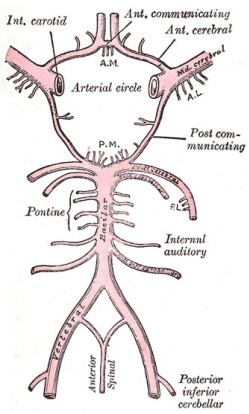
BRAINSTEM STROKE
& TIA
CHEAT SHEET

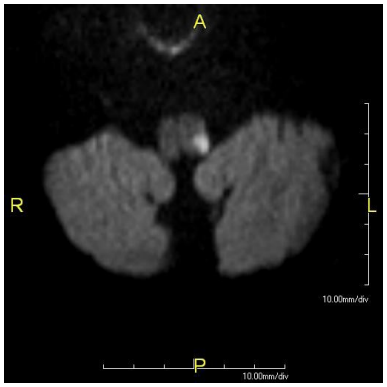
Brainstem Stroke & TIA

A Vestibular Physician's quick reference — recognition, localisation, imaging and acute management.

► Why brainstem stroke matters

Around one in four high-risk acute vestibular syndromes (AVS) is a brainstem or cerebellar stroke, and posterior-circulation stroke is the most commonly missed cerebrovascular presentation. Symptom quality does not separate vascular from peripheral vertigo — a structured oculomotor examination does. The labyrinthine artery is an end-branch of AICA, so AICA stroke uniquely combines inner-ear and brainstem loss.





Posterior (vertebrobasilar) circulation supplying the brainstem and labyrinth (left); diffusion-weighted MRI showing a left lateral-medullary (Wallenberg) infarct — the bright lesion (right).

Source: Gray's Anatomy of the Human Body (1918), public domain; DWI image — Australian Dizziness Clinics teaching collection.

► Recognising the central pattern (AVS)

- **Head-impulse —** a corrective catch-up saccade is peripheral; a NORMAL test with florid spontaneous nystagmus is central.
- **Nystagmus —** direction-changing gaze-evoked or vertical nystagmus is central; unidirectional is peripheral.
- **Skew —** vertical ocular misalignment on alternate cover test is a brainstem sign.
- **Truncal ataxia —** inability to sit or stand unaided is central regardless of the eye signs.
- **Focal signs —** dysarthria, diplopia, crossed sensory loss, Horner, dysphagia all localise centrally.

Pearl — Acute, continuous vertigo with a NORMAL head-impulse test is a stroke until proven otherwise.

► HINTS — peripheral vs central

Test	Peripheral (neuritis)	Central (stroke)
Head-Impulse	Abnormal — corrective saccade	Normal — no saccade
Nystagmus	Unidirectional, horizontal-torsional	Direction-changing / vertical
Test of Skew	Absent	Skew may be present

Any one central feature is ~100% sensitive and ~96% specific for stroke and outperforms early MRI-DWI [Kattah 2009]. Add bedside hearing (HINTS plus) to capture AICA-pattern strokes. Apply only to continuous AVS with spontaneous nystagmus.

► Vascular territory → syndrome

Territory	Key features
PICA / vertebral (lateral medulla)	Wallenberg: vertigo, Horner, crossed sensory loss, dysphagia, ataxia, ipsipulsion
PICA (medial cerebellum)	Isolated vertigo + gait ataxia mimicking neuritis (~11%); normal h-HIT
AICA (lateral pons + labyrinth)	Vertigo + hearing loss, facial palsy, ataxia; DWI often negative early
SCA (rostral cerebellum)	Gait ataxia, dysarthria; vertigo in up to half
Basilar apex / distal basilar	Vertigo, vertical gaze palsy, pupillary change, depressed consciousness — emergency

► Investigations & imaging

- Non-contrast CT is insensitive for posterior-fossa ischaemia — use mainly to exclude haemorrhage.
- Early diffusion-weighted MRI is falsely negative in ~12% of strokes and up to half of SMALL infarcts within 48 h.
- When the exam is central, admit, observe and repeat imaging at 48–72 h — do not discharge on a normal early scan.

- CT/MR angiography defines stenosis, basilar occlusion and dissection; seek a cardioembolic source.

► Acute management & secondary prevention

- Time-critical: confirm onset, stabilise, assess reperfusion — thrombolysis if eligible; thrombectomy for basilar / large-vessel occlusion.
- Short-term dual antiplatelet for high-risk TIA or minor stroke; anticoagulate for AF; treat dissection.
- Watch large PICA/SCA infarcts for swelling over 24–72 h — declining GCS needs urgent neurosurgical decompression.
- Statin, blood-pressure and risk-factor control; screen swallowing; withdraw vestibular suppressants early; refer for vestibular rehab.

Pearl — A large cerebellar infarct can kill through delayed swelling, not the initial ischaemia — monitor and decompress in time.

► Transient ischaemic attack (TIA)

- TIA is tissue-based — transient dysfunction without infarction; isolated vertigo CAN be vertebrobasilar TIA.
- ABCD2 underperforms a structured exam for dizziness — do not use it to exclude stroke risk.
- Early stroke risk is front-loaded (first days–weeks); vertebrobasilar stenosis carries high recurrence — image vessels and prevent urgently.

► Red flags — image before you reassure

- Normal head-impulse test in continuous AVS, or any direction-changing / vertical nystagmus or skew.
- Inability to sit or stand unaided (truncal ataxia) — central until proven otherwise.
- Any focal sign: dysarthria, diplopia, crossed sensory loss, Horner, dysphagia, limb weakness.
- New neck pain or occipital headache, especially in a younger patient — think vertebral dissection.
- Sudden hearing loss with vertigo and vascular risk factors — possible AICA infarction, not labyrinthitis.

► Differential diagnosis — central (vascular) vs peripheral

Feature	Peripheral (neuritis / labyrinthitis)	Central (vascular)
Head-impulse test	Abnormal (corrective saccade)	Often normal
Nystagmus	Unidirectional, suppresses with fixation	Direction-changing, vertical, fixation-resistant
Skew deviation	Absent	May be present
Gait / truncal	Unsteady but can stand	Often cannot sit or stand unaided
Other signs	None	Dysarthria, diplopia, sensory loss, Horner, dysphagia

Pearl — Symptom quality — 'spinning' versus 'lightheaded' — does NOT separate dangerous from benign causes. Use timing, triggers and the oculomotor examination.

► Prognosis, pitfalls & practice points

- Isolated vertigo carries an elevated stroke risk for months — a confident peripheral diagnosis needs a confidently peripheral examination.
- HINTS is only valid in continuous AVS with spontaneous nystagmus — never apply it to an episodic or examination-normal patient.
- A poorly performed head-impulse test (large amplitude, predictable, no fixation) is the commonest source of error — use video-oculography when unsure.
- Chronic sequelae — central positional vertigo, downbeat nystagmus, persistent imbalance — are the legacy of the stroke, not a new peripheral disorder.

Key refs — Kattah 2009 · Saber Tehrani 2014 · Edlow 2018 · Lee 2006 · Markus 2013 · Powers 2019 · Choi 2019