the best of our knowledge, so far, no such work has been carried out in India. However a controlled study using statistical tools needs to be carried out on a larger sample population in order to validate the study.

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