

The role of the vestibular assessment

J S PHILLIPS, J E FITZGERALD*, A P BATH

Abstract

Objective: To evaluate the role of vestibular assessment in the management of the dizzy patient.

Materials and methods: A retrospective review of case notes and vestibular assessment reports of 100 consecutive patients referred for vestibular assessment.

Results: Sixty of the 100 patients had an abnormal vestibular assessment. Eleven patients had benign paroxysmal positional vertigo as the sole diagnosis, of whom nine had not had a Dix–Hallpike manoeuvre performed before referral. Of patients referred for vestibular rehabilitation, 76 per cent had an abnormal electrophysiological assessment. After vestibular assessment, 35 patients were discharged with no further follow-up appointments in the ENT department.

Conclusions: All patients should have a Dix–Hallpike manoeuvre performed prior to referral for vestibular assessment. The majority of our patients undergoing vestibular rehabilitation had abnormal test results, although a significant number did not. Prior to referral, it is worth considering the implication of a ‘normal’ and ‘abnormal’ result for the management of the patient. Careful consideration should be given to the development of dedicated dizziness clinics run by practitioners with a specialist interest in balance disorders, in order to ensure appropriate requests for vestibular assessment.

Key words: Vestibular Assessment; Dizziness; Vertigo; Benign Paroxysmal Positional Vertigo

Introduction

Dizziness is a common, non-specific complaint. A recent survey revealed that, every year in England and Wales, eight out of every 1000 patients are likely to consult their general practitioner due to this symptom.¹ Between 13 and 16 per cent of dizzy patients are referred for a specialist opinion; up to 36 per cent of these referrals are to the ENT clinic.^{1,2}

The key specialist investigation for evaluating vestibular function is the vestibular assessment, which may include a battery of clinical, electrophysiological and questionnaire-based tests. This makes formal vestibular assessment both expensive and time-consuming. However, numerous authors agree that a diagnosis can be made in the majority of cases from a focussed history and examination, with selective adjunctive use of magnetic resonance image (MRI) scanning or audiometry.^{3–7} There is also acknowledgement of the limitations of certain aspects of the standard vestibular test battery;^{4–6} however, no author has been able to quantify the unrealistic expectations of these investigations.

The role of an ENT specialist in the assessment of the dizzy patient should be to diagnose and treat pathologies appropriately and, also, to determine

when a vestibular assessment would have a useful role in the management of these patients.

A retrospective audit was undertaken focussing on whether: (1) the diagnosis and management of benign paroxysmal positional vertigo (BPPV) had been attempted prior to referral for vestibular assessment; (2) the assessment was helpful in the decision-making process (as to whether vestibular rehabilitation was indicated); and (3) the assessment had a significant impact on the eventual patient management.

Materials and methods

We retrospectively reviewed the notes of 100 consecutive patients referred for a vestibular assessment by the ENT department of the Norfolk and Norwich University Hospital. A member of the audiology administrative staff independently identified patients from the audiology appointments system. The clinical notes for each patient were reviewed and data entered into a spreadsheet for analysis (Microsoft[®] Excel X for Mac[®]). The following data were recorded: patient demographics, out-patient clinic evaluation (specifically, whether a Dix–Hallpike manoeuvre was performed), referral for vestibular rehabilitation and eventual patient

management. At the Norfolk and Norwich University Hospital, a full vestibular assessment involved a number of items (see Table I). In the current study, the term 'electrophysiological assessment' specifically relates to the assessment of eye movements by electronystagmography, as applicable to the last six items in Table I.

Results

A vestibular assessment was performed on 100 consecutive patients referred by the ENT department between March 2006 and November 2006. All 100 sets of medical notes were obtained, without exception. Patient ages ranged from 15 to 85 years (median = 56). There were 30 male patients and 70 female patients.

Overall, 40 patients had normal electrophysiological test results (Figure 1). The remaining 60 patients had a vestibular assessment that was judged to be abnormal. Thirty-seven patients had a Dix–Hallpike manoeuvre performed before referral. One patient (who had a negative Dix–Hallpike manoeuvre before referral) was diagnosed with resolved BPPV, and another patient (who had a positive Dix–Hallpike manoeuvre before referral) had an Epley manoeuvre performed as part of their assessment. Of the remaining 63 patients, who had not had a Dix–Hallpike manoeuvre performed before referral, nine had a positive Dix–Hallpike manoeuvre during vestibular assessment, and BPPV remained their sole final diagnosis subsequent to a successfully performed Epley manoeuvre.

