





MAGNETIC RESONANCE IMAGING AND MR ANGIOGRAPHY (MRA)

- Considered the investigation of choice if the history and examination suggest a central cause for vertigo or if a peripheral and central cause cannot be distinguished and there are risk factors for cerebrovascular disease or if there is a severe headache accompanying the vertigo. [1](#)
- Ischaemia in the vertebrobasilar system can produce infarction of the labyrinth, brain stem, cerebellum or a combination of these areas.
- Vertigo associated with these causes is typically of abrupt onset and occurs in patients with risk factors for stroke such as hypertension, diabetes, smoking or those with cardiac abnormalities such as atrial fibrillation or valvular heart disease. [2-6](#)
- MRI has a high sensitivity for the detection of cerebellar infarction, even early in the course of symptoms but may be less sensitive for the detection of a cerebellar haemorrhage. The conversion of oxyhaemoglobin to deoxyhaemoglobin, which may take 12-24 hours, also allows the more ready detection of haemorrhage. [8](#)
- One study showed MRA to have a sensitivity of 97% and specificity of 98.9% for the diagnosis of occlusions and stenoses of the posterior circulation when compared to the reference standard of intra-arterial angiography. [7](#)
- The use of diffusion weighted imaging (DWI) is particularly useful for the detection of ischaemia. Two studies have shown DWI to have a sensitivity of 88-100% and specificity of 95-100% for the detection of ischaemia within 6 hours of stroke. [9,10](#)

COMPUTED TOMOGRAPHY

- If MRI is not available or contraindicated CT is the preferred investigation for suspected vertebrobasilar ischaemia or haemorrhage. [1](#)
- However, CT is not as sensitive as MRI with diffusion weighted imaging for the detection of ischaemia and provides inferior images of structures in the posterior fossa. [11](#)
- Fine cuts through the cerebellum should be used to assist with diagnosis. If immediate brain imaging is indicated and a normal CT is obtained on the first day subsequent MRI and MRA are generally recommended and in the meantime the patient's neurological status should be closely monitored. [1](#)
- Imaging may not be necessary if the patient has isolated vertigo, no other neurological signs and no risk factors for stroke. [1](#)

REFERENCES

1. Hotson JR, Baloh W. **Acute vestibular syndrome**. NEJM 1998;339:680-5. (Review article)
2. Oas JG, Baloh RW. **Vertigo and the anterior inferior cerebellar artery syndrome**. Neurology 1992;42:2274-9. (Level IV evidence)





3. Norrving B, Magnusson M, Holtas S. **Isolated acute vertigo in the elderly: vestibular or vascular disease?** Acta Neurol Scand 1995;91:43-8. (Level III evidence)
4. Amarenco P, Levy C, Cohen A, et al. **Causes and mechanisms of territorial and nonterritorial cerebellar infarcts in 115 consecutive patients.** Stroke 1994;25:105-12. (Level III evidence). [Click here to view reference](#)
5. Grad A, Baloh RW. **Vertigo of vascular origin: clinical and electronystagmographic features in 84 cases.** Arch Neurol 1989;46:281-4. (Level IV evidence)
6. Gomez CR, Cruz-Flores S, Malkoff MD, et al. **Isolated vertigo as a manifestation of vertebrobasilar ischemia.** Neurology 1996;47:94-7. (Level IV evidence)
7. Röther J, Wentz K, Rautenberg W, et al. **Magnetic resonance angiography in vertebrobasilar ischaemia.** Stroke 1993;24:1310-5. (Level III evidence). [Click here to view reference](#)
8. Bradley Jr WG. **MR appearance of hemorrhage in the brain** 1993;189:15-26. (Review article)
9. Gonzalez RG, Schaefer PW, Buonanno FS, et al. **Diffusion-weighted MR imaging: diagnostic accuracy in patients imaged within 6 hours of stroke symptom onset.** Radiology 1999;210:155-62. (Level III evidence)
10. Lovblad KO, Laubach HJ, Baird AE, et al. **Clinical experience with diffusion-weighted MR in patients with acute stroke.** AJNR Am J Neuroradiol 1998;19:1061-6. (Level III evidence)
11. Fiebach JB, Schellinger PD, Jansen O, et al. **CT and diffusion-weighted MR imaging in randomized order: diffusion-weighted imaging results in higher accuracy and lower interrater variability in the diagnosis of hyperacute ischaemic stroke.** Stroke 2002;33:2206-10. (Level II evidence). [Click here to view reference](#)

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