Acute Vestibular Syndrome and Posterior Circulation Stroke

蔡子同 醫師
義大醫院神經科
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Etiologies for Dizziness/Vertigo in the Acute Care Setting

Dizziness source	Rate (%)
Otovestibular	32.9
Cardiovascular	11.5
Neurologic (Stroke)	11.2 (4)
Metabolic	11
Poisoning	10.6
Psychiatric	7.2
Gastrointestinal	7

Continuum (Minneap Minn) 2021; 27(2, Neuro-otology):402-419

Most Common Presenting Symptoms of Posterior Circulation Ischemia

- Dizziness/vertigo (47%)
- Unilateral limb weakness (41%)
- Unilateral limb weakness (38%)
- Gait ataxia (31%)
- Dysarthria (31%)
- Unilateral limb ataxia (30%)
- Dysarthria (28%)
- Headache (28%)
- Nausea and Vomiting (27%)
- Nystagmus (24%)

Archives of Neurology 2012; 69(3), 346-351

Dizziness without Vertigo does not Exclude Vestibular Dysfunction

Well-documented lesions within the vestibular pathways sometimes produce only a nonspecific sensation of disorientation (dizziness) without a clearly defined illusion of movement (vertigo).

Baloh RW, Honrubia V: Clinical Neurophysiology of the Vestibular System, 3rd ed, 2001.

Cerebellar Stroke mimics Peripheral Vertigo

- Acute cerebellar infarction may present with prominent vertigo, nausea, vomiting, and ataxia.
- Because of lack of typical lateral brain stem signs, a misdiagnosis of an acute peripheral labyrinthine disorder might be made.

Baloh RW, Honrubia V: Clinical Neurophysiology of the Vestibular System, 3rd ed, 2001.

Stroke among the Dizziness/Vertigo Patients

- Posterior circulation strokes account for almost 20% of all cerebral ischemic strokes.
- Estimated that about 20% of the posterior circulation strokes present as isolated vertigo without focal neurological signs.
- About 1/6 to 1/3 of these posterior circulation strokes presenting as isolated vertigo are missed in the emergency department.

J Neurol 2016; 263:2151-2157.

History of the Patient with Dizziness/Vertigo

- Quality of dizziness/vertigo
  - ➢ Timing and duration
  - ➢ Triggering circumstances
- Other associated symptoms

Timing-and-Trigger-Based Vestibular Syndrome in Acute Dizziness/Vertigo

Vestibular Syndrome	Common benign cause	Dangerous cause(s)
Acute vestibular syndrome (continuous, > 24 h)	Vestibular neuritis	Stroke
Episodic triggered vestibular syndrome	BPPV	Posterior fossa tumor
Episodic spontaneous vestibular syndrome	Vestibular migraine	TIA Cardiac dysrhythmia

J Emerg Med 2016; 50:617-628.

Imaging in Ischemic Posterior Circulation Stroke

- CT misses approximately 90% of vestibular strokes (very low sensitivity).
- MRI misses approximately 20% of vestibular strokes in the first 24 to 48 hours.

