Assessment, diagnosis and management of the dizzy patient

Abstract

Dizziness and balance disorders are very common problems. Having a structured approach, including adequate history taking and clinical examination, in a multidisciplinary environment allows for effective management of patients with these complex symptoms. Hearing assessment is an integral part of the assessment of patients with dizziness, along with the occasional need for further testing. Identifying red flags, along with the ability to involve different medical specialties, are prerequisites for safe management and a successful outcome. While surgical intervention has a small role in the management of balance disorders, vestibular rehabilitation remains the cornerstone of treatment, along with different supportive measures. This article outlines the approach used in the authors' centre to manage patients with dizziness and balance disorders.

Key words: Balance; Dizziness; Dizzy; Vertigo; Vestibular rehabilitation

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Introduction

Vertigo, balance and dizziness disorders are common throughout primary and secondary care and are eventually referred to a handful of specific ear nose and throat balance and dizziness clinics (Newman-Toker and Edlow, 2015; Wuyts et al, 2016). Precise statistics are highly variable because of the marked variability in definitions used, population groups studied and research methodologies used. Murdin and Schilder (2015) identified a lifetime prevalence of 17–30% in the general population. However, it is well recognised that the incidence rises steadily with age. Balance and dizziness disorders have a huge impact on patients' quality of life as well as their mental health.

A systematic review by Kovacs et al (2019) reported vertigo to be a rising burden on the healthcare system, related to repeated and not well-targeted healthcare consultations, excessive use of expensive diagnostic imaging and unnecessary admissions to emergency care. This study also identified additional indirect costs as a result of sick leave and occupational disability (Kovacs et al, 2019).

Other studies (Agrawal et al, 2017; Ciorba et al, 2017) confirm the huge burden of these disorders on healthcare systems and the negative impact on patients' quality of life, highlighting the need for efficient diagnosis and management of the dizzy patient.

Despite symptoms frequently being disabling, many patients fail to get a satisfactory diagnosis. Differential diagnosis of the 'dizzy patient' can be difficult, but taking a detailed history and performing an objective clinical examination enables a clinical diagnosis to be reached in the majority of patients, allowing an effective management plan and better prognosis.

There are various models of assessment, including TiTrATE (Newman-Toker and Edlow, 2015), 'SO STONED' (Wuyts et al, 2016) and HINTS to infarct (Newman-Toker et al, 2009). Irrespective of each one's specific approach, all aim to differentiate serious causes from benign causes (central from peripheral) and unilateral from bilateral weakness.

The assessment goals are therefore to effectively and efficiently identify the pathology, enabling optimum management and patient education. This will optimise the patient journey, while reducing costs. Specifically, it is important to differentiate a peripheral vestibular disorder (such as benign paroxysmal positional vertigo, labyrinthitis, neuritis, persistent postural-perceptual dizziness, superior semi-circular canal dehiscence, Ménière's disease or bilateral vestibular loss) from a central disorder (such as migraine vertigo, central ischaemia, neuropathy, post-concussion, multiple sclerosis or acoustic neuroma). (Note that neither list is exhaustive.)

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Patients with serious causes of dizziness, such as stroke, cardiac problems, tumours or other sinister pathology, may also occasionally present to ear nose and throat balance and dizziness clinics.

Assessment

The authors' ear nose and throat balance and dizziness team performs initial history taking focusing on a clear description of symptoms, frequency, duration and aggravating factors. Tables 1 and 2 show the most common conditions, but they are not exhaustive.

Benign paroxysmal positional vertigo is the most common peripheral vestibular disorder, is more prevalent in women and its incidence rises with age. Recurrence is common and it is a well-recognised risk of falls in the elderly (Kasbekar et al, 2014). Within the authors' balance and dizziness clinics it accounts for approximately 25% of new patient diagnoses.

Otological history

All new patients with balance problems or dizziness must undergo detailed otological assessment at first presentation, as hearing loss is essential to consider in the differential diagnosis. The otological history must include questions regarding discharge, otalgia, tinnitus, aural fullness and history of previous ear surgery.

