Dizziness in the elderly

Introduction

Dizziness is a common presenting symptom in the elderly population. Its prevalence increases with age. At the age of 70 years one third of the population has balance problems, but this increases to about 50% at the age of 90 years (Jonsson et al, 2004). It is more common in women (Colledge et al, 1994).

As the elderly may have other comorbid conditions, it can be difficult to diagnose the cause of the dizziness (Uneri and Polat, 2008). Dizziness is a term that may represent a number of symptoms and can be caused by a variety of conditions (Kruschinski et al, 2010).

In the elderly, dizziness can often lead to falls. Apart from the substantial effect this has on health economics, the subsequent fear of falling leads to a lack of confidence, fear of going out and social isolation. This can have wide-ranging impacts on the patient and his/her carers. The psychological impact of dizziness in the elderly cannot be underestimated. Dizziness and loss of balance often lead to a marked secondary anxiety state. This is worse if the dizziness is compounded by falls, as the fear of falling makes the anxiety worse.

Patients with dizziness are most often managed in primary care. Effective management at this level is crucial. In the elderly dizziness is often multisensory or multifactorial. It may be the first presenting symptom of a serious underlying pathology which needs to be identified and treated. Understanding the differences between the presentations of various pathologies is crucial to appropriate diagnosis and further management.

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Defining dizziness

The maintenance of balance is complex and depends on normal vestibular, visual and proprioceptive inputs (Luxon, 2004). These pass into the CNS, where they are integrated. The cerebellum, the extrapyramidal system, the limbic system and the cerebral cortex then modulate these inputs to provide spatial perception, eye movement control and postural stability. A malfunction in either the sensory inputs or the integrating mechanisms can lead to dizziness or instability. The diagnosis and management of dizziness in the elderly can be difficult, as they often have other comorbidities and a variety of other factors causing instability.

Although dizziness implies an impaired sense of spatial perception and stability, it is an imprecise term and could mean different sensations to different individuals. Dizziness has been grouped into four different types of symptoms:

1. Vertigo or an illusion of movement
2. Presyncope
3. Disequilibrium
4. Vague light-headedness (Drachman and Hart, 1972; Mukherjee et al, 2003).

Individuals may also describe other sensations, e.g. 'muzzy-headed' or 'feeling drunk'. It is important to get the patient to describe his/her symptoms rather than just use the term 'feeling dizzy', as obtaining a detailed history and thorough clinical examination is the most important step in diagnosing the aetiology of the dizziness (Bronstein et al, 2010).

Vertigo is an illusion of movement – either of self or the environment. It is classically a spinning or rotatory sensation, but it could also be a linear one, e.g. 'the walls tilt sideways', 'the floor appears to come towards me'. The patient may also describe oscillopsia, which is a sensation of the visual field bouncing or oscillating. Vertigo is usually the result of a disorder of the vestibular system.

Presyncope or near fainting is a sensation of impending faint and may be accompanied by a feeling of generalized weakness (Karatas, 2008). This is more likely to be caused by general medical disorders including postural hypotension, cardiac arrhythmias, hypoglycaemia or vasovagal episodes.

Disequilibrium is a sense of unsteadiness which is more pronounced when the patient is walking. This may be caused by vestibular pathology, sensory or motor disorders including peripheral neuropathy, muscle weakness, joint problems like osteoarthritis, visual problems, Parkinsonism and cerebellar ataxia.

Lightheadedness may be caused by a number of pathologies including vestibular, neurological, general medical or psychogenic ones.

Ageing and balance

There are various reasons for increased balance problems in the elderly, vestibular senescence being one. Age-related decreases in the hair cell count and deformities of the cilia have been noted in the vestibular sensory and supporting cells (Walther and Westhofen, 2007). Degenerative changes in the otoconia lead to an increased incidence of benign paroxysmal positional vertigo in the elderly. In addition to these vestibular changes, visual problems like cataract, macular degeneration and diabetic eye changes, sensory changes like peripheral neuropathy and degenerative joint conditions like osteoarthritis affect the maintenance of balance in the elderly population. Some authors have found cardiovascular disease (Maarsingh et al, 2010) or cerebrovascular disease (Colledge et al, 1996) to be the commonest cause of dizziness in the elderly, while others have found vestibular problems to be more common (Kroenke et al, 1992).