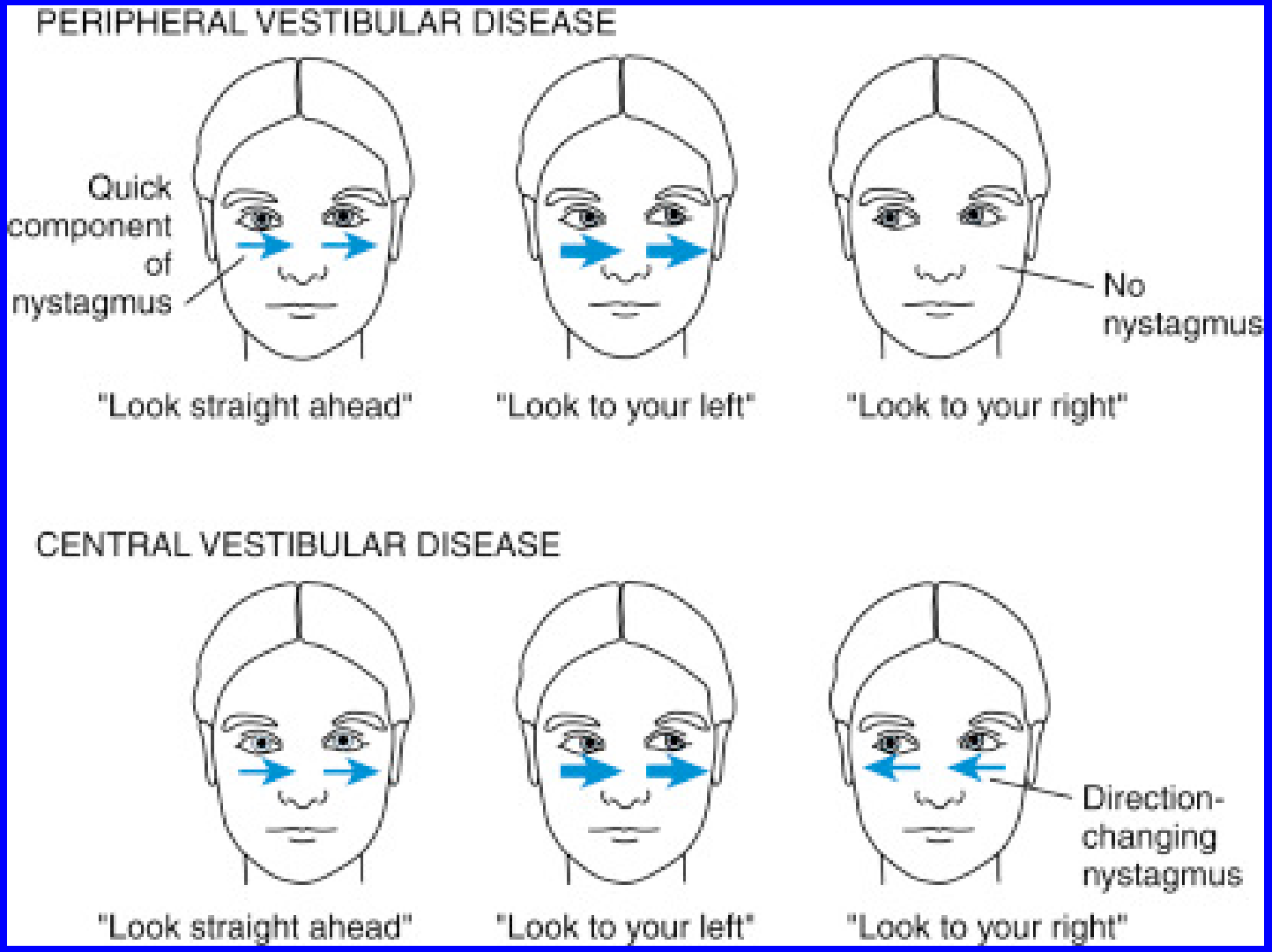
Semin Neurol 2019; 39:761-774.

Targeted Physical Examination in Diagnosis of Acute Vestibular Syndrome

- Growing evidence suggests that the targeted physical examination can help physicians differentiate a specific peripheral from central vestibular disorders
  - Nystagmus
  - Head impulse test
  - Test of skew

