

CLINICAL VIGNETTE

Recurrent Head and Neck Pain due to Unsuspected Carotid Artery Dissection

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Introduction

Cervical artery dissection is a common cause of stroke in the young but may develop at any age. This involves either the carotid or vertebral arteries, with separation of arterial walls to create a false lumen where blood can enter. An intima tear or rupture can result in hemorrhage. Subintimal dissections can lead to stenosis or occlusion of the lumen, while subadventitial dissections can result in aneurysm. Luminal stenosis may result in cerebral ischemia due to thromboembolism, hypoperfusion, or both. Rarely, dissection may lead to vessel rupture with subarachnoid hemorrhage.¹ Early recognition is challenging as the associated symptoms may not be easily detectable on initial presentation.

Presentation

A 57-year-old female without a significant medical history, presented with headaches and right-sided neck pain, which radiated to the ear. She initially noted a severe, sharp headache just over the right temple, which lasted 1 minute and did not recur. Around that time, she also developed throbbing right inner ear discomfort radiating to the temple. She described feeling like there was a “golf ball in the throat,” which lasted 24 hours. This was followed by swelling around the right eye.

Three days later she was seen at Urgent Care, where she had her first physician encounter since symptom onset. At this visit she reported 2 days of right neck swelling followed by right ear pain, which had woken her up in the middle of the night. She had also reported some drainage of the ear and vomited the previous night. She denied any fevers, chills, dysphagia, shortness of breath.

Her vital signs included: blood pressure 121/79, pulse 71, temperature 98.2, oxygen saturation 97%. On physical exam, she was well-appearing with mild tenderness over the submandibular glands and a 1cm mobile cervical lymph node. There were no neurologic deficits and the rest of her exam was unremarkable. She was recommended to use acetaminophen or ibuprofen as needed for pain relief.

Three days later she returned to Urgent Care for follow-up of recurrent right ear pain. She denied any headaches at that time. Acetaminophen, did not provide relief. Her blood pressure was 136/88. On exam she was only noted to have slight swelling of the right eyelid and erythema in the right ear canal. She was

prescribed ear drops for mild otitis externa and discharged as she did not have any neurologic deficits.

The following week she presented to the Emergency Department for worsening headaches, right-sided neck pain and right eyelid swelling. MRA Head and Neck without contrast identified a dissection of the cervical right internal carotid artery resulting in moderate stenosis of the cervical portion and focal severe stenosis of the vessel as it enters the petrous apex.

This may be related to a chiropractic injury as she had seen a chiropractor for neck pain, with neck manipulation the day before symptom onset. She was evaluated by Neurology and IR, who recommended no intervention was indicated and her exam was not concerning for acute infarct. She was initially placed on a heparin drip for concerns that the carotid artery stenosis secondary to thrombosis. Lab tests were significant for LDL elevation of 190. Before discharge she was transitioned to apixaban and started on atorvastatin.

Repeat imaging 2 months later, demonstrated improvement of the right internal carotid artery dissection. There was only residual localized mild-moderate stenosis of the vessel as it enters the petrous apex. There was no new dissection, thrombosis or aneurysm. At follow-up, she reported mild intermittent right-sided headaches that were decreasing in frequency. Repeat CTA Head and Neck showed resolution of the dissection and anticoagulation was discontinued.

Discussion

The incidence of cervical artery dissection is low but outcomes can be devastating. Initial symptoms may involve headache and/or neck pain. Headaches are typically unilateral with a sudden onset and may resemble a cluster or migraine headache. Other signs or symptoms include pulsatile tinnitus, partial Horner's syndrome with ptosis and miosis, vision changes, and cranial nerve palsies.² The time from initial symptoms to ischemic stroke varies from minutes to weeks.³

Population-based studies reported a relatively low annual incidence of cervical artery dissection estimated to be 2.9 to 3.0 per 100,000 people.⁴ The true incidence may be higher considering the possibility of asymptomatic cases. Predisposing factors include connective tissue or vascular disease including fibromuscular dysplasia, Marfan syndrome, and vascular

Ehlers-Danlos. Other risk factors include recent infection, hypertension, smoking, migraine, elevated homocysteine levels, oral contraceptive use, higher body height, low body weight, pregnancy, mainly in the postpartum period. The possibility of genetic factors contributing to sporadic cases is being considered.¹

Common causes of arterial dissection include head and neck trauma, after minor injury or spontaneously. Cases have been attributed to a variety of injuries that may be trivial from such activities as coughing, sneezing, chiropractic neck manipulation, childbirth, sexual intercourse, sports injuries, yoga.⁵

The possibility of cervical dissection related to cervical manipulation therapy (CMT) is an area of interest, particularly for this case. The mechanism is not well established, however, several population-controlled studies have reported an association between CMT and specifically vertebral artery dissection stroke in young patients. The incidence of CMT-associated cervical dissection in patients who have previously received CMT is not well established yet there is a statistical association.⁶ A case-control study found out of 582 cases, those aged less than 45 years showed vertebrobasilar accidents to be 5 times more likely than controls in those who had visited a chiropractor within 1 week of the VBA (95% CI from bootstrapping, 1.32 to 43.87).⁷