Cerebrovascular events involving the brainstem and cerebellum (posterior fossa) are a major cause of acute vertigo in the elderly patient. There may be additional neurological features like hemisensory loss, ataxia, dysarthria or cranial nerve palsies. Occlusion of the anterior inferior cerebellar artery (AICA syndrome) causes acute vertigo, ipsilateral deafness, Horner's syndrome, ipsilateral facial paralysis and ataxia. In cerebrovascular events involving the posterior inferior cerebellar artery (PICA syndrome, lateral medullary syndrome or Wallenberg syndrome) in addition to acute vertigo, there is limb ataxia, hoarseness, dysphagia, ipsilateral facial paralysis and

Horner's syndrome. The main difference between PICA and AICA syndrome is that in PICA syndrome hearing is not affected, but there is involvement of lower cranial nerves causing hoarseness and dysphagia.

Dizziness is a multifactorial geriatric syndrome that may result from interactions between a variable numbers of domains (Tinetti et al, 2000). Use of multiple medications is another cause of dizziness in the elderly (Kao et al, 2001).

An undesirable consequence of dizziness in the elderly is an increased incidence of falls. It has been estimated that about 7–20% of the elderly fall as a result of dizziness (Sixt and Landahl, 1987; Jonsson et al, 2004). The fear of falling is a major concern for the elderly (Kruschinski et al, 2010) and this in turn leads to a loss of confidence in going out. The resultant inactivity further impedes the balance (Umapathy and West, 2005).

Assessment of the elderly dizzy patient

The common causes of dizziness in the elderly are as detailed in *Table 1*. It can often be multifactorial.

An essential step in the assessment of dizziness is to differentiate if the aetiology is vestibular or non-vestibular. Vestibular causes include problems in the peripheral or central vestibular components. The peripheral vestibular organs consist of the semicircular canals, the utricle, saccule and the vestibular nerve. The central vestibular part is made of the vestibular nuclei, vestibulo-cerebellum, brainstem, spinal cord and vestibular cortex (Chan, 2009). If the dizziness is of vestibular origin, the next step is to determine if it is of peripheral or central origin. The main differences in the clinical features between central and peripheral vestibular pathology are given in *Table 2*.

Table 1. Common causes of dizziness in the elderly

General medical	Cardiovascular	Arrhythmia
		Postural hypotension
	Haematological	Anaemia
	Metabolic	Diabetes – hypo- or hyperglycaemia
Neurological	Cerebrovascular disease	Brainstem ischaemia
		Cerebellar strokes
	Migraine	
Otological	Benign paroxysmal positional vertigo	
	Uncompensated peripheral vestibular impairment following vestibular neuronitis or labyrinthitis*	
Multisensory or multifactorial		
Others	Multiple medications	

* Labyrinthitis, although commonly thought to be viral, could also have an autoimmune basis. Vascular pathology could cause an acute labyrinthine dysfunction mimicking viral or autoimmune labyrinthitis

History

A systematic approach based on the patient's symptoms often helps to arrive at a correct diagnosis. It is very important to note the mode of onset and description of first episode, the frequency and duration of each episode, any provoking factors and the presence of any associated symptoms. A guide to systematic assessment of a 'dizzy' patient is illustrated in *Figure 1*.

Clinical examination

A thorough clinical examination should include measurement of lying and standing blood pressure to note any postural drop, otoneurological examination including vestibular assessment, general medical examination and neurological examination if indicated, as outlined in *Table 3*.

Table 2. Main differences in the clinical features of central and peripheral vestibular pathology

			Peripheral	Central
Presenting symptoms	Vertigo or hallucination of movement		Common	Less common (unless acute brainstem or cerebellar event)
	Nausea, vomiting, other autonomic symptoms		More marked	Less marked
	Triggered by head movements or head position		Common	May not be present
	Imbalance or disequilibrium mainly when walking		May not be marked	More marked
	Auditory symptoms		More likely to be present	Less likely to be present
	Loss of consciousness or other sensory symptoms		Unlikely	More likely
Signs	Neurological signs		Unlikely	More likely
	Nystagmus	Direction	Horizontal, horizontal/torsional or torsional/vertical, conjugate	Pure vertical or pure torsional, disconjugate*
		Optic fixation	Suppresses nystagmus	No effect
		Change with time	Diminishes over time with central compensation	No change

* A pure vertical or a pure torsional nystagmus is always a central nystagmus. A peripheral vestibular nystagmus is conjugate; a central nystagmus can be disconjugate

