Common Misconceptions in the Evaluation of ED Dizzy Patients Parallel Those Found in Emergency Medicine Texts

Bárány Society XXIII
Poster 084
July 7-8, 2004

David E. Newman-Toker, M.D. & David S. Zee, M.D. *Neurology Department, Johns Hopkins University School of Medicine, Baltimore, MD*

Introduction

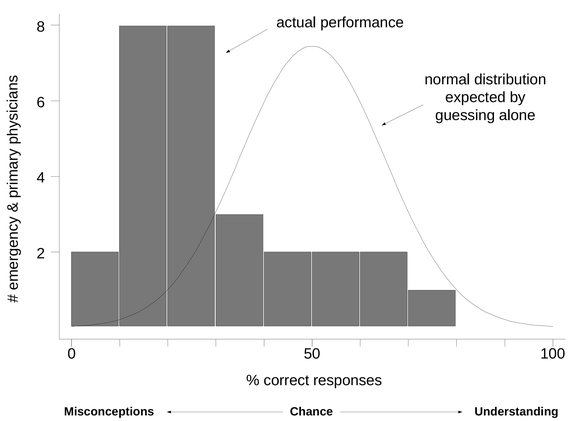
Recognized, preventable medical errors are estimated to account for 44,000-98,000 deaths annually in the U.S.[1] In the Emergency Department [ED], errors in diagnosis may represent the majority of errors.[2] Although in the outpatient setting fewer than one in ten cases of dizziness is attributed to a 'serious cause' such as cerebrovascular accident (6%) or cardiac dysrhythmia (1.5%),[3] in the ED up to 25% of patients over age 50 may have ischemic stroke as a cause of new, isolated vertigo.[4] In the ED setting, therefore, there is an added premium on accurate diagnosis and a need for simple bedside methods to identify those at greatest risk.

Although bedside techniques to distinguish 'benign' from 'malignant' causes of dizziness have been described previously by academic sub-specialists trained in neuro-otology,[5-6] it is unclear to what extent these methods have been incorporated into the knowledge base of front-line healthcare providers.

Objectives

We sought to determine whether bedside techniques commonly employed by neuro-vestibular specialists were familiar enough to ED and other primary providers to help them identify medically-serious causes of dizziness. We hypothesized that misconceptions about the bedside evaluation of dizzy patients would be common and that a major source of misinformation would be the published medical literature, particularly textbooks.

Figure 1. Histogram of ED & Primary Care Provider Scores on a 10-Question, True-False Exam Regarding the Bedside Evaluation of Dizzy Patients



10 True-False Questions

T or F: Likely to indicate a peripheral cause of PERSISTENT vertigo

1. Presence of new unilateral tinnitus.
2. Head motion or change in position exacerbates dizziness.
3. Horizontal nystagmus beating rightward in right gaze and leftward in left gaze.
4. Hallpike maneuver produces nystagmus which was absent in primary gaze.
5. Nystagmus present in primary gaze increases with occlusive ophthalmoscopy.

T or F: General questions about vertigo and nystagmus

6. 'True vertigo' refers particularly to a spinning sensation in the horizontal plane.
7. When elicited, classic benign paroxysmal positioning nystagmus is vertical-torsional in primary gaze.
8. Nausea with vomiting is a frequent concomitant of benign paroxysmal positioning vertigo.
9. Nystagmus in a unilateral destructive vestibulopathy is always most evident looking away from the lesion.
10. A patient with several bouts of isolated vertigo lasting 5-10 minutes is most likely to have BPPV.

Methods & Statistics

On two separate occasions, we anonymously quizzed 14 physicians attending a dizziness lecture, using 10 true-false questions about the clinical evaluation of dizzy patients. The group comprised 14 ED physicians (mixed residents and attendings) and 14 primary care physicians (all attendings) at two different, well-regarded University teaching hospitals. With institutional review board approval, we conducted an unmasked, retrospective, anonymous analysis of the survey data. We calculated the percent correct responses for individuals and for each question across individuals. We then compared these results to 50% (results expected by guessing alone) using a binomial exact statistic. Later, qualitative comparisons were made between these results and textbook findings.

Results

Among 14 ED physicians, the mean individual score was 31% (range 0-60%, median 30%). The same results were found among the 14 PCPs (mean score 29%, range 0-70%, median 25%). Combining the two groups, no question was answered correctly at a rate significantly above that expected by guessing alone (range 8-60%), and 6 of 10 questions (#2, 3, 4, 5, 6, 10) were answered correctly at rates significantly below that expected by guessing alone (8-26%, $p = 0.00002$-0.02). As can be seen graphically (Figure 1), **these data imply misinformation, rather than lack of knowledge**.

