

## Case Report

# Vertebral Artery Dissection Mimicking Migraine: A Case Report

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### ABSTRACT

Vertebral artery dissection (VAD) is caused by an intimal tear that leads to bleeding into the vascular wall, which may cause vascular occlusion by thrombus formation and subsequent distal emboli (leading to ischemic stroke), aneurysm formation and subarachnoid hemorrhage. Cervical artery dissections (either carotid or vertebral artery dissection) are an important cause of stroke in patients under 50-years of age. Headache with or without neck pain is a common symptom. Usually, it occurs with focal neurological signs but sometimes it may occur without any neurological deficits and may mimic migraine. Often it occurs spontaneously without trauma but sometimes there is history of minor traumas, sudden neck movements or chiropractic manipulation. Imaging modalities include magnetic resonance imaging (MRI) brain, magnetic resonance angiography (MRA), and computed tomography angiography (CTA). Treatment involves anticoagulation or antiplatelet agents.

### Keywords

Vertebral artery dissection; Migraine; Headache; Neck pain.

### INTRODUCTION

Vertebral artery dissection (VAD) is an important cause of stroke in patients under 50-years of age and presents with headache with or without neck pain. It occurs with focal neurological signs but sometimes it may occur without any neurological deficits and may mimic migraine.

A 28-year-old female with past history of chronic migraines presented to the emergency department (ED) with headache, neck stiffness and vertiginous giddiness. There was no prior trauma and there were no gross neurological deficits. Patient was discharged with analgesics. The patient returned with persistent headache and giddiness 3-days later. Gait was steady however patient was unsteady on tandem gait. There were no other neurological signs. magnetic resonance imaging (MRI) brain with magnetic resonance angiography (MRA) showed dissection of right vertebral artery with acute infarct in the right cerebellar hemisphere. Patient was stable and was discharged on dual antiplatelet therapy.

Although many VAD cases are caused by minor trauma to head and neck and usually have focal neurological deficits, it

would be advisable to keep VAD as a differential diagnosis when dealing with patients with headache without history of trauma and no neurological deficits as it may mimic migraine and would alter the course of treatment and influence morbidity and mortality of the patients.

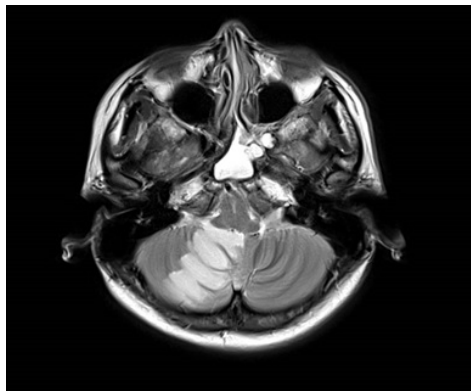
### CASE REPORT

A 28-year-old female with past history of chronic migraines presented to the ED with headache of 24 hours duration. Headache was right sided and reported to be similar in nature to her migraine but more intense. Onset was gradual over a few hours. She gave history of seeing flashes of light at the onset of headache, blurring of vision in right eye and episodes of vomiting and reported that all of these features were also present with her migraine headaches. There was associated stiffness in neck and vertiginous giddiness. The patient reported that her usual migraine is aborted in 12-hours by taking paracetamol. There was no history of double vision, altered mental state, fever, no limb weakness, numbness or slurred speech. On examination, the patient was found to have Glasgow Coma Scale (GCS) of 15, no dysmetria, no dysidiadochokinesia, no facial asymmetry, and extraocular movements were normal. Power was grade 5/5 in all limbs. She was given analgesia while in the ED,

after which the headache resolved completely and the subjective blurring of vision resolved partially. She was also reviewed by the ophthalmologist-on-call in ED and was found to have a normal eye examination and was discharged with analgesia and advised to return in case of recurrent symptoms.

