

Research article

Peripheral Vestibular Disorders and Its Management in a Nigerian Teaching Hospital

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Abstract

Background: Peripheral vestibular disease is one of the most common and frustrating complaints in the Otolaryngological clinics. This study reviews causes, management and outcome of peripheral vestibular disease as seen in a tertiary health facility in a young ENT practice.

Methods: A retrospective review of patients that were managed for peripheral vestibular disease over a five year period

Results: A total of 42 patients with M: F ratio 1: 1.3. All the patients presented with vertigo with duration of attack in; second in 47.6%, minutes to hour in 35.7%, hours to days 7.1% and no definite pattern 2.4. Clinical

signs on neuro-otological examinations were elicited on 38.1%. Pure tone audiometry of 45.8% was abnormal; 20 % (mild HL), 16.7% (moderate HL) and 8.3% (severe HL). Eighteen patients (42.9%) have benign positional paroxysmal vertigo (BPPV) and 35.7% had Meniere's disease. Conservatively management was successful in most of the patients.

Conclusion: Effective management of peripheral vestibular disease depends on accurate diagnosis and appropriate therapy. General practitioners should be informed about differential diagnosis of this condition and promptly refer difficult to diagnose patients to relevant specialist for proper evaluation and treatment. **Copyright © WJMMS, all rights reserved.**

Keywords: vestibular disease, vertigo, meniere's disease, benign positional paroxysmal vertigo, conservative management

Introduction

Vertigo is one of the most common and frustrating complaints in the Otolaryngological clinics [1, 2]. Vertigo is described as hallucination of movement or disorder of orientation in space and is considered to be due to either faulty sensory input (from visual, vestibular and proprioceptives) or problems of central integration and modulation centres [3]. It is a symptom of various pathologies. Vertigo accounts for 54 percent of reports of dizziness in primary care [1, 4]. Somofun in Lagos, Nigeria reported that peripheral vestibular disorders are common, of which BPPV is the most prevalent [2] and vertigo is reported to be one of the common Otological Diseases amongst elderly in Nigeria [5].

Vertigo can be peripheral, central or drug induced and over ninety percent of patients with vertigo are of peripheral vertigo [1].

Peripheral vertigo (peripheral vestibular disease) include pathology of inner ear vestibular structures as well as the vestibular portion of the eighth cranial nerve and such pathology diminishes available sensory information regarding head position and movement. Various aetiological factors for peripheral vestibular disease had been described [1, 2, 4, 6, 7] and benign paroxysmal positional vertigo (BPPV) is responsible for majority of the cases [1, 2].

The pathogenesis or mechanisms of vertigo depends on the aetiological factors which includes; vertebra-basilar insufficiency leading to labyrinthine ischemia, labyrinthine inflammation, canalolithiasis/ cupulolithiasis, endolymphatic hydrops, perilymphatic fistular etc [1, 3, 7 - 9].

History and physical findings are essential to arrive at diagnosis as well as for effective management of patients presenting with vertigo. History alone reveals the diagnosis in about 75% of patients¹. Hence it is important to establish that the patient truly has vertigo while taking the history [1, 10]. The duration of the vertigo, what provokes or aggravates it and any associated hearing loss are vital aspects of the history in patient presenting with peripheral vertigo.[1, 10, 11]

Treatment of vertigo in many cases is multidisciplinary and involves the Otorhinolaryngologist, Orthopedic surgeon, Physiotherapist, Neurologists, Psychiatrist, and Neurosurgeons [1, 2, 4, 12, 13]. Conservative approach is successful in large percentage of patients [2, 3, 8, 9, 12, 13] but surgery may be indicated in those patients that are refractory to medical care^{8, 13} and this must be tailored to the identified cause. [13, 14]

Vertigo poses a challenge to the patients and therapeutic dilemma to the attending physician, unfortunately, little information is available on vertigo in Nigeria. The objectives of this study therefore was to review cases of vertigo due to peripheral vestibular disease with the aim of finding the aetiology and risk factors, management and outcome as seen in a tertiary health facility in a young ENT practice of a developing country.