While this approach helps with the formulation of a differential diagnosis, the following areas still need to be covered:

Past medical history

This specifically includes previous vertigo disorders, previous history of cancer, cardiac conditions, trauma, neurological disease, diabetes and thyroid dysfunction. The authors also ask about any history of head trauma, anxiety or migraine, all of which can be the initial cause, and also affect prognostic indicators of recovery (Zhu et al, 2019).

Table 1. Episodic balance conditions

	Symptoms	Duration	Frequency	Exacerbated by	Hearing loss
Benign paroxysmal positional vertigo	Rotatory vertigo	Seconds	Daily	Head extension, rolling in bed	Nil
Ménière's disease	Severe vertigo with residual 'hangover' type feeling for hours after Hearing loss Tinnitus Ear fullness	20 mins to 12 hours	Weekly, monthly or years in between	Spontaneous	Unilateral hearing loss (bilateral is possible)
Persistent postural-perceptual dizziness	General disequilibrium (may have autonomic factors)	Hours	Daily	Visual triggers and patterns	Nil
Migraine vertigo	Dizziness and general disorientation, (photophobia, phonophobia, travel sickness, headache features are likely)	Minutes, hours or several days	Daily	Poor sleep, stress, migraine triggers, busy environments	Nil
Superior semi-circular canal dehiscence	Vertigo Dislike gravity head movements Background disequilibrium Autophony	≤1 minute	Daily	Loud noise or pressure Positive Tullio phenomenon Valsalva	Nil or hyperacusis
Orthostatic hypotension	Light headedness (may have known blood pressure changes)	≤1 minute	Daily	Sitting to standing, or assuming upright posture	Nil

Table 2. Non-episodic balance conditions

	Symptoms	Duration	Frequency	Exacerbated by	Hearing loss
Bilateral vestibular loss	Oscillopsia on background disequilibrium (recent illness requiring antibiotics is common)	Seconds or minutes	Daily	Quick head movements, in the dark or on uneven ground	May or may not be present
Cerebello-pontine angle lesions, eg vestibular schwannoma	Vertigo General disequilibrium Very variable	From seconds, to hours, to continuous	Daily		Unilateral hearing loss +/- unilateral tinnitus
Labyrinthitis or vestibular neuritis	Severe vertigo initially, nausea or vomiting, followed by disequilibrium	Constant for 3 days, then seconds or minutes	Most days		Preserved in vestibular neuritis Unilateral loss likely in labyrinthitis
Presbyastasis	Light-headedness and disequilibrium	Continuous	Daily		Nil (symmetrical age-related or presbyacusis changes common)
Psychogenic	Rarely classic vertigo Anxiety Light-headedness	Variable: minutes or hours, or continuous	Variable	Panic attacks, worsening stress, anxiety attacks	Nil
Central ischaemia	Severe vertigo	Continuous	Daily	Nothing	Nil

Drug history

Ototoxic medication includes chemotherapy and certain intravenous antibiotics. Polypharmacy in itself can trigger dizziness (Shoair et al, 2011). Very few medications can help the chronic dizzy patient and are far more likely to inhibit vestibular compensation.

Social history

This includes occupation, normal activity levels, hobbies, sports and normal level of independence in order to gauge how functionally affected the patient may be as a result of their symptoms. This information also helps to set future goals for rehabilitation and recovery.

This information is combined with that from the detailed subjective assessment and should allow a possible hypothesis to be formed or indicate several differential diagnoses to consider, as the authors then continue through a detailed physical examination.

Physical examination

This includes examination of general wellbeing and posture. Basic assessment of gait is performed, looking for spontaneous or guarded movement, neurological gait patterns, speed and confidence, and any reliance on walking aids. Cervical range of movement is assessed, and cranial nerve and coordination tests are undertaken – an abnormality in these suggests central rather than peripheral vestibular disorder.

Audiological assessment is required in all new patients, which comprises otoscopy, audiogram (with comparison to any previous audiograms) and tympanometry.