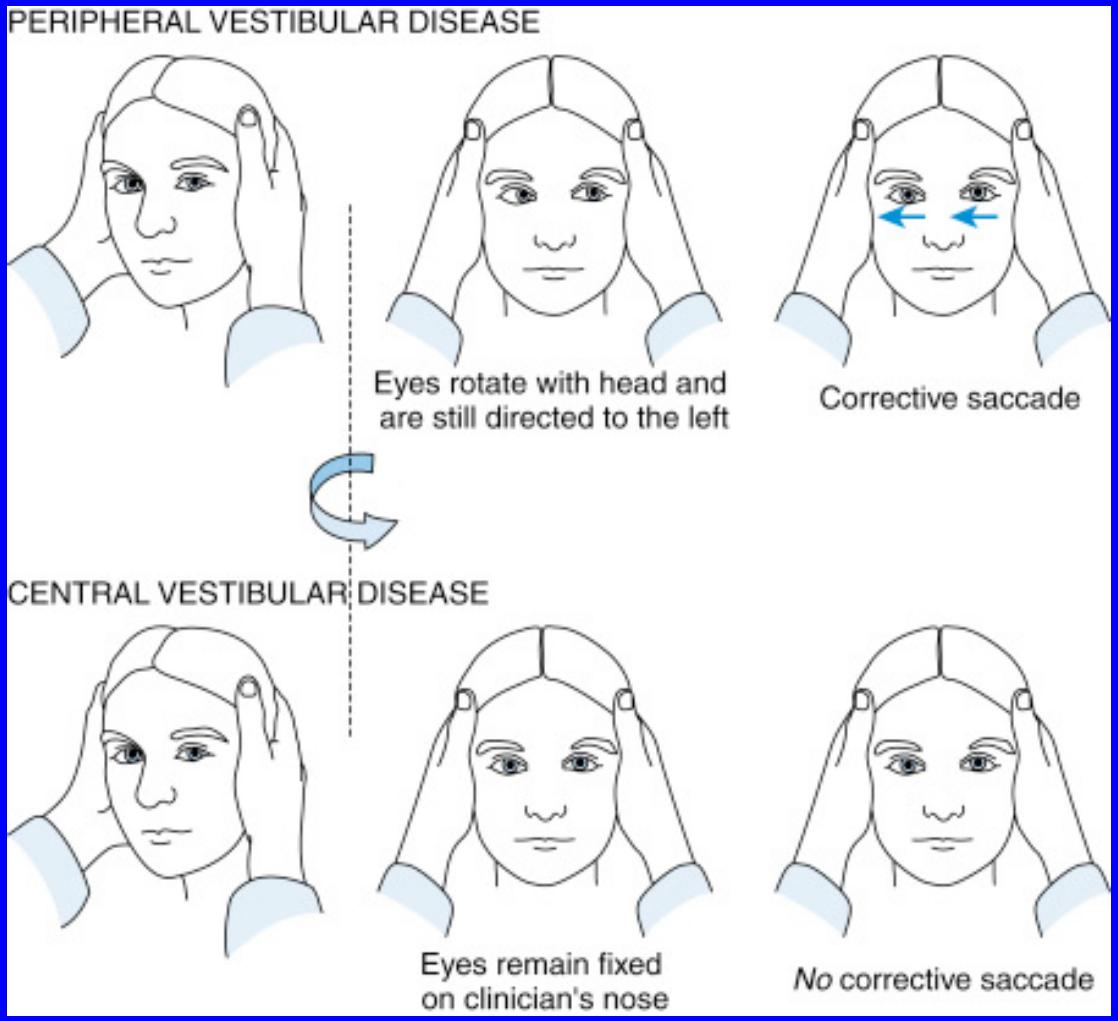
J Emerg Med 2016; 50:617-628.

Spontaneous Nystagmus (+)



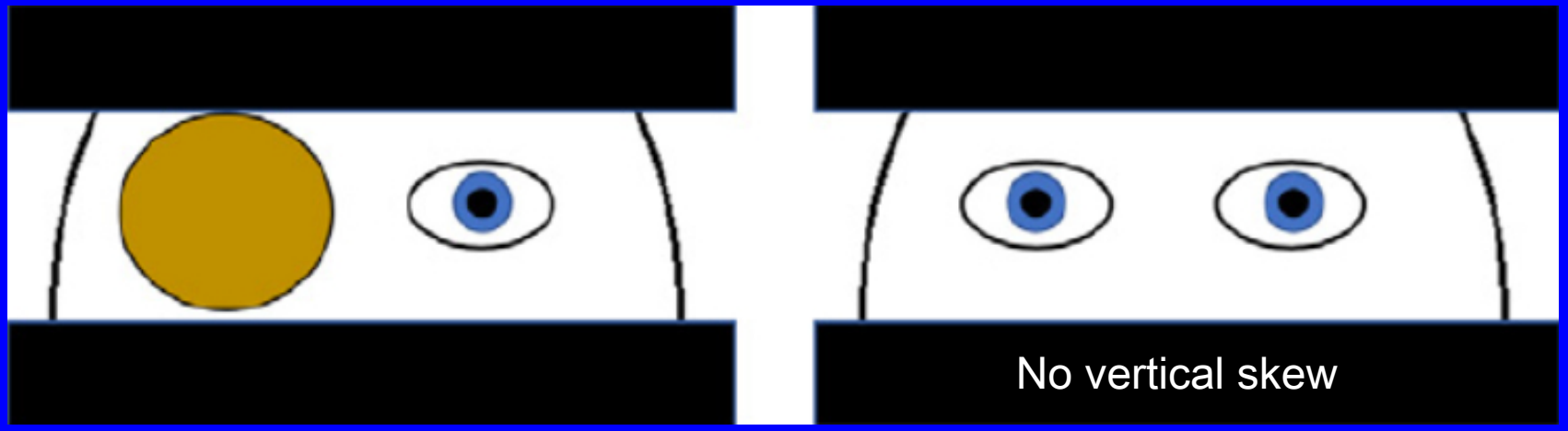
McGee S: Evidence-based physical diagnosis, 2018. Chapter 68