Materials and Method

The study is a retrospective review of patients that were managed for peripheral vestibular disease at a tertiary health facility in Nigeria between July 2007 and June 2012. Information retrieved from patient records included patients'

age, gender, timing and duration of the vertigo, provoking or aggravating factors, associated symptoms (nausea, vomiting and hearing loss), patient's past medical history (medications, trauma), neuro-otological examination findings, cervical spine radiological findings, audiometric and laboratory findings, treatment and outcome. Excluded were patients whose records could not be located and records with incomplete information.

Diagnosis is majorly clinical supported by investigative findings:

Ménière's disease: Recurrent episodes of vertigo which last minutes to hours, fluctuating hearing loss, tinnitus, with/without aural fullness

Benign positional paroxysmal vertigo: Transient episodes of vertigo, which last for seconds caused by head movement, Dix-Hallpike maneuver is positive in majority of the patients.

Acute labyrinthitis: Inflammation of the labyrinthine organs caused by viral or bacterial infection

Acute vestibular neuronitis: Inflammation of the vestibular nerve, usually caused by viral infection, vertigo last for days in most cases

Cervical vertigo: Vertigo last for seconds to minutes and usually triggered by somatosensory input from head and neck

Psychogenic vertigo: Constant vertigo lasting weeks without improvement

The data was entered into a spread sheet and presented in simple descriptive forms as proportions using tables and charts. A statistical analysis was done using statistical package for social sciences SPSS version 14 (Chicago, IL) with means, frequencies calculated.

Results

A total of 42 patients had complete records for analysis consisting of 18 (42.9%) males and 24 (57.1%) females, M:F ratio was 1: 1.3. The age ranged between 3 and 87 years, mean age was 48.7 ± 18.5 years and age group 41 – 60 years was the preponderance group (35.8%). The age, sex and occupational distribution were shown in table 1.

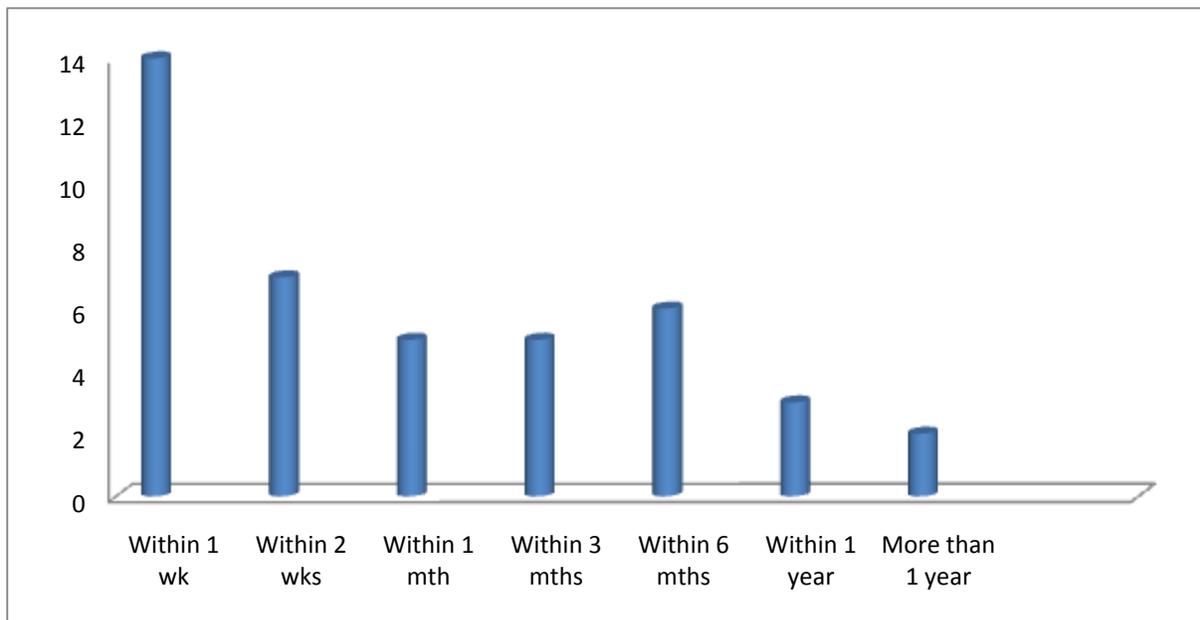
Table 1: Age, gender and occupation distribution