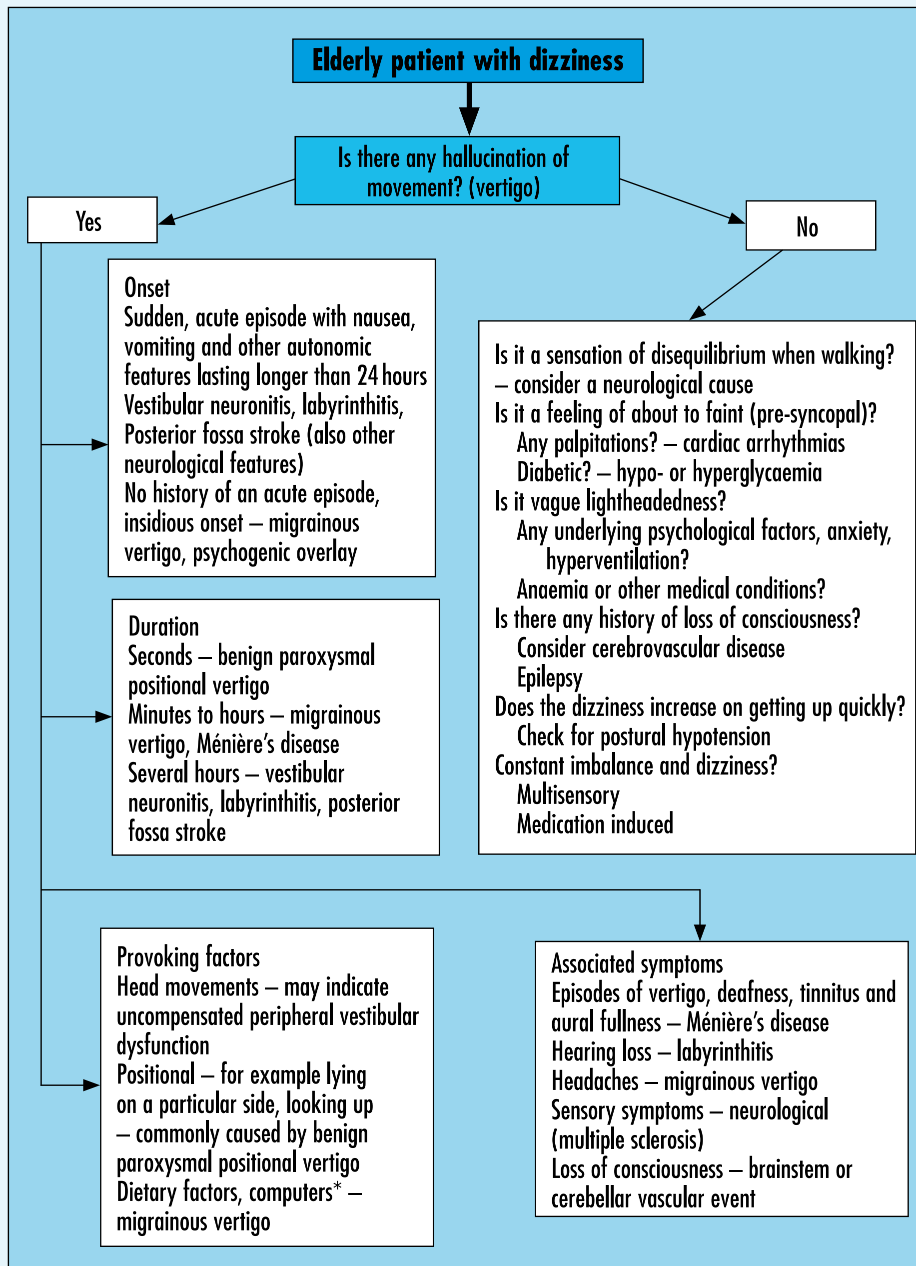

*Figure 1. Flow chart for history taking from an elderly dizzy patient. *Migraine triggers can also provoke dizziness. Additionally, avoiding known migraine triggers can improve the dizziness.*

Investigations

In most cases the cause of dizziness can be diagnosed with a good history and thorough clinical examination; expensive investigations are rarely needed (Colledge et al, 1996). General medical investigations required are directed by the history. Objective vestibular assessments such as videonystagmography and calorics are only needed in some cases. A magnetic resonance imaging scan of the internal auditory meati and brain may be indicated if a central cause of dizziness is suspected.

Treatment

If a definite cause like benign paroxysmal positional vertigo is identified, it is treated by the appropriate canalith repositioning procedure. In a patient with acute vertigo caused by vestibular neuronitis or labyrinthitis, symptomatic treatment with a vestibular sedative like cinnarazine 15 mg three times daily may be effective. Prochlorperazine is useful in controlling the nausea and vomiting, but not the vertigo. In patients with chronic or recurrent vertigo the treatment may be divided into the following categories:

1. Physical exercise regimen or vestibular rehabilitation exercises – this has been shown to be effective even when no specific cause has been found (Jung et al, 2009)
2. Treatment of any underlying medical conditions like anaemia, hypothyroidism or migraine, which may be affecting central compensation after a peripheral vestibular dysfunction
3. Pharmacological treatment – vestibular sedatives are useful only in the acute phase of vertigo. Long-term use of vestibular sedatives hampers central compensation of a vestibular dysfunction and should be discouraged
4. Psychological support – in patients with avoidance behaviour, cognitive behaviour therapy may be useful.