Head Impulse Test
– Testing of VOR Function–



McGee S: Evidence-based physical diagnosis, 2018. Chapter 68

Test of Skew



Cover

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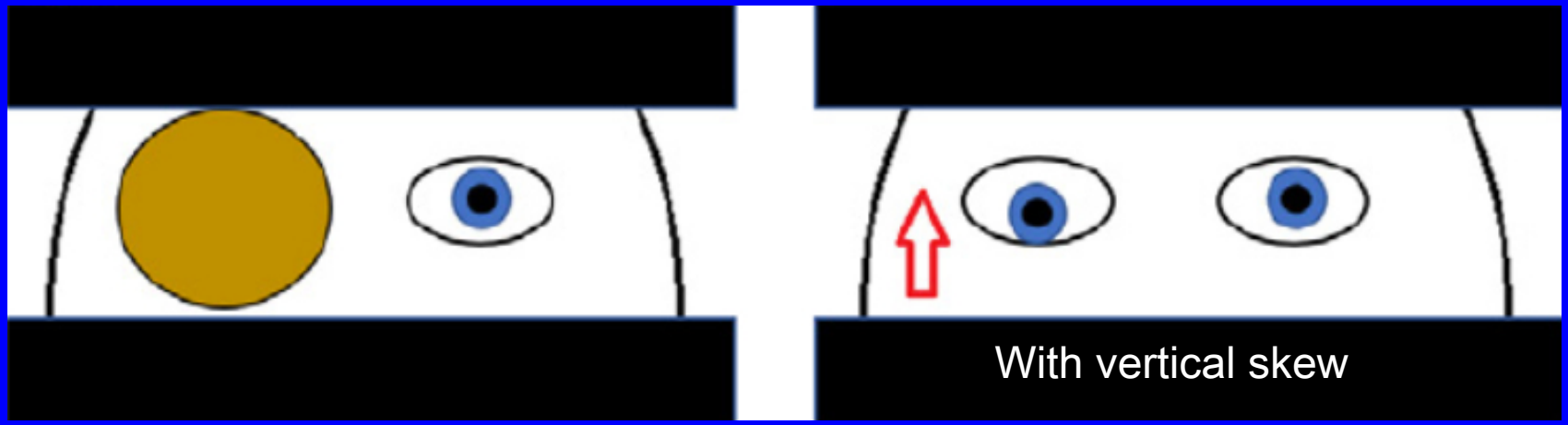


HINTS in the Acute Vestibular Syndrome

	Central	Peripheral
Head impulse test	• No corrective saccade	• Corrective saccade with head turn toward side of lesion
Nystagmus	• Direction-changing • Pure vertical, pure torsional or vertical-tortional • Nonfatiguing	• Unidirectional • Horizontal-torsional • Attenuates with fixational point
Test of skew	• Abnormal vertical ocular alignment	• Absence or rarely time-limited vertical ocular alignment

- A negative HINTS examination (presence of corrective saccade, unidirectional nystagmus, absence of skew deviation) can rule out a stroke better than a negative MRI with DWI in the first 24 to 48 hours after symptom onset with a specificity of 96%.

Continuum (Minneap Minn) 2021; 27(2, Neuro-otology):402-419.