Three of the most common misconceptions place ED physicians at substantial risk of missing cerebrovascular accidents causing dizziness:

(1) **"if the Dix-Hallpike maneuver elicits nystagmus in a patient with persistent vertigo, then the patient has benign positional vertigo [BPPV]"**

This is *only* true when there are brief bouts of vertigo (< 2 minutes duration), and only then when the nystagmus elicited has a *specific* waveform (vertical-torsional) and certain temporal characteristics (latency to onset, damps quickly, fatigues on repeated trials).[7]

(2) **"if a patient with persistent vertigo feels worse when they move their head, the cause is likely peripheral"**

If a patient with persistent vertigo feels worse when they move their head, it is a good indicator of a vestibular problem; however, it does not discriminate between a 'benign' peripheral vestibular problem (e.g. labyrinthitis) and a 'malignant' central one (e.g. stroke).[6]

(3) **"a patient with several bouts of isolated vertigo lasting 5-10 minutes is most likely to have BPPV"**

Vertigo caused by BPPV typically lasts 10-40 seconds, and almost never longer than 2 minutes.[7] Five to ten minutes is a common duration reported in patients suffering from TIAs in the posterior cerebral circulation.[8]

Using sub-specialist literature (peer-reviewed[5-7] and textbook[9]) as the reference standard, three commonly used textbooks of Emergency Medicine (Rosen[10], Harwood[11], and Tintinalli[12]) were found to have similar errors to those identified in quiz results. It is important to note that similar misconceptions were also found in commonly used medical[13] and neurologic textbooks[14-16] as well as peer-reviewed journals across disciplines[17-20].

Conclusions & Future Directions

Our results indicate that misconceptions about the bedside approach to dizzy patients may be commonplace, and perhaps derive from misinformation in Emergency Medicine texts and other published literature. Such misconceptions could increase the risk of misdiagnosis and reduce patient safety.

Limitations of our study include the small and potentially biased sample, retrospective design, and lack of instrument validation. Despite these limitations, the strength of the associations, consistency across disparate groups, and concordance between survey responses and textbook findings provide strong support for our conclusions.

In subsequent studies, we intend to explore the relationship between misinformation and the risk of actual misdiagnosis of ED dizzy patients, as well as possible methods to reduce such diagnostic errors.

Acknowledgments

This research was supported by grants from the Foundation for Education and Research In Neurologic Emergencies (FERNE), and the National Institutes of Health (1 K23 RR17324-01, "Building a New Model for Diagnosis of ED Dizzy Patients").

Reference List

1. Kohn,LT, Corrigan,J, Donaldson,MS. *To err is human : building a safer health system*. Washington, D.C.: National Academy Press; 2000.
2. Kovacs,G, Croskerry,P. Clinical decision making: an emergency medicine perspective. *Acad Emerg Med*. 1999;6:947-52.
3. Kroenke,K, Hoffman,RM, Einstadter,D. How common are various causes of dizziness? A critical review. *South Med J*. 2000;93:160-7.
4. Norrving,B, Magnusson,M, Holtas,S. Isolated acute vertigo in the elderly; vestibular or vascular disease? *Acta Neurol Scand*. 1995;91:43-8.
5. Hotson,JR, Baloh,RW. Acute vestibular syndrome. *N Engl J Med*. 1998;339:680-5.
6. Baloh,RW. Dizziness: neurological emergencies. *Neurol Clin*. 1998;16:305-21.
7. Baloh,RW, Honrubia,V, Jacobson,K. Benign positional vertigo: clinical and oculographic features in 240 cases. *Neurology*. 1987;37:371-378.
8. Grad,A, Baloh,RW. Vertigo of vascular origin. Clinical and electronystagmographic features in 84 cases. *Arch Neurol*. 1989;46:281-4.
9. Baloh,RW, Halmagyi,GM. *Disorders of the vestibular system*. New York: Oxford University Press; 1996.
10. Rosen,P. *Emergency medicine concepts and clinical practice*. 4th ed. St. Louis, Mo: Mosby; 1998.
11. Harwood-Nuss,A. *The clinical practice of emergency medicine*. 2nd ed. Philadelphia: Lippincott-Raven; 1996.
12. Tintinalli,JE, Kelen,GD, Stapczynski,JS, American College of Emergency Physicians. *Emergency medicine a comprehensive study guide*. 5th ed. New York: McGraw-Hill, Health Professions Division; 2000.
13. Harrison,TR, Isselbacher,KJ. *Harrison's principles of internal medicine*. 13th ed. New York: McGraw-Hill; 1994.
14. Bradley,WG. *Neurology in clinical practice*. 2nd ed. Boston: Butterworth-Heinemann; 1996.
15. Merritt,HH, Rowland,LP. *Merritt's textbook of neurology*. 9th ed. Baltimore: Williams & Wilkins; 1995.
16. Weiner,HL, Levitt,LP, Weiner,HL. *Neurology*. 5th ed. Baltimore: Williams & Wilkins; 1994.
17. Sloane,PD, Coeytaux,RR, Beck,RS, Dallara,J. Dizziness: state of the science. *Ann.Intern.Med.* 2001;134:823-832.
18. Walker,JS, Barnes,SB. Dizziness. *Emerg.Med.Clin.North Am.* 1998;16:845-75, vii.
19. Weinstein,BE, Devons,CA. The dizzy patient: stepwise workup of a common complaint. *Geriatrics*. 1995;50:42-6, 49.
20. Linstrom,CJ. Office management of the dizzy patient. *Otolaryngol.Clin.North Am.* 1992;25:745-780.