Specific vestibular clinical assessment testing

Oculomotor examination

Detailed descriptions of these tests is beyond the scope of this article, but they are documented elsewhere (Power et al, 2020). They include:

- Spontaneous nystagmus, clarification of direction if present
- Ocular alignment (may indicate an ophthalmic or central cause)
- Convergence (abnormality may indicate ophthalmic or central cause, and is often very symptomatic in post-concussion and migraine patients)

- Smooth pursuit and saccadic eye movement (abnormality suggests central pathology)
- Head thrust test (detects peripheral vestibular disorder, unilateral or bilateral)
- Vestibulo-ocular reflex cancellation (abnormality suggests central vestibular disorder)
- Head shaking nystagmus (detects peripheral vestibular disorder)
- Dynamic visual acuity (detects peripheral vestibular disorder, bilateral in nature).

Standing balance tests

These tests are more an indicator of equilibrium and function, rather than being diagnostic. They include:

- Rhomberg's test
- Unterberger's test (Kaski and Bronstein, 2014)
- Single leg stance (Strupp et al, 2014)
- 5x sit to stand (Whitney et al, 2005; Springer et al, 2007).

Positional testing

This is performed using Frenzel's goggles and includes the Dix–Hallpike test, which tests the posterior semi-circular canal and the roll test which tests the horizontal canal.

Lying and standing blood pressure

These should be recorded in all new patients, and abnormalities highlighted to the patient's GP.

Neurological examination

Neurological examination, including assessment of the myotomes, dermatomes and reflexes, may be indicated to exclude peripheral neuropathies, cervical myelopathy or lumbar stenosis.

Questionnaires

The Dizziness Handicap Inventory Questionnaire is used. Other questionnaires such as the Hospital Anxiety and Depression Scale and Situational Characteristics Questionnaire (Pavlou et al, 2006) are used when deemed necessary.

Diagnosis

In the vast majority of patients, the detailed clinical assessment, including the subjective questions and simple clinical balance tests, will allow a hypothesis regarding the diagnosis, although a small number will remain undiagnosed (approximately 10% from the authors' unpublished data).

The list below indicates the outcome diagnosis from the authors' clinic over the last year in order of frequency of presentation. (Note that the list is not exhaustive.)

- Benign paroxysmal positional vertigo
- Presbyastasis or multisensory imbalance of ageing
- Migraine vertigo
- Labyrinthitis or neuritis
- Persistent postural-perceptual dizziness
- Anxiety related dizziness
- Post-concussion
- Ménière's disease
- Bilateral vestibulopathy
- Superior semi-circular canal dehiscence
- Acoustic neuroma
- Vestibular paroxysmia
- Cervical myelopathy or lumbar stenosis
- Arnold–Chiari malformation
- Cerebrovascular ischaemia
- Cerebellar ataxia
- Ramsay Hunt syndrome
- Autoimmune disease.

Red flags

It is important to identify 'red flag' features that need onward referral or investigations. These include:

- Vertical or non-peripheral nystagmus, which may indicate neurological pathology
- Neurological features such as weakness or altered reflexes, which require referral to a neurologist
- Severe headaches or poorly controlled migraine – a referral to a neurologist or headache specialist should be considered
- Unexplained ocular deficits – referral to ophthalmology is needed
- Blackouts, palpitations or abnormal blood pressure recordings require referral to cardiology
- Unexplained or deteriorating falls – referral to a specialised falls clinic is needed
- Significant mental health problems, whether primary or secondary, should be referred to a psychiatrist, or counselling requested via GP (Kolev et al, 2014; Staab et al, 2014).

Investigations

There is a range of possible tests required for patients with red flag features (non-exhaustive). An audio pure tone audiogram is required for every patient attending the clinic.

Magnetic resonance imaging of the head and/or the internal auditory meatus is needed for patients with the following conditions:

- Unilateral or asymmetrical sensorineural hearing loss or tinnitus to exclude acoustic neuroma
- New onset headaches in a patient aged 50 years or over, or with an unusual presentation to exclude central pathology
- Detected cerebellar signs during examination.