Variables	Frequencies	percentage
Age (years):		
1 – 10	1	2.4
11 – 20	1	2.4
21 – 30	7	16.7
31 – 40	5	11.9
41 - 50	9	21.4
51 – 60	6	14.3
61 and above	13	30.9
Total	42	100
Gender:		
Male	18	42.9
Female	24	57.1
Total	42	100

Occupation:		
Traders	15	35.7
Teaching / lecturing	7	16.7
Civil servant	5	11.9
Student	5	11.9
Retiree	4	9.5
Farmer	2	4.8
Dependant	2	4.8
Banking	1	2.4
Clergy	1	2.4
Total	42	100

All the patients presented with symptoms of vertigo, 20 (47.6%) recorded average duration of episode of vertiginous attacks in seconds, 15 (35.7%) recorded within minutes to hours, 3 (7.1%) recorded within hours to days and 1 (2.4%) recorded within days and in 3 (7.1%) there was no definite pattern. Majority of the patients had been receiving treatment from general practitioners before presentation and only 14 (33.3%) presented within first week of onset of vertiginous attack Figure 1 shows duration of onset of vertiginous attack before presentation.

Figure 1: Duration of vertiginous attack before presentation.



Other symptoms were tinnitus (69%), hearing impairment (23.8%), neck pain (14.3%) and nausea and vomiting (42.9%). Clinical signs on neuro-otological examination were elicited on 16 (38.1%) patients, it was not remarkable in 13 (31%) patients while in 13(31%) were not properly documented. There was history of recurrence of vertiginous attack in 36 (85.7%) patients duration of which ranged from 1 week to 5 years.

Pure tone audiometry (PTA) of 24 patients were available for review out of which 13 (54.2%) were normal and 11 (45.8%) were abnormal. Five (20.8) % of the abnormal PTA were mild HL, 4 (16.7%) were moderate HL and 2 (8.3%) had severe HL. Ten patients suspected of cervical spondylosis had cervical spine radiograph, out of these 6/10 (60%) or 14.3% of all the patients had abnormal radiological findings.

Table 2: Pure tone audiometry of 24 patients with peripheral vestibular disorders; and among various age groups

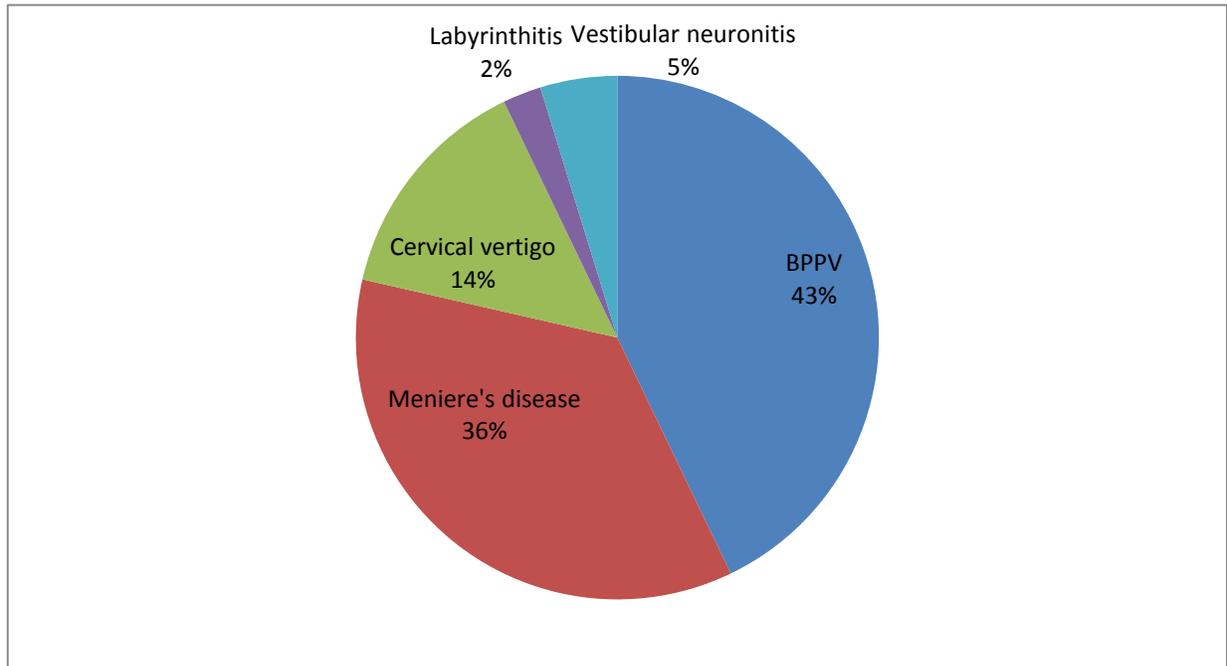
Variables	PTA (Threshold level)				Total
	Normal	Mild	Moderate	Severe	
Diagnosis:					
BPPV	5	2	1	-	8
Menniere's disease	6	3	2	1	12
Cervical vertigo	-	2	1	-	3
Labyrinthitis	-	-	-	1	1
Vestibular neuronitis	-	-	-	-	-
Total	11	7	4	2	24
$X^2 = 39.89, p < 0.05$					
Age (years):					
1 – 20	-	-	-	1	1
21 – 40	5	-	1	-	6
41 – 60	6	2	1	-	9
61 – 80	2	2	2	1	7
81 and above	-	1	-	-	1
Total	13	5	4	2	24
$X^2 = 46.53, p < 0.05$					