Pitfalls in Vestibular Examination

- HINTS should only be done in the population of patients with acute vestibular syndrome
- HINTS cannot be relied upon in patients
  1) with episodic vestibular disorders
  2) with continuous symptoms but without spontaneous nystagmus (e.g., a patient whose symptoms are due to a medical condition)

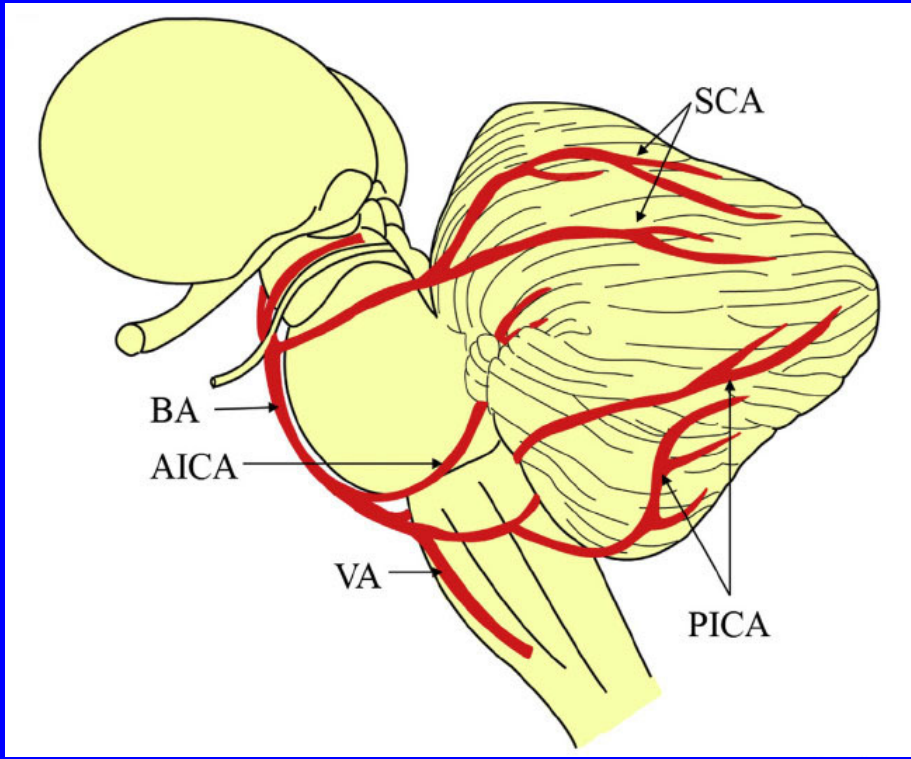
Semin Neurol 2019; 39:761-774.

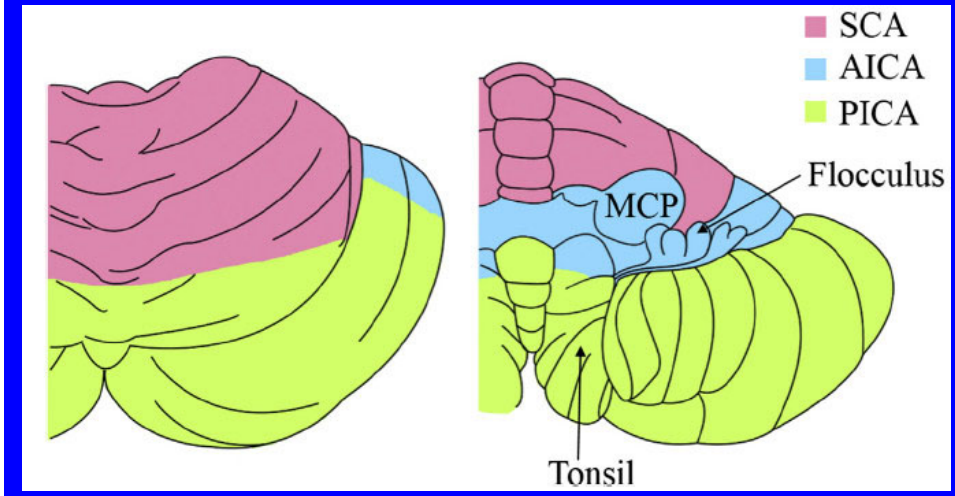
Central Lesions Causing Isolated Dizziness/Vertigo

Structure	Vascular territory
• Vestibular nucleus	PICA
• Root entry zone of the 8th nerve (pontomedullary junction)	AICA
• Nodulus (of Cerebellum)	PICA
• Flocculus (of Cerebellum)	AICA

Journal of Stroke, 2014; 16(3):124-130.