The patient reattended our ED with persistent headache, giddiness and blurring of vision three days later. There was only temporary relief with given analgesics. The patient reported this time that the headache is different from previous episodes of migraine in its nature and its duration. There was no diplopia or nystagmus or past pointing. Gait was steady however patient was unsteady on tandem gait. Power was grade 5/5 in all limbs. An MRI brain showed right cerebellar infarct and MRI brain with MRA showed dissection of V2 segment of right vertebral artery with acute infarct in the right cerebellar hemisphere (Figures 1 and 2). The patient was stable and was discharged on dual antiplatelet therapy.

**Figure 1.** MRI Brain T2 Weighted Image Showing Right Cerebellar Infarct



**Figure 2.** MR Angiogram Showing Intimal Flap Along the V2 Segment of the Right Vertebral Artery and Attenuated Distal Right Vertebral Artery Flow



## DISCUSSION

Headache and neck pain are common complaints in patients presenting to the ED. One study reported ‘symptoms involving head and neck’ was the 6<sup>th</sup> most common ED diagnosis, seen in 2.2% of ED visits. The majority of these patients do not have a life-threatening problem. The challenge is to recognize signs of cervical artery dissection in patients with head and neck pain.

The incidence of cervical artery dissection is low; however, it is a common etiology of stroke in adults younger than 50-years of age, causing up to 10% of the cases. It is more common in the carotid arteries than the vertebral arteries. Extracranial VAD occurs more frequently in women while intracranial VAD and internal carotid artery dissection is more common in men.<sup>1,2</sup> Trauma, usually mild in nature, or other mechanical events are triggers for cervical artery dissection in up to 40% of cases.<sup>3</sup> Such triggers can be chiropractic neck manipulation, minor sports injuries, sudden neck movement or vigorous exercise including skating, swimming, weight lifting, etc. Many patients with dissection have neckache/headache preceding cerebral ischemia: isolated neck pain or a combination of neck pain with headache were characteristic of VADs.<sup>4</sup> Head and neck pain is supposed to be caused by activation of nociceptors from dissection of the vessel wall.<sup>5</sup> For all dissections, headaches are typically ipsilateral to the side of dissection.<sup>6</sup> VAD with isolated pain might be more common than expected and is more often caused by extracranial VAD. A history of migraine is present in many of the VAD patients.<sup>7</sup> Furthermore, headache from dissection may mimic migraine<sup>8</sup> making the diagnosis of VAD more challenging. There are case reports of headache and migraine-like presentations of cervical artery dissection including VAD.<sup>9-13</sup> A prospective cohort study has shown that in patients with ischemic stroke aged 18 to 45-years, migraine, especially migraine without aura, is consistently associated with cervical artery dissection.<sup>14</sup> A small proportion of patients have underlying vascular abnormalities such as fibromuscular dysplasia, Marfan’s syndrome or Ehlers-Danlos syndrome.<sup>15</sup>

Once VAD is suspected, choosing appropriate imaging modality is the key. The usual approach to a new onset severe headache in the ED is a non-contrast computerized tomography (CT) brain and lumbar puncture in appropriate situations. Unfortunately, this may miss uncomplicated VAD, leading to delays in diagnosis and subsequent stroke or death. Preferred imaging modality is MRA and/or computed tomography angiography (CTA).<sup>16</sup> A large series comparing MRA to traditional angiography found a sensitivity of 20% and specificity of 100% for VAD while CTA showed a sensitivity of 90% and specificity of 100%.

The treatment of patients diagnosed with VAD may begin with candidacy for fibrinolytic therapy with tissue plasminogen activator (tPA),<sup>17</sup> although most patients with dissection present late, often beyond the beneficial thrombolytic window. Evidence suggests that the effectiveness and safety of thrombolysis for patients with ischemic stroke related to cervical artery dissection are similar to its effectiveness and safety for patients with ischemic stroke from other causes.<sup>18</sup> Other treatment modalities include mechanical thrombectomy or endovascular stenting. For patients

with acute ischemic stroke or TIA caused by vertebral artery dissection, antithrombotic treatment using either antiplatelet or anticoagulation therapy is generally recommended. The cervical artery dissection in stroke study (CADISS) trial which compared antiplatelet and anticoagulation therapy was unable to establish which treatment is superior or safer when used to treat cervical artery dissection.<sup>19</sup> Recent biomarkers and antithrombotic treatment in cervical artery dissection (TREAT-CAD) trial did not show that aspirin was non-inferior to vitamin K antagonists in the treatment of cervical artery dissection.<sup>20</sup>

