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CASE REPORT

HINTS in the er – case report

HINTS na ostro – opis przypadku

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ABSTRACT:

Introduction: Vertigo is a false sense of motion of either the environment or self and is diagnosed in approximately half of the patients with dizziness. Acute spontaneous onset of vertigo is called acute vestibular neuritis (AVN). It is caused by peripheral lesion and requires symptomatic treatment. The symptoms of AVN can mimic a central pathology like cerebellar or brainstem infarction with no concomitant red-flag manifestation. MRI-DWI as well as CT scan deliver false negative results which significantly delays the treatment of stroke. HINTS is an acronym for the battery of three bedside tests of ocular motor physiology. The method is more sensitive in diagnosing posterior circulation infarct than MRI-DWI with specificity – 96 %.

Case report: We present a case of a patient with vertigo who underwent two cranial CT scans and neurological examination. HINTS were worrisome. The brainstem infarct diagnosis was confirmed by MRI-DWI.

KEYWORDS: acute vestibular neuritis, dizziness, HINTS, mri-dwi, stroke, vertigo

STRESZCZENIE:

Wprowadzenie: Vertigo to fałszywe poczucie ruchu otoczenia lub własnej osoby, rozpoznawane u około połowy pacjentów z zawrotami głowy, spowodowane uszkodzeniem obwodowego układu nerwowego, wymagające leczenia objawowego. Nagły, samoistny napad vertigo nazywany jest ostrym zespołem przedsionkowym (OZP). Objawy OZP mogą imitować patologię ośrodkową, m.in. zawał móżdżku lub pnia mózgu. Co więcej, zawrotom głowy i zaburzeniom równowagi zwykle nie towarzyszą objawy alarmowe, takie jak: ból głowy, porażenie połowy ciała, utrata przytomności i niewyraźna mowa. Dodatkowo, badanie MRI z opcją DWI oraz TK, używane w diagnostyce udaru, często dają wyniki fałszywie ujemne. Powyższe problemy diagnostyczne znacznie opóźniają leczenie udaru niedokrwiennego omawianej okolicy. HINTS to akronim pochodzący od pierwszych liter trzech testów przyłóżkowych, mających na celu obserwację ruchów gałek ocznych. Metoda ta jest bardziej czuła w diagnozowaniu zawału tylnego krążenia mózgu ze swoistością – 96% niż MRI-DWI.

Opis przypadku: W niniejszej pracy przedstawiamy przypadek pacjenta z zawrotami głowy, któremu wykonano dwie TK i badanie neurologiczne. Wynik baterii testów HINTS był niepokojący. Rozpoznanie zawału pnia mózgu zostało potwierdzone po wykonaniu MRI-DWI.

SŁOWA KLUCZOWE: HINTS, MRI-DWI, ostry zespół przedsionkowy, udar, vertigo, zawroty głowy

ABBREVIATIONS

AVN – acute vestibular neuritis
CT – computed tomography
DWI – diffusion-weighted imaging
HINTS – Head Impulse test, Nystagmus, Test of Skew
HTT – Head Thrust Test
INFARCT – Impulse Normal, Fast-phase Alternating, Refixation on Cover Test
MRI – magnetic resonance neuroimaging
MRI-DWI – magnetic resonance neuroimaging with DWI
N – nystagmus
TS – test of skew

INTRODUCTION

Dizziness is a vague term that may refer to a wide variety of diseases [1]. It is the third most common major medical symptom reported in general medical clinics and accounts for about 3%–5% of visits across care settings [2]. In the United States, this translates to 10 million ambulatory visits per year due to dizziness, with roughly 25% of these visits to emergency departments. Among possible diagnosis, we can specify four main groups of symptoms. These are presyncope, disequilibrium, psychogenic dizziness, and vertigo. Vertigo is defined as a false sense of motion of either the environment or self [3]. It is diagnosed in approximately half of the patients with dizziness [4].

Fig. 1. MRI scan – left vertebral artery occlusion marked with a red arrow.

Tab. I. The interpretation of HINTS exam..

