


Vertebral Artery Dissection Related to Amphetamine Abuse – A Case Report

Frederik Winsløw¹ , Nadja Skadkær Hansen¹ and Michael Broksgaard Jensen^{1,2}

¹Department of Neurology, North Zealand Hospital, Hillerød, Denmark. ²Faculty of Health Sciences, University of Copenhagen, Copenhagen, Denmark.

Journal of Central Nervous System Disease
Volume 12: 1–2
© The Author(s) 2020
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/1179573520939340



ABSTRACT: We report the case of a 37-year-old male patient with chronic amphetamine abuse who presented with vertebral artery dissection. Prior to presentation, he had increased the consumption of amphetamine from 5 times a year to once every week and had used amphetamine on the day of presentation. He attended with neck pain, vertigo and coordinating difficulties of his left arm. Computed tomography angiogram of the neck vessels showed a left vertebral stenosis and cerebral magnetic resonance imaging showed a left vertebral pseudolumen and a medullary stroke. Cervical artery dissection is a major cause of stroke in the young. To the authors' knowledge, this is the second reported case of vertebral artery dissection in a patient with amphetamine abuse. Amphetamine might contribute to an increased risk of vertebral artery dissection through its vasculopathic properties although more data are needed to establish a causal relationship.

KEYWORDS: Cervical artery dissection, vertebral artery dissection, amphetamine abuse, stroke

RECEIVED: February 12, 2020. **ACCEPTED:** June 12, 2020.

TYPE: Case Report

FUNDING: The authors received no financial support for the research, authorship and/or publication of this article.

DECLARATION OF CONFLICTING INTERESTS: The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

CORRESPONDING AUTHOR: Frederik Winsløw, Department of Neurology, North Zealand Hospital, Dyrehavevej 29, Hillerød 3400, Denmark. Email: win@dadlnet.dk

Introduction

Cervical artery dissection (CAD) is a major cause of stroke in the young.¹ Amphetamine is related to an increased risk of stroke through its presumed vasculopathic properties.² Evidence suggesting a causal relationship between amphetamine abuse and vertebral artery dissection (VAD) is limited. We present the case of a patient who developed VAD in close temporal relation to amphetamine abuse.

Case Report

A 37-year-old male patient previously known with abuse of amphetamine and cannabis presented to the emergency department with acute left-sided neck pain and vertigo with no exacerbating factors. He also complained of a mild cough but had no history of neck trauma. A month prior to his admission, he had increased the consumption of amphetamine from 5 times a year to once a week and admitted to have taken amphetamine on the day of presentation. He had no neurological deficits and was discharged home. No toxicology screen was performed. The following day, he re-attended with worsening vertigo, nausea and vomiting, left facial numbness and coordinating difficulties of his left arm. General examination was unremarkable. Neurological examination showed a mild left arm ataxia but was otherwise normal. Routine blood tests were unremarkable. Computed tomography angiogram of the neck vessels showed a stenosis at the left V3 segment. Cerebral magnetic resonance imaging (MRI) revealed a left vertebral pseudolumen and a diffusion restriction in the left posterolateral medulla oblongata (Figure 1). Treatment with dual platelet therapy was instituted. A repeat computed tomography (CT) angiogram after 3 months showed resolution of the left vertebral intramural haematoma.

Discussion

Several risk factors for CAD has been hypothesised including congenital (connective tissue disorders, hyperhomocysteinemia), neck manipulation (blunt neck trauma, chiropractor manipulation, coughing, skiing, child birth) and other medical disorders (infection, migraine).³ In this case, the patient had no connective tissue disorder or history of neck manipulation, but he did complain of a cough. Interestingly, he had increased the consumption of amphetamine significantly and had used amphetamine on the day of presentation. Although coughing is a possible cause for VAD in this case, amphetamine abuse could be a contributing factor. Dissection of the aorta, coronary arteries and the internal carotid artery has been reported in relation to amphetamine abuse.⁴⁻⁶ One case report described VAD in a patient with amphetamine abuse.⁷ The vasculopathic properties of amphetamine remains to be fully elucidated. Several mechanisms have been described including vasculitis and vasospasm.^{8,9} The sparsity of cases relating VAD to amphetamine could be partly due to reporting bias. First, doctors who are unaware of a potential relationship between VAD and amphetamine abuse are less prone to ask about illicit drug use. Second, patients demonstrate high false negative rates in self-reported substance abuse when abuse is verified by biochemical testing.¹⁰

Conclusions

This is the second reported case of VAD in a patient with amphetamine abuse. Although amphetamine might contribute to an increased risk of VAD, more data are needed to establish a causal relationship.