Magnetic resonance imaging of the spine is recommended if the patient has abnormal upper or lower limb neurology indicating spinal stenosis or myelopathy.

Computed tomography of the temporal bone may be indicated for a patient with a positive Tullio phenomenon (dizziness induced by sound) to exclude superior semi-circular canal dehiscence.

Vestibular function tests which may be required include:

- Videonystagmography or calorics to specify the side of vestibular loss before considering surgical intervention, especially in patients with Ménière's disease
- Video head impulse test. This is a simple test that is easily tolerated, and is required for patients suspected of having bilateral vestibular disorder
- Vestibular evoked myogenic potential is used to identify the active side in cases of bilateral superior semi-circular canal dehiscence.

Nerve conduction tests can be useful to detect undiagnosed significant peripheral neuropathy. Blood tests may be needed, for example if vitamin B_{12} deficiency, anaemia, thyroid dysfunction or diabetes is suspected.

Treatment plan

Diagnosis is discussed with each patient and an appropriate management plan is formulated using shared decision making, which is a collaborative process through which a healthcare professional supports a person to reach a decision about their care (National Institute for Health and Care Excellence, 2019). Treatment interventions include:

Patient education

This involves educating the patient about the disease and providing appropriate education leaflets.

Vestibular rehabilitation

Either in clinic by a specialist physiotherapist, or transferred to outpatient physiotherapy vestibular clinic for follow-up vestibular rehabilitation. Vestibular rehabilitation is highly effective for patients with unilateral or bilateral peripheral vestibular hypofunction and is far more effective when patients are offered a tailored exercise programme (Monzani et al,

Key points

- A systematic clear history, although often very difficult to elicit, should point towards a differential diagnosis, or certainly clarify whether the patient has a central or peripheral disorder. It can also help to exclude serious pathology.
- A hearing test is essential in the assessment of patients with dizziness; relying on patients reporting hearing loss is not sufficient.
- A patient with benign paroxysmal positional vertigo presenting with non-classic nystagmus or with neurological signs should have central pathology excluded.
- Benign paroxysmal positional vertigo is the most common peripheral vestibular disorder.
- A small percentage of patients presenting with dizziness to ear nose and throat need additional testing, the majority of whom require testing for asymmetrical hearing loss or tinnitus. Additional lab testing may help in the diagnosis of balance and dizziness.
- The majority of patients presenting to balance and dizziness clinics can be well managed with a detailed clinical assessment, the majority needing no lab tests or imaging. The ability to refer onwards to other specialties is crucial to allow a seamless service.

2001; Lacour and Bernard-Demanze, 2015; Hall et al, 2016). The outcome of treatment may be affected by comorbidities such as diabetes mellitus, peripheral neuropathy, cataracts or arthritis because they stop the patient from using alternative strategies to control their balance.

Balance support group

A monthly group meeting which includes a mixture of appropriate vestibular, balance and light cardio exercise, a short talk on an aspect of living with balance and dizziness disorder, group discussion to troubleshoot problems and share information, finishing with a short guided relaxation.

Social prescribing

Social prescribing enables the authors to refer to a range of local, non-medical services as a mechanism for promoting health, independence and wellbeing (The King's Fund, 2020). This supports the NHS Five Year Forward View and Long Term Plan (Alderwick and Dixon, 2019). This has been particularly useful to signpost patients to community exercise groups to improve general activity levels, eg Tai Chi groups or walking groups, smoking cessation support, or help for low level anxiety or depression.

Surgical intervention

A small number of patients can be considered for surgical intervention, eg those with Ménière's disease (including intra-tympanic therapy), superior semi-circular canal dehiscence or perilymph fistula.

Conclusions

Balance disorders and dizziness are common complaints both in primary and secondary care. They have a huge impact on a patient's quality of life and a large percentage of patients will suffer anxiety as a result of this. A detailed approach, following clear history taking combined with simple objective balance tests, allows the majority of patients to receive a diagnosis in a timely manner.

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Conflicts of interest

The authors declare no conflicts of interest.

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