Cerebrovascular Anatomy of the Posterior Circulation and Vascular Territory of the Cerebellum



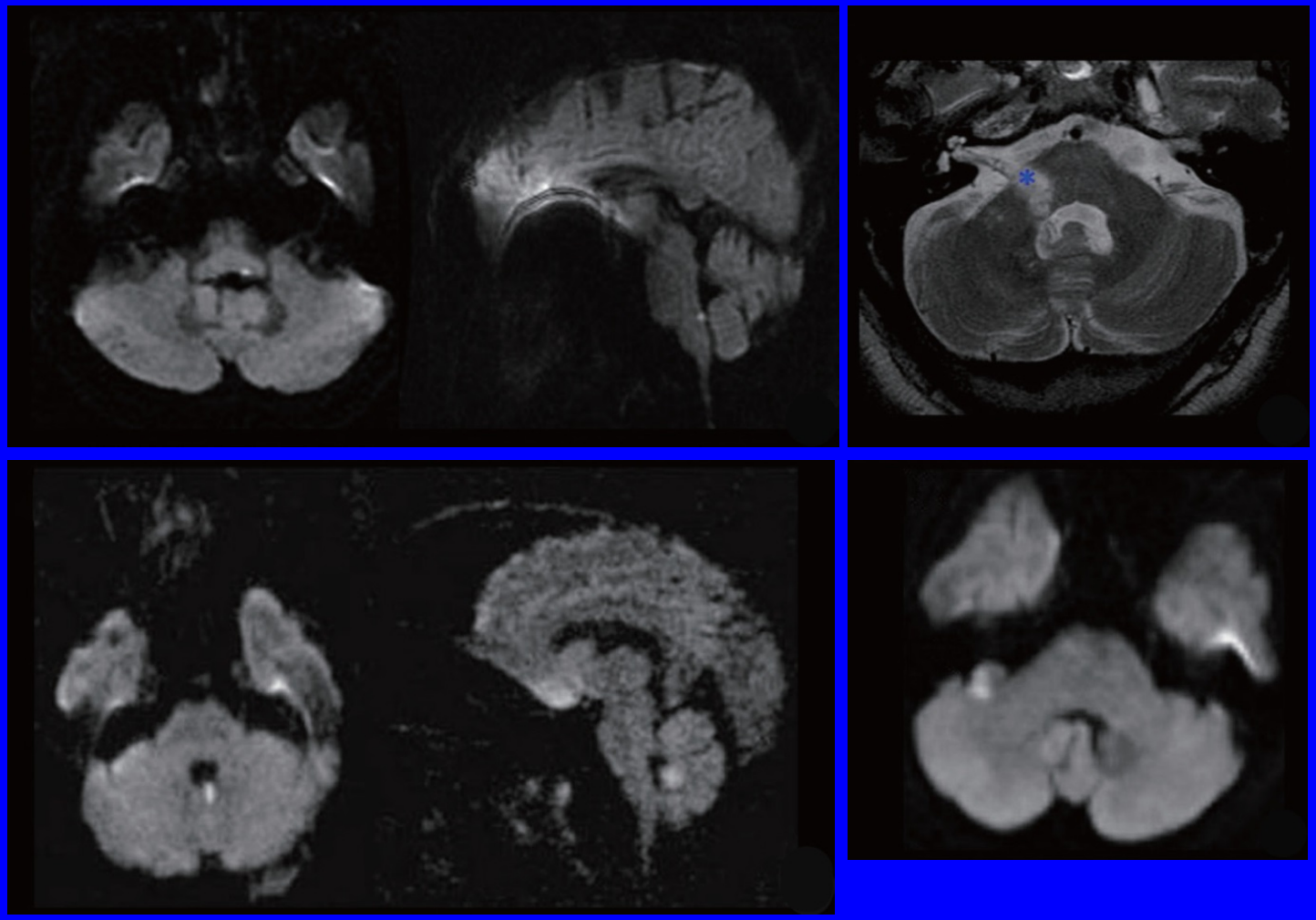


Posterior view

Anterior view

Neurologic Clinic 2015; 33(3):541-716.

Focal Infarction Selectively Involving Structures Responsible for Isolated Vertigo



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Thanks for Your Attention