NB:

Normal hearing = 0 – 25dB
 Mild HL = 26 – 40dB
 Moderate HL = 41 – 55dB
 Moderately severe = 56 – 70 dB
 Severe = 71 – 90 dB
 Profound = \geq 91dB

The radiological findings included; anterior and posterior osteophytes, straightening of normal cervical spine lordosis, reduction of the vertebral height, and narrowing of the disc spaces. Eighteen patients (42.9%) have benign positional paroxysmal vertigo (BPPV) followed by Meniere's disease in 15 (35.7%) patients, other differential clinical diagnosis is shown in figure 2.

Figure 2: Differential diagnosis of peripheral vestibular disease.



All our patients were managed conservatively with good outcome. They all received labyrinthine sedatives for one to two weeks. Various other treatment modalities are shown in table 3

Meniere's disease and BPPV were randomly distributed among various occupational groups, 3 (50%) of cervical spondylosis was found among teachers, 2 (33.3%) was found among typists/ secretaries and 1 (16.7%) among farmers. A case of labyrinthitis secondary to chronic discharging ear was found in a child and 1 case of vesibular neuronitis was found among a teacher and a trader each.

Table 3: Conservative modality of treatment of patients with peripheral vestibular disease

Treatment	Frequencies (N = 42)	Percentage
Labyrinthine sedatives	42	100
Muscle relaxant/ anxiolytics	22	52.4
Eply manoeuver	9	21.4
Physiotherapy	6	14.3
NSAID	6	14.3
Cervical collar immobilization	5	11.9
Steroid	3	7.1

NB: Some patients received 2 or more treatment modalities

Discussion

Vertigo, the major symptom of peripheral vestibular disease and is reported to be one of the common complaints to the Otolaryngologists especially amongst the elderly [2, 5, 15]. Though, the prevalence of this disease is not known in Africa, it is however reported to affect more than 90 million Americans 75 years of age or older [2, 5, 15, 16]. Preponderance of the disease among the female seen in the present study was similar to the findings from previous published studies [1, 8, 9, 15, 16] and the reason for female preponderance is not known. Amusa et al [12] in their study however reported preponderance of the disease among men. Majority (30.9%) of those affected was 61 years and above in the present study consistent with the assertion by [Thompson](#) et al [15] that the disease predominantly affects the elderly.