In total, 34 patients were referred for vestibular rehabilitation. Of these patients, 76 per cent had an abnormal electrophysiological assessment and 24 per cent had a normal assessment.

In total, 35 patients were discharged immediately after their vestibular assessment, without a formal ENT follow-up appointment, being simply written to with their results. Fifteen of the 40 patients with normal results (38 per cent) and 20 of the 60 patients with abnormal results (33 per cent) were dealt with in this way.

TABLE I

COMPOSITION OF VESTIBULAR ASSESSMENT AT NORFOLK & NORWICH UNIVERSITY HOSPITAL

Audiometry
Tympanometry
Romberg test (normal, sharpened, foam)
Unterberger stepping test
Dynamic gait index
Hospital Anxiety & Depression questionnaire score
Nijmegen (hyperventilation) questionnaire score
Dizziness Handicap Inventory
Dix–Hallpike manoeuvre
ENG assessment of nystagmus, spontaneous*
ENG assessment of nystagmus, gaze-evoked*
ENG assessment of nystagmus, positional*
ENG assessment of smooth pursuit
ENG assessment of saccadic eye movements
ENG assessment of caloric irrigation†

*Abnormal if $\geq 6^\circ$ per second. †Abnormal if ≥ 20 per cent asymmetry. ENG = electronystagmography

The eventual management of the 100 patients was: 11 had BPPV diagnosed and treated as necessary; 34 were referred for vestibular rehabilitation; 35 were discharged with no further follow up; and 20 were followed up in the ENT clinic.

Discussion

Writing about the clinical assessment of the dizzy patient is extremely challenging as expert opinions vary significantly. Many clinicians use a vestibular assessment for the evaluation of nearly all patients, whereas others are more sparing and rarely require a vestibular assessment to aid management. The aim of this study was to assess the practical implications of vestibular assessment for patients passing through a modern ENT department.

A formal assessment of the vestibular system can supply useful information which can be helpful in the management of the dizzy patient. However, the idea of reliably diagnosing a peripheral vestibulopathy purely from the outcome of electrophysiological tests is a common misconception. The diagnostic accuracy of caloric tests, for example, cannot be compared to that of a pure tone audiogram.⁴ Caloric responses provide information on the function of the horizontal semicircular canal; normal test results do not necessarily rule out vestibular dysfunction in the other constituents of the peripheral vestibular apparatus.⁵ Even if the responses are thought to be useful, it is worth bearing in mind that the results will vary in individual patients over time; this is particularly important when dealing with patients with active Ménière's disease, and those who are recovering or undergoing central compensation after an acute peripheral vestibular insult. It is interesting to note that the American Academy of Otolaryngology-Head and Neck Surgery guidelines for the diagnosis of Ménière's disease do not consider electrophysiological testing as essential.⁸ The whole concept of 'normal' and 'abnormal' results is perhaps misleading, and the use by some of strict cut-off values is especially unhelpful. In our department, an abnormal caloric test is considered when a canal paresis and/or directional preponderance of 20 per cent or more is demonstrated. This value may differ between departments, and may lead to a situation whereby a patient is defined as having normal vestibular function in one department and abnormal vestibular function in another.

Many previous studies have found that the most common peripheral vestibulopathy is BPPV.^{9,10} This condition is diagnosed by performing the Dix–Hallpike manoeuvre, and it should be treated with a particle-repositioning manoeuvre; a vestibular assessment is not required. Despite this, 11 of our cohort undergoing a vestibular assessment were diagnosed solely with BPPV. Sixty-three of our patients did not have a Dix–Hallpike manoeuvre performed as part of their initial examination, nine of whom had BPPV. By taking a thorough history and performing a Dix–Hallpike manoeuvre prior to referral for vestibular assessment, a reduction of 9 per cent of requests could have been achieved. The one patient who was referred having been diagnosed with

