

Research Paper Review

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Bedside Diagnosis of Acute Vestibular Syndrome – is my dizzy patient having a stroke? Canadian Medical Association Journal 2011; 183(9): E571-E592

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<u>ANALYSIS</u>

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Background Information

Dizziness is a relatively common symptom presenting within the primary care setting, representing the third most common major symptom reported in medical clinics (1).

When a patient presents with dizziness, the clinician will aim to differentiate the cause as being peripheral or central. Peripheral causes of dizziness include Benign Paroxysmal Positional Vertigo (BPPV), Meniere's disease, vestibular neuronitis, labyrinthitis, etc. Central causes of dizziness include stroke, tumor, Multiple Sclerosis, arteriovenous malformation or even migraine. Of these central causes, the most medically urgent condition is stroke. Therefore, primary care clinicians will often proceed with their history and physical examination carrying a high degree of suspicion for this diagnosis, referring the patient for further investigation as concern rises.

The authors of the current study sought to conduct a systematic review concerning the evidence-based bedside diagnosis and management of an acute vestibular syndrome, with the suspicion for stroke. However, within this paper a 'critical review' is also referred to; that being non-systematic review findings presented in a narrative format. When referring to their critical review they are highlighting the medical literature they were able to unearth, however excluded in their systematic process. In an effort to reduce bias and complex results, this review will highlight the results of the authors' systematic review only, and therefore present the state-of-the-evidence according to the authors inclusion/exclusion criteria.

PERTINENT RESULTS

How Common Is Acute Vestibular Syndrome?

Minimal information was found on the direct incidence or prevalence of this condition. However, given the array of peripheral causes of dizziness, vestibular neuritis was found to be the most common cause of acute vestibular syndrome with a reported annual incidence of 3.5/100000.

Based on the available information, the authors extrapolate that 10-20% of patients presenting with acute dizziness in the emergency department are suffering acute vestibular syndrome, which corresponds to 250000 - 500000 emergency room visits per year.

What Are The Most Common Causes?

Only three studies were identified which enrolled an unselected population of patients, and no study was identified which evaluated all presentations of acute vestibular syndrome.

While vestibular neuritis was found to be the most common peripheral cause of dizziness, the most common central cause of dizziness was found to be cerebrovascular (representing approximately 83% of central cases). Demyelinating disorders such as MS represented 11% of cases.

What Elements Of Clinical History Are Useful For Diagnosis?

Classic medical teaching has encouraged clinicians to classify dizziness into either vertigo, pre-syncope, unsteadiness or non-specific for the purposes of guiding clinical decision making. However, current evidence does not support this approach. In fact, a study examining 300 consecutive patients presenting to the ER with dizziness, found that more than 50% were unable to describe a type of dizziness that reflected their experience most accurately (2).

Duration of dizziness is a helpful clinical indicator, however the label of acute vestibular syndrome requires a duration of 24 hours or more. This automatically eliminates transient causes of peripheral vertigo such as Meniere's, BPPV etc. For further differential diagnostic help on disorders such as these, please refer to van der Velde (3).

No study included within this review compared the timing of the onset of dizziness across disorders. Further, no included studies reported on prodromal symptoms. Also, no included studies reported on specific triggers of dizziness as a predictor of the underlying cause.

Clinical wisdom and narrative reports dictate that the presence of neurological signs and symptoms associated with acute onset dizziness are strongly associated with central causes. Studies included in this review where not helpful in confirming this, however the nature of the review excluded studies which examined patients that presented with neurological symptoms. Wisdom states that while their presence should be cause for alarm, there absence should not be used as a predictor for peripheral causes.

No included studies reported on the proportionality of symptoms, that being whether dizziness, autonomic or postural symptoms were more severe.

It has been traditionally thought that auditory symptoms presenting with dizziness indicates a peripheral cause, which this review confirms. However, literature that has examined transitory causes of

dizziness has found an association with audiovestibular loss due to infarction of the anterior inferior cerebellar artery in up to 42% of subjects (4-6).

Two included studies addressed comorbid headache in the presence of acute vestibular syndrome, being found in 29-38% of cases. This historical factor becomes relevant given the concern for more central causes of dizziness. Clinical research has confirmed that the three most common symptoms of vertebral artery dissection are headache, dizziness and neck pain. While the presence of these three symptoms however should cause concern, the absence of headache or neck pain in dizziness is diagnostically inconclusive, given that 25% of VBA patients have presented with an absence of these symptoms (7).

While the systematic review was unable to identify any evidence promoting the screening for comorbid diseases, common sense dictates that recent viral infections, recent surgery involving the middle ear or the current use of ototoxic medications is helpful information to obtain.

This systematic review was unable to identify any risk factors, modifiable or otherwise, which may help to identify those suffering from acute vestibular syndrome.

What Findings On Physical Examination Are Useful For Diagnosis?

The presence of neurological symptoms is frequently considered as a main differential factor between central and peripheral causes of dizziness. With respect to stroke patients, the systematic review was able to identify seven cases series, whereby 80% of subjects presented with focal neurologic signs.