## CONCLUSION

This case illustrates the importance of maintaining a high index of suspicion of vertebral artery dissection in patients presenting with headache to the ED. This is often made more difficult when patients have a history of migraine distracting and misleading the busy ED physician. The importance of a detailed history and examination looking for red flags and relevant investigations will help establish the diagnosis early so that appropriate treatment can be rendered with improved outcomes.

## CONSENT

The authors have received written informed consent from the patient.

## CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

## REFERENCES

1. Debette S, Grond-Ginsbach C, Bodenat M, Kloss M, Engelter S, Metso T, et al. Differential features of carotid and vertebral artery dissections: The CADISP study. *Neurology*. 2011; 77(12): 1174-1181. doi: [10.1212/WNL.0b013e31822f03fc](https://doi.org/10.1212/WNL.0b013e31822f03fc)
2. Hinse P, Thie A, Lachenmayer L. Dissection of the extracranial vertebral artery: Report of four cases and review of the literature. *J Neurol Neurosurg Psychiatry*. 1991; 54: 863-869. doi: [10.1136/jnnp.54.10.863](https://doi.org/10.1136/jnnp.54.10.863)
3. Engelter ST, Grond-Ginsbach C, Metso TM, Metso AJ, Kloss M, Debette S, et al. Cervical artery dissection: Trauma and other potential mechanical trigger events. *Neurology*. 2013; 80(21): 1950-1957. doi: [10.1212/WNL.0b013e318293e2eb](https://doi.org/10.1212/WNL.0b013e318293e2eb)
4. Fukuhara K, Ogata T, Ouma S, Tsugawa J, Matsumoto J, Abe H, Higashi T, Inoue T, Tsuboi Y. Impact of initial symptom for accurate diagnosis of vertebral artery dissection. *Int J Stroke*. 2015; 10 Suppl A100: 30-33. doi: [10.1111/ijss.12546](https://doi.org/10.1111/ijss.12546)
5. Arnold M, Cumurciuc R, Stapf C, Favrole P, Berthet K, Boussier M-G. Pain as the only symptom of cervical artery dissection. *J Neurol Neurosurg Psychiatry*. 2006; 77: 1021-1024. doi: [10.1136/jnnp.2006.094359](https://doi.org/10.1136/jnnp.2006.094359)
6. Silbert PL, Mokri B, Schievink WI. Headache and neck pain in spontaneous internal carotid and vertebral artery dissections. *Neurology*. 1995; 45(8): 1517-1522. doi: [10.1212/wnl.45.8.1517](https://doi.org/10.1212/wnl.45.8.1517)
7. Arnold M, Kappeler L, Georgiadis D, Berthet K, Keserue B, Boussier MG, Baumgartner RW. Gender differences in spontaneous cervical artery dissection. *Neurology*. 2006; 67(6): 1050-1052. doi: [10.1212/01.wnl.0000237341.30854.6a](https://doi.org/10.1212/01.wnl.0000237341.30854.6a)
8. Headache Classification Committee of the International Headache Society (IHS). The international classification of headache disorders, 3rd edition. *Cephalalgia*. 2018; 38(1): 1-211. doi: [10.1177/0333102417738202](https://doi.org/10.1177/0333102417738202)
9. Teodoro T, Ferreira J, Franco A, Almeida V, Casimiro C, Coelho M, et al. Vertebral artery dissection mimicking status migrainosus. *Am J Emerg Med*. 2013; 31(12): 1721.e3-e5. doi: [10.1016/j.ajem.2013.07.025](https://doi.org/10.1016/j.ajem.2013.07.025)
