Case Report

Type A aortic dissection secondary to a left common carotid artery dissection

Simon Doran, MB Bch BAO, MRCPI*, Yudy Llamas Osorio, MB Bch BAO, Mark Murphy, MB Bch BAO, Eoin Kavanagh, LRCSI, MB Bch BAO, MSc, Sean Murphy, MD, FRCPI, FRCP, FRCP, FACP, FAHA, FESO

Mater Misericordiae University Hospital, Dublin, Ireland

A R T I C L E   I N F O
Article history:
Received 17 January 2019
Revised 19 February 2019
Accepted 23 February 2019
Available online 20 March 2019

Keywords:
Aortic dissection
Common carotid artery dissection

A B S T R A C T
Common carotid artery dissection is an unusual clinical event that most commonly occurs secondary to type A aortic dissection. We present a rare case of spontaneous common carotid artery dissection temporally preceding aortic dissection. Our case highlights the careful attention that cases of common carotid dissection should be given; our knowledge base regarding their natural history and evidence-based management is distinctly lacking compared to dissection of other cervical vessels. It also demonstrates the importance of imaging the entire aorta at the time of, a seemingly isolated, common carotid dissection to exclude other potential synchronous dissections.

© 2019 The Authors. Published by Elsevier Inc. on behalf of University of Washington.
This is an open access article under the CC BY-NC-ND license.
(http://creativecommons.org/licenses/by-nc-nd/4.0/)

Introduction

Extracranial internal carotid or vertebral artery dissection is a relatively common and well described cause of ischaemic stroke, particularly in young stroke patients [1]. Isolated common carotid artery dissection however, is rarely encountered and is infrequently described in the medical literature. In this case, we describe how common carotid dissection may precede aortic dissection. Our case highlights the importance of recognizing the distinct features, both radiological and clinical, of common carotid artery dissection, and of being aware that its clinical course may be complicated by further episodes of major arterial vessel dissection.

Case presentation

A 53-year-old male presented to the emergency department with new onset dysphasia, blurred vision, and confusion. Of note prior to presentation, he had no known history of hypertension, illicit drug use, smoking, or other specific stroke risk factors. Urgent neurovascular imaging demonstrated a left common carotid artery dissection (CCAD) (Fig 1a and b) with an associated left parietal ischemic stroke. Imaging acquired at this time (Figs 1 and 2; CT angiogram aortic arch to vertex and MRI neck incl. T1 axial fat saturated images) did not demonstrate any evidence of retrograde aortic arch dissection. He was initially thrombolysed with intravenous alteplase and

* Corresponding author.
E-mail address: Dorans7@tcd.ie (S. Doran).
https://doi.org/10.1016/j.radcr.2019.02.020
1930-0433/© 2019 The Authors. Published by Elsevier Inc. on behalf of University of Washington. This is an open access article under the CC BY-NC-ND license. (http://creativecommons.org/licenses/by-nc-nd/4.0/)
subsequently medically managed with therapeutic anticoagulation. He was discharged home 10 days later and was well at that time.

He represented to ED 3 weeks later with acute onset aphasia, visual disturbance, and mild abdominal pain. At this time, an urgent CT angiogram intracranial and extracranial carotid arteries (Fig 3) demonstrated bilateral CCAD with evidence of aortic arch dissection. Subsequent CT angiogram aorta whole (Fig 4 a-d) demonstrated a large aortic dissection (Stanford type A) arising from the aortic arch, extending to the aortic arch, descending aorta, abdominal aorta, bilateral common iliac arteries, and the right internal iliac artery.

The patient was taken urgently to the operating theatre for surgical aortic arch repair but suffered a cardiac arrest at the time of anesthesia induction and died. The final diagnosis was retrograde extension of CCAD into the aortic arch.

Discussion

In contrast to internal carotid artery dissection, spontaneous CCAD is a rare and unusual clinical event. This is due to the distinct morphological differences between the muscular wall of the ICA and the elastic wall of the CCA [2]. Schwartz et al [1] in a review of 8800 ischemic stroke patients found 177 patients who had an extracranial internal carotid artery or vertebral artery dissection, but no cases of CCAD. In our case the CCAD preceded the Type A aortic dissection by 3 weeks. The first case description of retrograde extension of a CCAD was documented by Yoshioka et al in 2011 [3]. In their case the time gap between common carotid dissection and aortic dissection was 3 months. No evidence-based guidance exists regarding the management and follow-up imaging of spontaneous CCAD.

Regarding CCAD imaging: Provenzale et al [4] demonstrated that the specificity and sensitivity of CTA and MR techniques for the diagnosis of carotid artery dissections is relatively similar. CTA is a readily available technique allowing rapid acute dissection diagnosis. On discharge from his initial admission, our patient was scheduled for follow-up MR imaging to assess lumen recanalization and intimal healing at 3 months.

In this case the original dissection extended almost to the ostia of the left common carotid artery; this may have been a risk factor for his subsequent, more extensive, aortic dissection. While we cannot say if it was possible to predict our patient’s subsequent type A aortic dissection, our experience demonstrates the importance of including the aortic arch down to the aortic bulb at a minimum in the imaging of CCAD. We further recommend that given its rarity and poorly understood natural progression, it may be beneficial to image the entire aorta with CTA to fully exclude other synchronous aortic dissections.
Fig. 2 – (a) Axial MR T1 fat saturated images obtained during the patient's first admission prior to discharge. Axial view demonstrating abnormal signal of the left CCA (arrow). (b) Axial MR T1 fat saturated images obtained during the patient's first admission prior to discharge. Axial view demonstrating abnormal signal of the left CCA (arrow). (c) Axial MR T1 fat saturated images obtained during the patient's first admission prior to discharge. Axial view demonstrating abnormal signal of the left ICA (straight arrow). Note the normal right ICA (curved arrow).
Fig. 3 – Urgent axial CT angiography at the time of the patient’s second ED attendance demonstrating bilateral CCA dissection (arrows). Note, there is a small amount of residual flow in both vessels.

Fig 4 – (a) Axial CT Aorta angiogram at the time of the patient’s second ED attendance demonstrating extensive aortic dissection of the ascending and descending aorta (arrows). (b) Axial CT aorta angiogram at the time of the patient’s second ED attendance demonstrating extensive aortic arch dissection. (c) Sagittal CT aorta angiogram at the time of the patient’s second ED attendance showing ascending and descending aortic dissection consistent with a Type A aortic dissection. (d) Coronal CT aorta angiogram at the time of the patient’s second ED attendance demonstrating ascending (straight arrow) and descending aortic (curved arrow) dissection consistent with a Type A aortic dissection.
Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.radcr.2019.02.020.

REFERENCES

[1] Schwartz NE, et al. Clinical and radiographic history natural history of cervical artery dissections. J Stroke Cerebrovasc Dis 2009;18(Issue 6):416–23.

[2] Hori E, Hayashi N, Hamada H, et al. A development of atheromatous plaque is restricted by characteristic arterial wall structure at the carotid bifurcation. Surg Neurol 2008;69:586–91.

[3] Yoshioka I, Sakurai M, Namai A, et al. Retrograde extension of common artery dissection into the aortic arch. J Thorac Cardiovasc Surg 2011;141(1):9–10.

[4] Provenzale JM, Sarikaya B. Comparison of test performance characteristics of MRI, MR angiography, and CT angiography in the diagnosis of carotid and vertebral artery dissection: a review of the medical literature. Am J Roentgenol 2009;193(4):1167–74. doi:10.2214/ajr.08.1688.