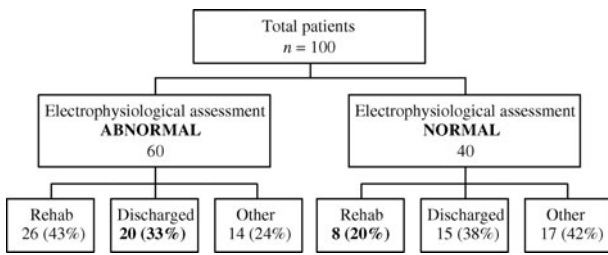


FIG. 1

Management of patients with abnormal electronystagmography or caloric test results. Rehab = vestibular rehabilitation

BPPV would have been more sensibly referred for an Epley manoeuvre performed by a competent audiologist or an ENT doctor, rather than for a full vestibular assessment.

The role of electrophysiological testing in determining the need for further rehabilitation is poorly defined, particularly as some patients may recover quickly from a major vestibular insult, whilst others may suffer prolonged imbalance with little evidence of peripheral vestibular dysfunction.⁴ In our cohort, 76 per cent of patients referred for vestibular rehabilitation had abnormal results. However, 24 per cent of patients referred for vestibular rehabilitation had normal results, indicating that, in a quarter of such cases, the outcome of objective electrophysiological tests would appear not to have assisted a decision regarding the need for vestibular rehabilitation. If the decision to undertake a course of vestibular rehabilitation is made primarily on the patient's symptoms, then it would be more useful to utilise patient questionnaires to a much greater extent, at an earlier stage in this process. This would potentially be more cost-effective, and would enable quicker access for those patients who do require vestibular rehabilitation.

Considering the eventual outcome of our patients, it is interesting that 35 patients were discharged with no further follow-up appointment. It is unclear how a vestibular assessment would have helped in the management of these patients, especially when over 30 per cent of both the 'normal' and 'abnormal' groups were treated in this manner. For patients with unilateral cochlear symptoms, such as a sensorineural hearing loss, management is well defined in that exclusion of intracranial pathology is required, ideally by MRI scanning. This test is performed to exclude retrocochlear disease, so that in the case of a normal result the patient can be simply written to. In contrast, the results of a vestibular assessment need to be analysed in the context of the patient's symptoms and, assuming that the patient remains symptomatic, follow up may be required to reassess the patient in the light of these results.

It is worth noting that vestibular assessment is not without its problems. An assessment of patient discomfort during various audiological procedures revealed caloric testing to be particularly unpleasant from the patient's point of view.¹¹ Furthermore, vestibular assessment can have a deleterious outcome when performed on patients with psychogenic dizziness, as

the experience only bolsters their psychopathology. Caloric irrigation can cause other adverse effects it can act as a tinnitus initiator, and so caloric irrigation can complicate migraine.¹²

To date, there has been a paucity of formal studies considering the practical implications of vestibular assessment upon the outcome of an independently defined cohort of patients. Browning states that, of those dizzy patients requiring further investigation, the majority are diagnosed by radiological methods and that:

'...outside a neuro-otological clinic, calorics and electronystagmography have a minimum role. Even in a neuro-otological clinic, they are more often a toy than an aid to diagnosis.'¹³

- **The key specialist investigation for evaluating vestibular function is the vestibular assessment, which may include a battery of clinical, electrophysiological and questionnaire-based tests**
- **A formal vestibular assessment is expensive and time-consuming**
- **All patients should undergo a Dix–Hallpike manoeuvre performed prior to referral for a vestibular assessment; this could reduce the number of referrals by approximately 10 per cent**
- **There is a strong case for dedicated dizziness clinics run by practitioners with a specialist interest in balance disorders, in order to ensure appropriate requests for vestibular assessment**

Norre considered patients with specific diagnoses of BPPV, Ménière's disease and 'sudden unilateral loss syndrome', and concluded that the role of certain aspects of vestibular assessment was to provide further information regarding functionality, rather than to confirm a diagnosis based on typical signs and symptoms.¹⁴ However, this conclusion was dependent on data from posturography more than data from the vestibular assessment elements performed routinely in our unit. Bakr and Saleh considered the role of electronystagmography and concluded that it does not significantly aid diagnosis, although it may confirm a peripheral lesion in certain circumstances.⁶

The vestibular assessment remains a useful investigation which can aid the management of dizzy patients in certain circumstances. However, prior to referral, it is worth considering the implications of a 'normal' and 'abnormal' result for patient management. This, along with performing a Dix–Hallpike manoeuvre, could significantly reduce the number of requests for a vestibular assessment.

