




## An unusual case of vertigo: the usefulness of nystagmus examination

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A 50-year-old gardener presented to our Emergency Department (ED) after the onset of a sudden objective vertigo while standing up during work, accompanied by imbalance, nausea, and vomiting. Neither tinnitus nor other aural symptoms were present, but, if asked, he also complained of a mild headache. He had no medical background of interest except for a known hypertension, left untreated, and a possible history of migraine for which he was admitted to the ED 1 year before. He denied recent viral infections or trauma. He was an active smoker (35 pack years), but denied alcohol or sympathomimetic intake; he was not taking any medication and had no allergies. Clinical examination revealed no neurological deficit, in particular neither dysmetria nor motor or sensitive deficit, and the patient's physical examination was normal except for a right beating horizontal nystagmus in primary position. Due to vomiting and overt vagal signs, upright position was impossible to evaluate. The blood pressure was found high and symmetric in both arms (160/100 mmHg), but the other vital signs were normal (HR 80 beats/min, SpO<sub>2</sub> 99 % in FiO<sub>2</sub> 21 %, temperature 36.5 °C). The National Institutes of Health Stroke Scale (NIHSS) was 0 [1]. The absence of otological and aural symptoms, as well as the absence of a recurrent vertigo in the history of the patient, was not compatible with Menière disease. A vestibular migraine could be excluded too because of the

lack of diagnostic criteria of migraine [2]. The patient was free from neurological signs except for nystagmus and referred imbalance. These features could be typical of an acute vestibular syndrome of peripheral origin; however, a more detailed nystagmus evaluation was needed. The STANDING, a recently developed diagnostic algorithm for the evaluation of patients with acute vertigo, was used to evaluate the patient [3] (Fig. 1).

Frenzel goggles confirmed the presence of a spontaneous, i.e., not triggered by head movements, horizontal, right beating, and unidirectional nystagmus, thus excluding a Benign Paroxysmal Positional vertigo (BPPV). As indicated by the diagnostic algorithm, to differentiate a peripheral from a central disease, a head impulse test (HIT) was performed [4]. The HIT test was negative, strongly suggesting a central origin. Therefore, a first-level bedside eco-color Doppler of the neck vessels was obtained that showed the absence of blood flow in the right vertebral artery.

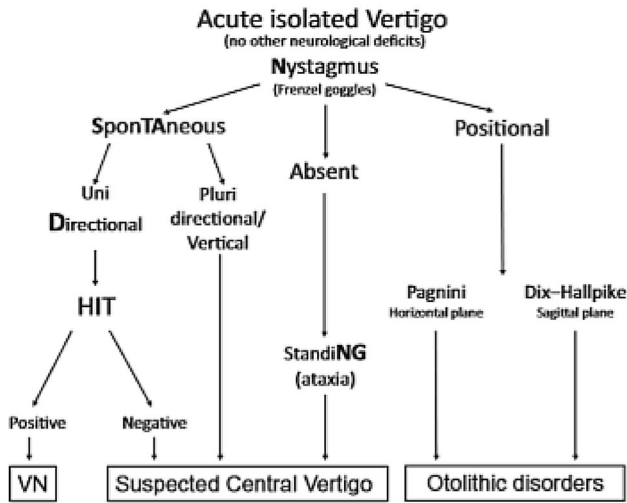
These findings prompted the execution of a CT angiography of cervical and intracranial vessels that showed a sub occlusive stenosis of the right vertebral artery at the onset, probably caused by a spontaneous dissection (Fig. 2). To confirm the diagnosis, the patient underwent a DWI sequences MRI that clearly revealed a cerebellar stroke (Fig. 3a, b). Systemic thrombolysis was not initiated, because of the delay of presentation to the ED (more than 6 h from the onset of symptoms to ED presentation), and ASA was started.

The patient was admitted to the neurologic ward. The next day the patient's neurologic state worsened, and a new onset dysmetria of the left arm, left hemi-anaesthesia of the face, left VI and VII cranial nerves palsy, and left hearing loss were detected. The patient underwent new MRI, and acute lesions in the left cerebellar peduncle were found. An

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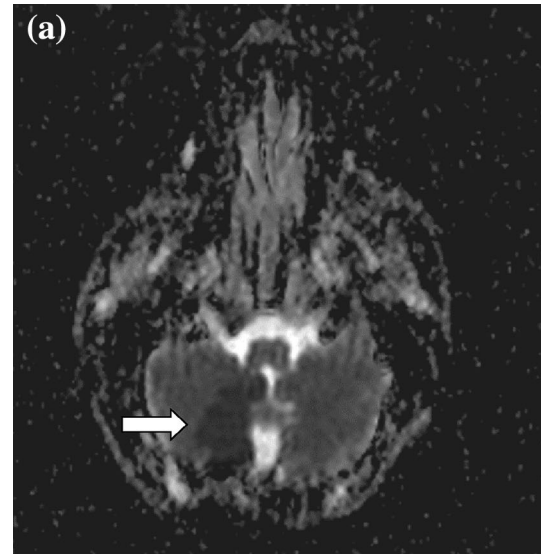
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**Fig. 1** Diagram of STANDING approach. *HIT* head impulse test, *VN* vestibular neuritis



**Fig. 2** CT angiography of cervical and intracranial vessels showing a sub occlusive stenosis of the right vertebral artery (*white arrow*) at the origin



**Fig. 3** **a** Brain DWI-MR showing a right cerebellar ischaemic lesion in the PICA territory (*white arrow*). **b** Brain T2 sequences MRI showing the same lesion

anticoagulant therapy with low molecular heparin was started instead of antiplatelet agents, and after 3 days, it was switched to an oral anticoagulants therapy. The patient underwent rehabilitation program, and when he was discharged, he was able to stand and walk with aid, the left dysmetria improved, while the VI cranial nerve palsy, the left hemi-anaesthesia of the face, and the left hearing loss, as the nystagmus, were still present.

**Compliance with ethical standards**

**Conflict of interest** None.

**Statement of human and animal rights** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed consent** Informed consent was obtained from all individual participants included in the study.

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