Benign paroxysmal positional vertigo

This condition deserves a special mention as not only is this the commonest vestibular cause of dizziness in the elderly (Uneri and Polat, 2008), it is also the most easily treated. Patients typically complain of momentary episodes of vertigo triggered by positional changes of the head, like lying on a particular side, turning over in bed, looking up or bending over. There are no associated auditory symptoms.

The condition is diagnosed by Dix–Hallpike positional testing. The test is done with the patient sitting on the couch, the examiner turns the patient's head by 45° to one side and then rapidly lies the patient down so that his/her head is hanging from the edge of the couch by 30°. The patient is instructed to keep his/her eyes open so that they can be observed for the typical nystagmus. This appears after a brief latent period of a few seconds.

It is torsional with the upper pole of the eye beating towards the undermost ear; there is also a vertical upbeating component. The nystagmus lasts for about 20–30 seconds. It is subject to fatigue in that it may decrease or disappear with repeated positional testing. The condition is caused by free floating debris or otoconia collecting within the semicircular canals (usually posterior). It is treated with a canalith repositioning procedure, in which the patient's head is moved into different positions so that the debris migrates back into the utricle (Epley, 1992).

Conclusions

Dizziness is a common presenting complaint in the elderly. It may often be multifactorial, but careful assessment will lead to the identification of treatable causes. Often, treating even one component of the multiple problems may lead to an overall remarkable improvement in the quality of life. Hence attention to detail is of the utmost importance when assessing patients presenting with 'dizziness'. BJHM

Conflict of interest: none.

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Table 3. Key points in the clinical examination of an elderly patient with dizziness

General examination	Lying and standing blood pressure	
	Check for pallor	
	Look for obvious neurological signs like features of Parkinson's disease	
Otoneurological examination (including bedside vestibular assessment)	Otoscopy	
	Hearing assessment	
	Eye movement examination – this forms the cornerstone of the examination of a dizzy patient	Look for spontaneous or gaze-evoked nystagmus
		Check smooth pursuit, saccades, optokinetic nystagmus
	Bedside tests for vestibulo-ocular reflex	Head thrust or head impulse test*
		Dynamic visual acuity test†
	Dix–Hallpike positional test to diagnose benign paroxysmal positional vertigo ‡	
	Tests for posture and gait (vestibulospinal reflex tests)	Romberg
		Untenberger §
		Tandem gait
	Check the cranial nerves	
	Check cerebellar function	

*Head thrust or head impulse test – examiner asks patient to fixate on a target (for example the centre of the examiner's forehead), rapidly turns the patient's head about 15° to one side and observes the patient's ability to keep eyes fixated. In case of a peripheral vestibular lesion, the patient exhibits a catch up saccade when the head is being turned to the affected side (Halmagyi and Curthoys, 1988). † Dynamic visual acuity test – using an appropriate visual acuity chart (Logmar or Snellen), the patient's visual acuity is first tested by noting the last line he/she can read. The examiner then stands behind the patient and oscillates the patient's head at 1–2Hz; the patient's visual acuity during the head movement is noted. Normal individuals may lose one line, dropping two or more lines would indicate a problem with the vestibulo-ocular reflex (Bronstein and Lempert, 2007), this is especially noticeable in cases of bilateral vestibular failure. ‡ Dix–Hallpike is discussed in the text. § Untenberger – the patient is asked to march on the spot with eyes closed. In cases of unilateral vestibular hypofunction, the patient may deviate towards the side of lesion.

KEY POINTS

- The term dizziness could mean a hallucination of movement (vertigo), near fainting (presyncope), disequilibrium or vague lightheadedness.
- Dizziness is a common symptom in the elderly and often there may be more than one underlying cause.
- Good history and thorough clinical examination is the most important step in diagnosing dizziness; expensive investigations are rarely needed.
- Psychological factors resulting from the dizziness, such as fear of falling, secondary anxiety and lack of confidence, are common in the elderly. These must be identified and appropriately managed.
- Long-term use of vestibular sedatives hampers central compensation of a vestibular dysfunction and should be discouraged.
- It is important that dizziness is effectively managed at all levels of care. Referral to appropriate specialist centres may be necessary.