The results of this study are worthy of reflection, particularly when we consider the current issues surrounding the provision of balance services in the UK and the role of the ENT surgeon. Documents put forward by ENT-UK concur with our findings,

and state that 'special tests are expensive and may be uncomfortable and are not routinely necessary to make the diagnosis but can prove essential in more complex cases.'¹⁵ From March 2008, UK health services were required to ensure that all patients are assessed, investigated and treated within an 18-week target. This has caused anxiety in many domains, particularly for those involved with the provision of ENT services.¹⁶ Therefore, careful consideration of current practice is required if proposed targets are to be fulfilled.

Conclusions

All patients should have a Dix–Hallpike manoeuvre performed prior to referral for vestibular assessment. The majority of our patients undergoing vestibular rehabilitation had abnormal test results, although a significant number did not. Prior to referral, it is worth considering the implication of a 'normal' and 'abnormal' result for the management of the patient. Careful consideration should be given to the development of dedicated dizziness clinics run by practitioners with a specialist interest in balance disorders, in order to ensure appropriate requests for vestibular assessment.

References

- Jayarajan V, Rajenderkumar D. A survey of dizziness management in General Practice. *J Laryngol Otol* 2003; **117**:599–604
- Bird JC, Beynon GJ, Prevost AT, Baguley DM. An analysis of referral patterns for dizziness in the primary care setting. *Br J Gen Pract* 1998; **8**:1828–32
- Rutka J. Dizziness and vertigo: what's being missed? *The Canadian Journal of CME* 1984; **6**:75–84
- Ruckenstein MJ, Shepard NT. Balance function testing: a rational approach. *Otolaryngol Clin North Am* 2000; **33**:507–18
- Gordon CR, Shupak A, Spitzer O, Doweck I, Melamed Y. Nonspecific vertigo with normal otoneurological examination. The role of vestibular laboratory tests. *J Laryngol Otol* 1996; **110**:1133–7
- Bakr MS, Saleh EM. The medical management of vertigo. *J Laryngol Otol* 2000; **114**:178–83
- Luxon LM. The medical management of vertigo. *J Laryngol Otol* 1997; **111**:1114–21
- Committee on Hearing and Equilibrium guidelines for the diagnosis and evaluation of therapy in Meniere's disease. American Academy of Otolaryngology-Head and Neck Foundation, Inc. *Otolaryngol Head Neck Surg* 1995; **113**:181–5
- Bath AP, Walsh RM, Ranalli P, Tyndel F, Bance ML, Mai R *et al.* Experience from a multidisciplinary "dizzy" clinic. *Am J Otol* 2000; **21**:92–7
- Wells MD, Yande RD. Vertigo in a district NHS hospital. *J Laryngol Otol* 1987; **101**:1235–41
- Beynon GJ, Clarke N, Baguley DM. Patient comfort in audiological testing. *Br J Audiol* 1995; **29**:1–5
- Seemungal B, Rudge P, Davies R, Gresty M, Bronstein A. Three patients with migraine following caloric-induced vestibular stimulation. *J Neurol* 2006; **253**:1000–1
- Browning GG. *Clinical Otolaryngology and Audiology*, 2nd edn. Oxford: Butterworth-Heinemann, 1998
- Norre ME. Relevance of function tests in the diagnosis of vestibular disorders. *Clin Otol* 1994; **19**:433–40
- Balance 2008: Excellence in practice – the provision of adult balance services by otolaryngologists. ENT UK – The British Association of Otorhinolaryngologists – Head and Neck Surgeons. Available at: <http://www.entuk.org/publications/> [Accessed April 14, 2009]
- Davis A. Thousands of patients wait more than 26 weeks for tests, as 18 week diagnostic target looms. *BMJ* 2007; **335**:365

Address for correspondence:

Mr John S Phillips,
Paddock House,
The Common,
Mellis IP23 8EF, UK.

E-mail: john.phillips@mac.com

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