The mode of presentation, characterization of vertiginous attack, duration and trigger factors of vertigo are an important aspect of the history that helps to arrive at correct diagnosis and to decide on appropriate treatment modality [1, 2, 8, 15, 17]. Hence, the trend of presentations and duration of vertiginous attacks seen in this study was similar to that reported by Somefun et al [2] in Lagos, Nigeria. Labuguen et al [1] in USA opined that history alone reveals the diagnosis in roughly 75% of patients. Nwaorgu in Nigeria reported that medical history provides the key information for deciding on the type of dizziness/vertigo and its likely cause [3].

Peripheral vertigo are more likely to begin with an acute episode of vertigo associated with nausea and/or vomiting unlike central vertigo which is more likely to be insidious in onset and give more severe symptoms of imbalance [1]. The pattern of presentation in the present study in which 66.7% presented after the 1st week of onset of vertiginous attack and 28.6% presented at/after 6 months for which most of them have initially consulted general practitioner agrees with the assertion that most patients with vertigo initially consult the general duty doctors [1, 2, 18]. A large population study in the UK shows that 5 out of every 1000 people consult their general practitioner each year for vertigo [18]. Somefun et al [2] in their study 'Vestibular disorders among adults in Lagos, Nigeria' concluded that, 'peripheral vestibular disorders are common of which BPPV is the most prevalent and that pre-referral anti-vertiginous medication is common among general practitioners'.

Peripheral vestibular disease has numerous etiologies, and it often poses difficulty for the general practitioner to elucidate the diagnosis and decide how to proceed with medical management [15]. Therefore, higher prevalence and frustrating nature of the disease especially among the elderly implies that general duty doctors (usually the first point of call) need to be aware and should be well informed about the nature and treatment modalities so as to avoid prolonged usage of anti-vertiginous drugs, this will allow for early central compensation and recovery. They should be able to refer these patients promptly to Otolaryngologist or other relevant specialty for better evaluation and appropriate management [2, 3, 12]. Labuguen in USA stated that 'if the diagnosis of vertigo is unclear or if the patient has a medical problem requiring further subspecialty care family physicians should consider referral to the appropriate subspecialist'[1].

Only thirty eight percent of patients in this study had clinical signs on neuro-otological examinations; previous study also reported similar findings [2]. In most cases of dizziness/vertigo, no abnormality is identified unless the patient is experiencing an acute vestibular episode when examined, or there is associated neurological pathology [2, 18]. Another factor might be due to the fact that most of these patients had been prescribed anti-vertiginous medication from the referring general practitioners [2].

Relevant and specific investigations based on clinical suspicion are paramount at arriving at specific diagnosis in patients with peripheral vestibular disease. Thus early referral from general practitioner when the diagnosis is unclear cannot be over emphasized.

The pattern of pure tone audiometry (PTA) recorded in this study was similar to the findings in previous study [2]. Audiologic testing has been shown to be relevant and may reveal associated conductive or sensorineural hearing loss [15]. Although in vestibular neuronitis, the disease process affects only the vestibular portion of the vestibulocochlear apparatus, there is an absence of cochlear symptoms but patients with labyrinthitis, meniere's disease and cases of cervical vertigo present with complaints indicative of both vestibular and cochlear damage [1, 3, 9, 15] Hearing loss of 55 – 60 % among patients with vertigo has been reported [3, 9].

The course of pathologies in peripheral vestibular disease is variable and majority will develop progressive hearing loss [15, 19] hence, the hearing function of the patient is therefore dependent on the pathology as well as the time of presentation. Thompson et al [15] reported that patients with meniere's disease complain of spontaneous episodic attacks of tinnitus, aural fullness, fluctuating hearing loss, and vertigo superimposed on a gradual decline in hearing. This was the findings in the present study where majority (54.5%) of the hearing loss ($X^2 = 39.89$, $p < 0.05$) was found among patients with meniere's disease.

