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EDITORIAL

Is the bedside head impulse test useful in emergency decision making for nonexpert routine clinical practice?

In 1988, Halmagyi and Curthoys reported on the clinical interest of the bedside head impulse test (bHIT) for examination of the vestibular system [1]. Vestibulo-ocular reflex (VOR) deficit can be clinically demonstrated by the observation of a corrective refixation saccade immediately following head thrust. Head thrust mainly requires the action of the direct short latency VOR pathway from the labyrinths to the extraocular muscles [2]. Therefore, a VOR deficit observed with the head impulse test specifically reflects a peripheral vestibular deficit. The usefulness of this clinical sign has been challenged by showing low sensitivity and high specificity, both depending on the expertise of the examiner and the depth of the deficit [2,3]. However, for neuro-otological experts, realizing and interpreting the bHIT is highly relevant in examining patients complaining of dizziness, vertigo, or postural ataxia. This test is now part of the vestibular examination and the neurology and otolaryngology curriculum. The development of video eye and head recording systems, namely the video head impulse test (vHIT), improved the accuracy of detecting VOR deficits [2].

Acute vestibular syndrome is a frequent cause of emergency department (ED) visits. It is often due to acute peripheral vestibulopathy (APV), mainly vestibular neuritis (VN), but in some patients it can be due to serious and life-threatening brainstem or cerebellar stroke. Differentiating both etiologies is a routine challenge in EDs. A few expert neuro-otology teams have searched for good bedside predictors of acute central vestibular syndrome, and the bHIT has emerged as one of these predictors, along with others [4,5]. These studies provided evidence that normal VOR tested by the bHIT is a good predictor of acute central vestibular syndrome (mainly stroke). The head-impulse, nystagmus, test-of-skew (HINTS) test emerged from these studies as a three-step bedside oculomotor exam providing sensitive predictors of stroke versus APV [6]. Since then, multiple studies have emphasized the sensitivity and specificity of the HINTS test to diagnose stroke, exceeding those of magnetic resonance imaging (MRI) and vascular risk factors.

However, these subtle oculomotor signs and the way to handle the tests remain unfamiliar to most nonexpert physicians working in EDs, even neurologists and otolaryngologists. Learning to handle the bHIT with accurate velocity and amplitude of horizontal head

thrusts, and interpreting the presence or absence of corrective saccades, is not that easy for nonspecialists. Even if the importance of the bHIT has largely been diffused in journals of different specialties and largely taught by expert neuro-otologists, these difficulties remain limiting factors for using the test in EDs. In this issue of the *European Journal of Neurology*, Machner et al. [7] report the results of an interesting study that questions the impact of the bHIT performed by nonexperts during routine clinical practice in the ED to distinguish between stroke and VN. They reviewed medical charts and collected bHIT results assessed by neurology residents of 38 patients presenting to the ED for acute vestibular syndrome. They collected abnormal and normal bHIT results and determined whether patients were finally admitted to stroke units or general neurology. The bHIT results were compared to the vHIT results performed within 3 days. MRI confirmed stroke. The final diagnosis was vestibular neuritis in 24 and posterior cerebral stroke in 14 patients. The results show that the bHIT and vHIT were congruent in 58% of cases. The bHIT was considered abnormal with normal vHIT in 34% of patients and normal with abnormal vHIT in 8%. Regarding the final diagnosis, the bHIT had 88% sensitivity (percentage of VN patients with abnormal bHIT) and 64% specificity (percentage of stroke patients with normal bHIT). However, 11 out of 14 VN patients admitted to the stroke unit had an abnormal bHIT, and five out of six stroke patients admitted to the neurology unit had a normal bHIT. This study emphasizes that even a correctly interpreted (normal/abnormal) bHIT was not consistently used for in-hospital triage in stroke versus the general neurology unit.

This study also shows, as already demonstrated by others [2,3,8] that the vHIT has better specificity than the bHIT at approximately 100%. The implementation of the vHIT system in EDs has been reported in different publications [8]. However, if the vHIT can help to improve the interpretation of presence/absence of corrective saccade, it does not resolve the difficulty of nonexperts in neuro-otology in handling head thrust and would add to the constraint of having good-quality, well-calibrated eye movement recordings by nonexperts and in the context of emergencies. Therefore, I agree with the conclusions of Machner et al. [7] that there is a need to encourage ED clinicians and neurologists to perform the bHIT and use it for decision making in acute vestibular syndrome.

AUTHOR CONTRIBUTION

Caroline Froment Tilikete: Conceptualization (lead); writing–review & editing (lead).

Abbreviations: APV, acute peripheral vestibulopathy; bHIT, bedside head impulse test; ED, emergency department; HINTS, head impulse, nystagmus, and test-of-skew; MRI, magnetic resonance imaging; vHIT, video head impulse test; VN, vestibular neuritis; VOR, vestibulo-ocular reflex.

See paper by B. Machner et al. on page 1737

KEYWORDS

acute vestibular syndrome, head impulse test, vertigo

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REFERENCES

1. Halmagyi GM, Curthoys IS. A clinical sign of canal paresis. *Arch Neurol.* 1988;45(7):737-739.
2. Weber KP, Aw ST, Todd MJ, McGarvie LA, Curthoys IS, Halmagyi GM. Head impulse test in unilateral vestibular loss: vestibulo-ocular reflex and catch-up saccades. *Neurology.* 2008;70(6):454-463.
3. Jorns-Haderli M, Straumann D, Palla A. Accuracy of the bedside head impulse test in detecting vestibular hypofunction. *J Neurol Neurosurg Psychiatry.* 2007;78(10):1113-1118.
4. Cnyrim CD, Newman-Toker D, Karch C, Brandt T, Strupp M. Bedside differentiation of vestibular neuritis from central "vestibular pseudoneuritis". *J Neurol Neurosurg Psychiatry.* 2008;79(4):458-460.
5. Newman-Toker DE, Kattah JC, Alvernia JE, Wang DZ. Normal head impulse test differentiates acute cerebellar strokes from vestibular neuritis. *Neurology.* 2008;70(24 Pt 2):2378-2385.
6. Kattah JC, Talkad AV, Wang DZ, Hsieh YH, Newman-Toker DE. HINTS to diagnose stroke in the acute vestibular syndrome: three-step bedside oculomotor examination more sensitive than early MRI diffusion-weighted imaging. *Stroke.* 2009;40(11):3504-3510.
7. Machner B, Kira E, Choi JH, Trillenber P, Sprenger A, Helmchen C. Usability of the head impulse test in routine clinical practice in the emergency department to differentiate vestibular neuritis from stroke. *Eur J Neurol.* 2021.
8. Newman-Toker DE, Saber Tehrani AS, Mantokoudis G, et al. Quantitative video-oculography to help diagnose stroke in acute vertigo and dizziness: toward an ECG for the eyes. *Stroke.* 2013;44(4):1158-1161.