10. Donnelly A, Sinnott B, Boyle R, Rennie I. Beware the middle-aged migraine: Internal carotid artery dissection mimicking migraine in the emergency department. *BMJ Case Reports*. 2017; 2017: bcr-2017-221774. doi: [10.1136/bcr-2017-221774](https://doi.org/10.1136/bcr-2017-221774)
11. Jatuzis D, Valaikiene J. Migraine-like presentation of vertebral artery dissection after cervical manipulative therapy. *Perspectives in Medicine*. 2012; 1(1-12): 452-454. doi: [10.1016/j.permed.2012.03.010](https://doi.org/10.1016/j.permed.2012.03.010)
12. Morelli N, Mancuso M, Gori S, Maluccio MR, Cafforio G, Chiti A, et al. Vertebral artery dissection onset mimics migraine with aura in a graphic designer. *Headache*. 2008; 48(4): 621-624. doi: [10.1111/j.1526-4610.2008.01066.x](https://doi.org/10.1111/j.1526-4610.2008.01066.x)
13. Sakakibara S, Nakatani T, Yamamoto H, Motooka A, Hashimoto T, Saito Y. A case of severe headache attributed to vertebral artery dissection. *JA Clin Rep*. 2019; 5: 27. doi: [10.1186/s40981-019-0247-9](https://doi.org/10.1186/s40981-019-0247-9)
14. De Giuli V, Grassi M, Lodigiani C, Patella R, Zedde M, Gandolfo C, et al. Italian project on stroke in young adults investigators. association between migraine and cervical artery dissection: The italian project on stroke in young adults. *JAMA Neurol*. 2017; 74(5): 512-518. doi: [10.1001/jamaneurol.2016.5704](https://doi.org/10.1001/jamaneurol.2016.5704)
15. Brandt T, Morcher M, Hausser I. Association of cervical artery dissection with connective tissue abnormalities in skin and arteries. *Front Neurol Neurosci*. 2005; 20: 16-29. doi: [10.1159/000088131](https://doi.org/10.1159/000088131)
16. Vertinsky AT, Schwartz NE, Fischbein NJ, Rosenberg J, Albers GW, Zaharchuk G. Comparison of multidetector CT angiography and MR imaging of cervical artery dissection. *AJNR Am J Neuroradiol*. 2008; 29(9): 1753-1760. doi: [10.3174/ajnr.A1189](https://doi.org/10.3174/ajnr.A1189)
17. Engelter ST, Rutgers MP, Hatz F, Georgiadis D, Fluri F, Sekoranja L, et al. Intravenous thrombolysis in stroke attributable to cervical artery dissection. *Stroke*. 2009; 40(12): 3772-3776. doi: [10.1161/STROKEAHA.109.555953](https://doi.org/10.1161/STROKEAHA.109.555953)

18. Zinkstok SM, Vergouwen MD, Engelter ST, Lyrer PA, Bonati LH, Arnold M, et al. Safety and functional outcome of thrombolysis in dissection-related ischemic stroke: A meta-analysis of individual patient data. *Stroke.* 2011; 42: 2515-2520. doi: [10.1161/STROKEAHA.111.617282](https://doi.org/10.1161/STROKEAHA.111.617282)
19. Kasner SE. CADISS: A feasibility trial that answered its question. *Lancet Neurol.* 2015; 14(4): 342-343. doi: [10.1016/S1474-4422\(14\)70271-6](https://doi.org/10.1016/S1474-4422(14)70271-6)
20. Engelter ST, Traenka C, Gensicke H, Schaedelin SA, Luft AR, Simonetti BG, et al. Aspirin versus anticoagulation in cervical artery dissection (TREAT-CAD): An open-label, randomised, non-inferiority trial. *Lancet Neurol.* 2021; 20: 341-350. doi: [10.1016/S1474-4422\(21\)00044-2](https://doi.org/10.1016/S1474-4422(21)00044-2)