HINTS EXAM COMPONENT	PERIPHERAL VERTIGO	CENTRAL VERTIGO
Head Impulse Test (HIT)	Loss of eye fixation with head impulse; "positive" or "abnormal"	Intact vestibulo-ocular reflex;"negative" or "normal"
Nystagmus (N)	None or horizontal unidirectional	Vertical, rotatory, or horizontal bidirectional
Test of Skew (TS)	No skew; "negative"	Skew; "positive"

The causes of vertigo may be central (involving the brainstem or cerebellum) or peripheral (involving the inner ear). The most common causes of vertigo are, e.g. benign paroxysmal positional vertigo, vestibular neuritis and Ménière disease. These peripheral causes of vertigo are benign, and treatment involves reassurance and management of symptoms [4].

However, the diagnosis of peripheral aetiology is uncertain. Brainstem stroke often mimics the symptoms of vestibular neuritis. Moreover, magnetic resonance imaging (MRI) reveals neurological cells damage with significant delay. Thus, the neuronal ischaemia treatment is delayed.

A simple method to differentiate whether the attack has neurological nor laryngological origin is HINTS. The test relies on eye movement observation and can be performed easily next to the bedside of the patient. We present the case of a patient who underwent HINTS examination in the ER.

CASE STUDY

A 51-year-old man was transferred from a district hospital to the Head and Neck Diseases Clinic in the Clinical University Hospital due to dizziness to proceed further.

The patient was suffering from a sudden attack of continuous vertigo the first time in his life. It began a few hours earlier. He noted significant head motion intolerance, was nauseated and vomited several times. He denied hearing changes, recent URI symptoms and lightheadedness. Otorhinolaryngological anamnesis was negative. He did not report any previous chronic disease, surgery history nor hospital treatment so far.

Before admission to the ENT-Clinic, the patient had reported to the district hospital emergency unit, where the cranial CT scan was performed showing no pathological findings.

In laryngological examination, within the external acoustic meatus, no changes were observed bilaterally. In otoscopy, both tympanic membranes were pearly grey with a cone of light. In anterior rhinoscopy, a bilateral septum deviation and restricted patency of the nasal cavity were found. Oral cavity mucosa was pink and moisturised. No systemic nor ENT apparatus infection features were found. The presence of a spontaneous third-degree mixed horizontal-torsional nystagmus to the right side was noted. Unilateral left ptosis was observed - the patient could not define whether the symptom had occurred before the incident.

HINTS exam was performed, showing negative head impulse test, unidirectional, horizontal nystagmus and revealing skew deviation.

Neurological examination was normal. Laboratory tests performed were normal. After 6 hours of continuous symptoms, another cranial CT scan was repeated showing no pathology.

The patient stayed in the ENT department for 2 days, in a satisfying condition with the symptoms diminishing. Bed rest and antiemetics were also used. The family of the patient claimed that the unilateral ptosis, as well as indistinct speech, had appeared together with vertigo. Thus, another neurological consultation was performed and brain magnetic resonance imaging with diffusion-weighted imaging (MRI-DWI) was executed.

MRI demonstrated 4.5 mm focus of restricted diffusion in the left medulla oblongata which had infarct character. Acute infarct of medulla oblongata with left vertebral artery occlusion was described. The patient was transferred to the Stroke Unit with the aim of further treatment.

RESULTS AND DISCUSSION

Acute vestibular neuritis (AVN) is an acute spontaneous onset of vertigo without hearing loss or tinnitus. The term was first used by Dix and Hallpike in 1952 [5]. It is caused by inflammation of the vestibular nerve and is usually preceded by a viral upper respiratory tract or herpes zoster infection and is caused by immune-mediated sequelae following viral illness [4]. It is commonly seen in middle-aged adults of both sexes [4].

Initially, the vertigo is severe, lasts for two to three days and is followed by a gradual recovery, which may take two to six weeks [6]. Symptoms of vertigo are aggravated by a change in the position of the head. Loss of balance is more prominent, compared with other causes of vertigo, and patients may commonly present with falls. Relevant differential diagnoses are vestibular pseudoneuritis due to acute pontomedullary brainstem lesions, cerebellar nodular infarctions or vestibular migraine [7].

