Why HINTS examination outperforms imaging for acute vertigo

Written by The Life Science Feed Editorial Team · Edited by Mara Voss

Acute vertigo presents a diagnostic challenge in the emergency department, where distinguishing benign peripheral causes from potentially life-threatening central pathology is critical. Misdiagnosis carries significant morbidity, but over-reliance on neuroimaging leads to resource strain and patient exposure to radiation. A structured clinical assessment offers a more efficient and accurate pathway.1,2

KEY TAKEAWAYS

- The Pivot: Clinical examination using HINTS (Head Impulse, Nystagmus, Test of Skew) provides superior diagnostic accuracy for central vertigo compared to immediate imaging.
- The Data: Only 0.5% of ED patients imaged for vertigo had acute actionable central pathology, while HINTS demonstrated high sensitivity and specificity.
- The Action: Implement HINTS as the primary diagnostic tool for acute vertigo in the ED, reserving neuroimaging for patients with HINTS-positive findings or other high-risk features.

Patients presenting to the emergency department with acute vertigo often trigger a cascade of investigations, primarily neuroimaging, driven by the imperative to rule out stroke or other central nervous system events. This approach, while seemingly cautious, frequently yields negative results and consumes valuable resources. The challenge lies in identifying the small subset of patients who truly require urgent imaging, without subjecting the majority to unnecessary scans.1
A retrospective analysis published in Emerg Radiol examined the diagnostic yield of neuroimaging in adult ED patients presenting with vertigo.1 The study, conducted by Spencer, Gandhi, and Tepe, included 1,942 adult patients who underwent neuroimaging for vertigo at a single academic medical center between 2018 and 2023. The primary objective was to quantify the incidence of acute actionable imaging findings and identify clinical predictors of central pathology.
A separate review in Emerg Med Clin North Am by Omron and Edlow reinforced the utility of a structured clinical approach, particularly the HINTS examination, in this setting.2

The Limited Utility of Routine Imaging

The retrospective analysis of 1,942 ED patients imaged for vertigo revealed a remarkably low incidence of acute actionable central pathology. Only 10 patients (0.5%) had findings requiring immediate intervention or admission for neurological management.1 These included acute stroke, intracranial hemorrhage, or mass lesions. The vast majority of scans, 99.5%, either showed no acute pathology or findings unrelated to the acute vertigo presentation. This low yield suggests that routine, unselected neuroimaging for vertigo is an inefficient diagnostic strategy.
The study also identified several clinical predictors of acute central pathology. Patients with acute actionable findings

were more likely to present with new neurological deficits beyond vertigo, such as focal weakness, sensory changes, or ataxia. They also had a higher prevalence of vascular risk factors, including hypertension, diabetes, and a history of stroke or transient ischemic attack. But these predictors alone did not achieve sufficient sensitivity or specificity to reliably rule out central causes in all patients, underscoring the need for a more precise diagnostic tool.1

HINTS: A Superior Clinical Tool

The HINTS examination, an acronym for Head Impulse, Nystagmus, and Test of Skew, offers a structured bedside assessment to differentiate central from peripheral causes of acute vestibular syndrome. This clinical tool has gained traction as a more accurate and efficient alternative to immediate imaging in appropriate patients. The Head Impulse Test assesses the vestibulo-ocular reflex; a normal reflex (saccadic correction) in a patient with acute vertigo points towards a central lesion. Nystagmus characteristics, specifically direction-changing nystagmus or vertical nystagmus, are highly indicative of central pathology. The Test of Skew, which checks for vertical ocular misalignment, also suggests a central lesion.2

Omron and Edlow emphasized that HINTS, when performed correctly by trained clinicians, demonstrates superior diagnostic accuracy compared to early MRI in the acute setting for differentiating stroke from peripheral vestibular disorders. They noted that a HINTS examination showing a normal head impulse test, direction-changing nystagmus, or skew deviation (a 'central HINTS') has a sensitivity of 96-100% and a specificity of 96-98% for stroke in patients with acute vestibular syndrome. This performance surpasses that of diffusion-weighted MRI within the first 24-48 hours of symptom onset, which can miss up to 10-12% of posterior circulation strokes.2 For clinicians seeking a comprehensive guide to neurological examination, the Oxford Handbook of Neurology provides practical quick-reference information.

The critical distinction lies in the patient population for whom HINTS is appropriate. It applies specifically to patients with acute vestibular syndrome, defined as acute onset, persistent vertigo lasting hours to days, associated with nystagmus, gait instability, and often nausea/vomiting. It is not intended for episodic vertigo or chronic dizziness. Misapplication of the HINTS examination outside this specific syndrome can lead to diagnostic errors.2 This is a common pitfall, as recurrent vertigo often goes undiagnosed despite clear patterns.