Imaging has been found to be a useful tool in evaluation of vertigo when patient is suspected of structural lesions. Physicians should consider neuro-imaging studies in patients who have associated neurologic signs and symptoms as well as risk factors for cerebrovascular disease, or progressive unilateral hearing loss [20, 21]. Nwaorgu et al [3] opined that plain radiography remains an investigative tool in assessing the cervical vertebrae for early diagnosis and treatment of patients with degenerative changes that may cause vertigo. A possible risk of vertebral artery compression exists in cervical degenerative changes thus making judicious ordering of X-rays of the cervical spine imperative in such patients [22, 23]. All our patients with suspected cervical spondylosis had plain cervical spine radiograph out of which 60% of them were radiologically confirmed. Pathogenesis of vertigo among these patients had been previously discussed [3, 9, 13, 14, 23].

BPPV followed by meniere's disease as the major cause of peripheral vestibular disease in the present study agrees with reports from previous studies [1, 2]. [Thompson](#) in USA reported that benign paroxysmal positional vertigo (BPPV) is considered the most common peripheral vestibular disorder, affecting 64 of every 100,000 Americans [15, 24]. BPPV has no racial bias with a life time prevalence of about 2.4% [2, 8, 25 - 27]. BPPV and meniere's disease as seen in this study and agrees with published studies have female preponderance and predilection for older age group [1, 2, 8, 15].

The distribution of patients with cervical vertigo on various occupations that pose some risk deserves attention. Majority of those affected were essentially teachers (50%). Risk for the development of cervical spondylosis in this group of people had been reported [3, 9, 12, 13]. Lasisi et al [9] reported socio-occupational life style especially those that require persistent neck extension as a risk factor for the development of cervical spondylosis and its consequence of cervical vertigo. Though pathogenesis of vertigo in cervical spondylosis is complex and multifactoria [3, 9], the predominant of spondylosis among these occupational groups might have suggested cervicogenic origin for vertigo. Arthritis and degenerative effect of ageing are other factor that might be responsible for cervical spondylosis [9]. Owolabi et al [13] reported rotational vertebral artery occlusion resulting from cervical spondylosis in the presence of atherosclerosed collateral vessels causing posterior circulation insufficiency manifesting as vertigo, they then proposed the tetrad of vertigo resulting from vascular risk factors, cervical spondylosis, and head rotation [13]. Vertigo in these patients may be due to reduction in vertebrobasilar blood flow or compression of cervical nerves leading to abnormal afferent firing from cervical proprioceptor causing abnormal sympathetic and vestibular functions [9, 28 - 30].

Various treatment modalities available for the treatment of peripheral vestibular disease abound, but majority of the patients usually do well on conservative management [8, 9, 30 - 33]. Previous published study reported that only severe cases of peripheral vestibular disease that are intractable and unresponsive to medical treatment may require surgical intervention [15, 32]. Lasisi et al [9] reported 81% resolution of vertigo on patients with cervical spondylosis and concluded that conservative treatment forms the mainstay of vertigo control.

Majority of the patients with BPPV usually benefit from canalith repositioning (Epley maneuver); this procedure remains the gold standard in the treatment of BPPV except for very occasional intractable cases that might require surgery [15, 24, 25, 27]. The maneuver attempts to reposition the free-floating canalith particles from the semicircular canals to the utricle using gravity. Thompson et al [15] reported canalith repositioning to be effective in 91% of the patients with BPPV and only those patients with symptoms refractory to repositioning maneuvers may be candidates for singular neurectomy or posterior semicircular canal occlusion. Nine of our patients had complete resolution of their symptoms with canalith repositioning maneuver.

Patients with cervical vertigo were managed with cervical collar, physiotherapy, labyrinthine sedatives and analgesic and more than 90% had resolution of vertiginous attacks. This modality of treatment had been reported to be effective in managing patient with cervical vertigo [3, 9].

Vertigos that were due to infective origins in this study did well with antibiotics, labyrinthine sedatives and steroid. This corroborated the previous assertion that treatment of patients with vertigo of infective origin is aimed primarily at eradication of the underlying infection and supportive care [15]

Conclusion

In conclusion, conservative management of peripheral vertigo resolves most of the cases, and its effectiveness depends on accurate diagnosis and appropriateness of the choice of therapy. General practitioners should be informed about differential diagnosis of this condition, avoid injudicious use of anti-vertiginous drugs and promptly refer difficult to diagnose patients to relevant specialist for proper evaluation and treatment.

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