The Cervical Artery Dissection in Stroke Study (CADISS) performed a randomized, open-label international multicenter parallel design with central blinded review of clinical and imaging end points evaluated whether anti-platelet or anti-coagulation therapy is more effective in preventing stroke in cervical dissection and the risk of recurrent stroke. The study concluded that there were no significant differences between treatment groups for any outcome, including residual narrowing or occlusion.⁸ Caprio et al evaluated the use of direct oral anticoagulants in the treatment of CAD with retrospective cohort analysis. They determined that DOACs had similar rates of recurrent stroke, fewer hemorrhagic complications, but greater rates of radiographic changes compared to traditional anticoagulants.⁹

Conclusion

Carotid dissections are rare and generally seen in the young and middle-aged. Prompt and accurate diagnosis is vital due to the potential for stroke. Headaches are commonly seen in the primary care setting and can be challenging to manage given the wide differential diagnoses. Awareness of the predisposing factors, signs, symptoms and exam findings can aid in early detection and management to prevent serious complications, such as stroke.

REFERENCES

1. **Mehdi E, Aralasmak A, Toprak H, Yıldız S, Kurtcan S, Kolukisa M, Asıl T, Alkan A.** Craniocervical Dissections: Radiologic Findings, Pitfalls, Mimicking Diseases: A

- Pictorial Review. *Curr Med Imaging Rev.* 2018 Apr;14(2): 207-222. doi: 10.2174/1573405613666170403102235. PMID: 29853818; PMCID: PMC5902863.
2. **Debette S, Leys D.** Cervical-artery dissections: predisposing factors, diagnosis, and outcome. *Lancet Neurol.* 2009 Jul;8(7):668-78. doi: 10.1016/S1474-4422(09)70084-5. PMID: 19539238.
3. **Cadena R.** Cervical artery dissection: early recognition and stroke prevention. *Emerg Med Pract.* 2016 Jul;18(7):1-24. Epub 2016 Jul 1. PMID: 27315017.
4. **Béjot Y, Daubail B, Debette S, Durier J, Giroud M.** Incidence and outcome of cerebrovascular events related to cervical artery dissection: the Dijon Stroke Registry. *Int J Stroke.* 2014 Oct;9(7):879-82. doi: 10.1111/ij.s.12154. Epub 2013 Oct 22. PMID: 24148660.
5. **Engelter ST, Grond-Ginsbach C, Metso TM, Metso AJ, Kloss M, Debette S, Leys D, Grau A, Dallongeville J, Bodenart M, Samson Y, Caso V, Pezzini A, Bonati LH, Thijs V, Gensicke H, Martin JJ, Bersano A, Touzé E, Tatlisumak T, Lyrer PA, Brandt T; Cervical Artery Dissection and Ischemic Stroke Patients Study Group.** Cervical artery dissection: trauma and other potential mechanical trigger events. *Neurology.* 2013 May 21;80(21):1950-7. doi: 10.1212/WNL.0b013e318293e2eb. Epub 2013 May 1. PMID: 23635964.
6. **Biller J, Sacco RL, Albuquerque FC, Demaerschak BM, Fayad P, Long PH, Noorollah LD, Panagos PD, Schievink WI, Schwartz NE, Shuaib A, Thaler DE, Tirschwell DL; American Heart Association Stroke Council.** Cervical arterial dissections and association with cervical manipulative therapy: a statement for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke.* 2014 Oct;45(10): 3155-74. doi: 10.1161/STR.000000000000016. Epub 2014 Aug 7. Erratum in: *Stroke.* 2016 Nov;47(11):e261. PMID: 25104849.
7. **Rothwell DM, Bondy SJ, Williams JL.** Chiropractic manipulation and stroke: a population-based case-control study. *Stroke.* 2001 May;32(5):1054-60. doi: 10.1161/01.str.32.5.1054. PMID: 11340209.
8. **Markus HS, Levi C, King A, Madigan J, Norris J; Cervical Artery Dissection in Stroke Study (CADISS) Investigators.** Antiplatelet Therapy vs Anticoagulation Therapy in Cervical Artery Dissection: The Cervical Artery Dissection in Stroke Study (CADISS) Randomized Clinical Trial Final Results. *JAMA Neurol.* 2019 Jun 1;76(6):657-664. doi: 10.1001/jamaneurol.2019.0072. PMID: 30801621; PMCID: PMC6563567.
9. **Caprio FZ, Bernstein RA, Alberts MJ, Curran Y, Bergman D, Korutz AW, Syed F, Ansari SA, Prabhakaran S.** Efficacy and safety of novel oral anticoagulants in patients with cervical artery dissections. *Cerebrovasc Dis.* 2014;38(4):247-53. doi: 10.1159/000366265. Epub 2014 Nov 13. PMID: 25401389.