It is important to establish the differential diagnosis between peripheral and central pathology and to define patients with

a high probability of stroke. The anamnesis usually provides key information. The only central lesion that could mimic a peripheral vestibular lesion is cerebellar or brainstem infarction because vertigo and severe imbalance may be the only presenting features [8]. If abnormalities are detected on examination that suggests central nervous system disease, imaging should be pursued as appropriate. Thus, the rates of use of imaging studies such as a CT scan or MRI have dramatically increased nowadays [6]. MRI is indicated in any patient with acute vertigo and profound imbalance suspected to be the result of cerebellar infarct or haemorrhage. However, there are 12% false negatives in cerebral MRI and 74% false negative in cerebral CT-scan in the first 48 hours of an ischemic stroke [3]. Moreover, MRI is not always readily available.

HINTS is a battery of three bedside tests of ocular motor physiology to diagnose AVS. It was firstly described in 2009 by Kattah [9]. It consists of the head impulse test (HI-), characterisation of spontaneous nystagmus (-N-), and test of skew (-TS). The exam can be performed at the bedside in approximately 1 min and requires no extra equipment or tools. HINTS protocol is more reliable than MRI-DWI in the early acute period (first 24 to 48 hours after symptom onset) to detect a stroke [10] with acceptable specificity – 96% [9].

Finding 1 of 3 dangerous, subtle oculomotor signs (normal h-HIT or horizontal nystagmus that changes direction in eccentric gaze or skew deviation) is more sensitive than the combined presence of all other traditional neurological signs for identifying stroke as a cause of the acute vestibular syndrome. The dangerous signs can be remembered using the acronym INFARCT (Impulse Normal, Fast-phase Alternating, Refixation on Cover Test) [2, 9].

CONCLUSION

Typical neurological signs as limb ataxia, dysarthria is absent in fewer than half the patients with vertebrobasilar stroke, and that can lead to misdiagnosis, because vertigo and severe imbalance may be the only presenting features. Careful eye movement assessment may be the only bedside method to identify cerebellar or brainstem infarction in these patients.

References

1. Wipperman J.: Dizziness and Vertigo. Prim Care., 2014; 41(1): 115–131.
2. Tarnutzer A.A., Berkowitz A.L., Robinson K.A., Hsieh Y.H., Newman-Toker D.E.: Does my dizzy patient have a stroke? A systematic review of bedside diagnosis in acute vestibular syndrome. CMAJ, 2011; 183(9): E571–E592.
3. Vuong Chaney H., Rohmer D., Charpiot A.: How to manage vertigo in adult? JEUR, 2018; 30(1–2): 11–19.
4. Dommaraju S., Perera E.: An approach to vertigo in general practice. Aust Fam Physician, 2016; 45(4): 190–194.
5. Dix M.R., Hallpike C.S.: The Pathology, Symptomatology and Diagnosis of Certain Common Disorders of the Vestibular System. Ann Otol Rhinol Laryngol., 1952; 61(4): 987–1016.
6. Baloh R.W., Honrubia V., Kerber K.A.: Evaluation of the Dizzy Patient. In: Baloh and Honrubia's Clinical Neurophysiology of the Vestibular System. 4 ed.: Oxford, UK. Oxford University Press; 2011.
7. Strupp M., Brand T.: Vestibular Neuritis. Semin Neurol., 2009; 29(5): 509–519.
8. Baloh R.W.: Differentiating between peripheral and central causes of vertigo. Otolaryngol Head Neck Surg., 1998; 119(1): 55–59.
9. Kattah J.C., Talkad A.V., Wang D.Z.: 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: 3504–3510.
10. Newman-Toker D.E., Curthoys I.S., Halmagyi G.M.: Diagnosing Stroke in Acute Vertigo: The HINTS Family of Eye Movement Tests and the Future of the "Eye ECG". Semin Neurol., 2015; 35(05): 506–521.
11. Quimby A.E., Kwok E.S.H., Lelli D., Johns P., Tse D.: Usage of the HINTS exam and neuroimaging in the assessment of peripheral vertigo in the emergency department. J Otolaryngol Head Neck Surg., 2018; 47: 54.
12. Agrawal Y., Carey J.P., Della Santina C.C., Schubert M.C., Minor L.B.: Disorders of Balance and Vestibular Function in US Adults: Data from the National Health and Nutrition Examination Survey, 2001–2004. Arch Intern Med., 2009; 169(10): 938–944.

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