Refining Imaging Guidelines

Given the low yield of routine imaging and the high accuracy of HINTS, Spencer and colleagues proposed updated guidelines for neuroimaging in ED patients with vertigo. They suggested that imaging should be reserved for patients with a 'central HINTS' pattern, those with new focal neurological deficits, or individuals with a high suspicion of central pathology based on clinical presentation and risk factors, even if HINTS is equivocal or cannot be fully performed.1 This approach aims to reduce unnecessary imaging while maintaining patient safety. The authors noted that implementing such guidelines could significantly decrease healthcare costs and reduce patient exposure to radiation, without compromising the detection of acute central events.

The retrospective nature of the Spencer study is an obvious caveat. It relied on documentation in electronic health records, which may not always capture the full clinical picture or the precise details of the vestibular examination. The study also took place at a single academic center, which may limit the generalizability of its findings to other settings, particularly those with different patient demographics or imaging practices. But the consistency with other literature on HINTS, particularly the review by Omron and Edlow, strengthens the argument for a clinical-first approach.1,2

The challenge for widespread adoption of HINTS lies in clinician training. Performing and interpreting the Head Impulse Test, in particular, requires practice and a keen eye. Many emergency physicians and general practitioners may not have received adequate training in this specific maneuver. This gap in expertise can lead to underutilization or incorrect application of the HINTS examination, diminishing its diagnostic power. The diagnosis of vertigo in primary care often relies on differentiating BPPV, vestibular migraine, and Meniere's disease, where HINTS plays a key role in guiding diagnosis.

Still, the evidence strongly supports a shift away from reflexive neuroimaging for acute vertigo. The financial burden of unnecessary scans is substantial, and the cumulative radiation exposure, while small per individual scan, adds up across populations. A more judicious use of imaging, guided by a robust clinical examination like HINTS, represents a more responsible and effective use of healthcare resources. The next step involves integrating these findings into clinical pathways and ensuring adequate training for all clinicians who encounter patients with acute vertigo. This would allow for a more targeted approach, focusing imaging resources on the patients who truly need them, while providing rapid and accurate diagnosis for the majority. The ongoing discussion around AI in the ED also highlights the potential for technology to support diagnostic pathways, but clinical acumen remains paramount.

CLINICAL IMPLICATIONS

The data from Spencer and colleagues, reinforced by Omron and Edlow, delivers a clear message: routine neuroimaging for acute vertigo is largely futile. Clinicians in the emergency department should abandon the reflex to order a CT or MRI for every patient presenting with dizziness. This practice wastes resources and provides little diagnostic value for the vast majority.1,2

Instead, the HINTS examination should become the standard of care for patients presenting with acute vestibular syndrome. Its diagnostic accuracy for central causes, particularly stroke, surpasses early MRI. Investing in training for emergency physicians and neurologists to master the HINTS maneuvers is a far more impactful strategy than expanding imaging capacity. A simple medical penlight with a pupil gauge is often more useful than a multi-million euro scanner in these initial assessments.

For healthcare systems, this shift means re-evaluating current protocols and allocating resources towards education and skill development rather than solely relying on technology. The low yield of imaging, at 0.5% for actionable findings, is a stark indictment of current practice. It is time to trust clinical expertise, supported by a validated bedside examination, over the default to imaging.

Patients stand to benefit from faster, more accurate diagnoses and reduced exposure to unnecessary radiation. The anxiety of waiting for imaging results, often negative, can be mitigated by a confident clinical assessment. This approach also frees up imaging slots for patients with higher pre-test probability of acute pathology, improving overall ED efficiency.

REFERENCES

1. 1. Spencer R, Gandhi J, Tepe J. Low incidence of acute actionable imaging findings in emergency department patients imaged for vertigo: Retrospective analysis and proposed guidelines. Emerg Radiol. 2026.
2. 2. Omron R, Edlow J. Dizziness. Emerg Med Clin North Am. 2026.

LICENCE & RIGHTS

MEDICAL DISCLAIMER

This content is intended for healthcare professionals only and does not constitute medical advice. Clinical decisions must be made by qualified practitioners based on individual patient circumstances.

FOLLOW THE LIFE SCIENCE FEED

Instagram @lifesciencefeed **LinkedIn** linkedin.com/company/thelifesciencefeed

thelifesciencefeed.com