Truncal ataxia (i.e. the inability to sit with the arms crossed and unaided) is considered to be an obvious neurologic sign and has been found in 29% of stroke patients versus 0% of those with vestibular neuritis (8). Imbalance and gait unsteadiness was also more frequently found in those suffering from stroke (9).

The bulk of the systematic review findings concerned bedside testing of oculomotor and vestibular function, reviewed through ten included studies.

No evidence was identified to either refute or confirm the diagnostic value of spontaneous nystagmus, smooth-pursuit eye movements or saccades.

Three bedside maneuvers (the head impulse test, gaze-evoked nystagmus and ocular alignment) received significant attention within this paper.

The head impulse test begins with the patient in a seated position. With the patient looking towards a fixed forward target at all times, their head is passively rotated to one side. From here it is quickly rotated back to centre. While the patient attempts to continuously look at the fixed target, the eyes are observed for horizontal nystagmus. In patients presenting with acute vestibular syndrome, a positive test (nystagmus) is thought to indicate a peripheral vestibular lesion, whereas a negative test (normal response) is thought to indicate stroke.

Results of this review however identified that 15% of those identified as suffering from a stroke would have been misdiagnosed with neuritis based on the results of the head impulse test. The authors propose this number to be uncommon and that the presence of nystagmus to be an abnormal impulse for the

presenting pathology. As such they deem a negative head impulse test in acute vestibular syndrome to be diagnostic for stroke.

The systematic review supports using gaze-evoked nystagmus to differentiate central from peripheral causes of acute vestibular syndrome given that 6/10 studies provided a pooled specificity of 92% and a pooled sensitivity of 38%.

Ocular alignment (skew deviation) is observed as vertical ocular misalignment during the alternate cover test. In this systematic review, 2/10 studies found skew deviation to correctly identify central causes of acute vestibular syndrome with 98% pooled specificity, but only 30% pooled sensitivity.

One study (8) within this paper combined all three beside maneuvers, termed the HINTS examination. Positive results stem from a normal impulse, fast-phase alternative nystagmus and refixation on the cover test. At least one of the three findings is 100% sensitive and 96% specific for a bedside diagnosis of centrally caused acute vestibular syndrome. Most notably, the authors fproposed that the HINTS test ruled out stroke better than diffusion-weighted MRI. This suggestion requires further research.

CLINICAL APPLICATION & CONCLUSIONS

The overall clinical research reported on from this paper provides minimal insight into the clinical/differential diagnosis and management of acute vestibular syndrome.

While duration of dizziness longer than 24 hours is more likely to represent a central cause of dizziness, no true clinical features of dizziness timing, triggers or prodromal symptoms are helpful in the differential diagnosis of acute vestibular syndrome.

While the HINTS examination appears to be helpful in the bedside diagnosis of a central cause of acute vestibular syndrome, this finding is supported by minimal research. In no way should this test be used as a replacement for diffusion weighted MRI or alternate special imagining when a stroke is suspected.

In summary, while this paper is unlikely to alter the clinical management of this syndrome by manual therapists, it is helpful in providing a general framework on the state-of-the-evidence. More research is certainly needed, and a more stringent adherence to the systematic review process would strengthen the findings of such a review.

STUDY METHODS

In defining acute vestibular syndrome, the authors considered the presentation of an acute episode of dizziness, accompanied by nausea or vomiting, unsteady gait, nystagmus, and an intolerance to head motion, all with duration of one day or more.

MEDLINE was searched up to December 2009, attempting to identify all English language observational studies on the clinical features, diagnostic evaluation and differential diagnosis of acute vestibular syndrome.

Two reviewers screened the titles and abstracts of identified manuscripts to apply exclusion criteria.

Studies which evaluated end-stage disease, included subjects under the age of 18, offered no symptom data on dizziness or did not include information on diagnostic accuracy were excluded.

The same two reviewers evaluated full text manuscripts, and a third reviewer settled discrepancies and verified eligibility of each manuscript. The search identified 779 manuscripts, narrowed down to 139 for full text review. The end result included 15 manuscripts pertaining to 10 studies describing a total of 392 subjects.

STUDY STRENGTHS / WEAKNESSES

The purpose of this study was to conduct a systematic review, synthesizing the medical literature on the bedside diagnosis and management of acute vestibular syndrome. As a secondary point, the authors attempted to focus on the differential diagnosis of benign peripheral dizziness versus pathologic/central causes (such as stroke). In my opinion, the authors' product did not stand up to their premise.

This paper initially presents itself as a systematic review, and it presents its findings based upon this format. However, the paper also presents results from a narrative review of the evidence base, one which the authors present as their 'critical review.' The end product of this blend found that negative findings from the systematic review were then supported positively by cherry picked literature from the critical review. This blending contradicts the very purpose of a systematic review, which aims to minimize bias. One of our goals in reviewing this paper was to promote proper understanding of the state of the literature.

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