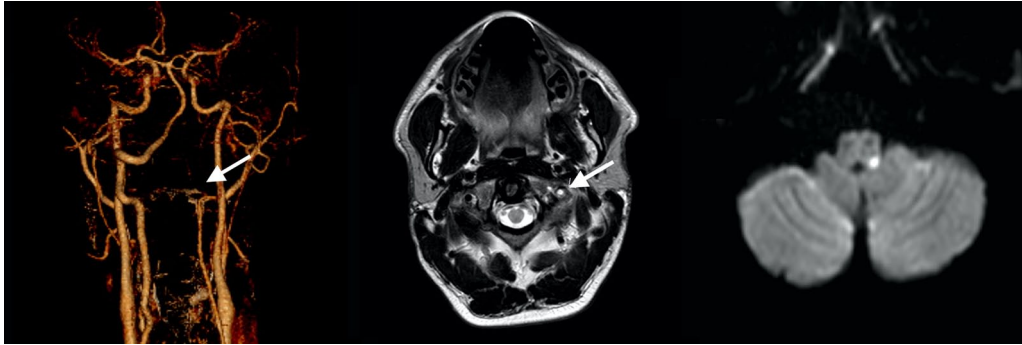


Figure 1. (Left): CT angiogram with 3-dimensional reconstruction shows a left vertebral stenosis (arrow). (Middle): Axial T2-weighted MRI shows left vertebral hyperintense pseudolumen (arrow). (Right): Cerebral DWI shows a diffusion restriction in the left posterolateral medulla. CT indicates computed tomography; MRI, magnetic resonance imaging; DWI, diffusion-weighted imaging.

Author Contributions

FW wrote the first draft of the manuscript. All authors reviewed and edited the manuscript and approved the final version of the manuscript.

Informed Consent

A written informed consent was obtained from the patient to publish patient information and images (Frederik Winsløw 12/2-2020).

ORCID iD

Frederik Winsløw  <https://orcid.org/0000-0002-7080-5838>

REFERENCES

1. Ekker MS, Boot EM, Singhal AB, et al. Epidemiology, aetiology, and management of ischaemic stroke in young adults. *Lancet Neurol.* 2018;17:790-801.
2. Indave BI, Sordo L, Bravo MJ, et al. Risk of stroke in prescription and other amphetamine-type stimulants use: a systematic review. *Drug Alcohol Rev.* 2018;37:56-69.
3. Debette S, Leys D. Cervical-artery dissections: predisposing factors, diagnosis, and outcome. *Lancet Neurol.* 2009;8:668-678.
4. Westover AN, Nakonezny PA. Aortic dissection in young adults who abuse amphetamines. *Am Heart J.* 2010;160:315-321.
5. Krittanawong C, Kumar A, Johnson KW, et al. Conditions and factors associated with spontaneous coronary artery dissection (from a national population-based cohort study). *Am J Cardiol.* 2019;123:249-253.
6. McIntosh A, Hungs M, Kostanian V, et al. Carotid artery dissection and middle cerebral artery stroke following methamphetamine use. *Neurology.* 2006; 67:2259-2260.
7. Zaidat OO, Frank J. Vertebral artery dissection with amphetamine abuse. *J Stroke Cerebrovasc Dis.* 2001;10:27-29.
8. Lappin JM, Darke S, Farrell M. Stroke and methamphetamine use in young adults: a review. *J Neurol Neurosurg Psychiatry.* 2017;88:1079-1091.
9. De Silva DA, Wong MC, Lee MP, et al. Amphetamine-associated ischemic stroke: clinical presentation and proposed pathogenesis. *J Stroke Cerebrovasc Dis.* 2007;16:185-186.
10. Clark CB, Zyambo CM, Li Y, et al. The impact of non-concordant self-report of substance use in clinical trials research. *Addict Behav.* 2016; 58:74-79.