

Case 1715: Spontaneous dissecting aneurysm of the vertebral artery: MR findings

Subspecialty: Vascular Imaging

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G. Zuccoli, F. Nicoli, A. Ghiraduzzi, D. Guidetti.

Arcispedale Santa Maria Nuova

42100 - Reggio Emilia / ITALY

Patient:

Age: 32 year(s)

Sex: female

Clinical Summary

Headache and left neck pain.

Clinical History and Imaging Procedures

The patient was referred with headache and left neck pain. 3D TOF (time-of-flight) contrast-enhanced and axial T1- and T2-weighted sequences of the neck were performed. There was a positive history of minor neck trauma and presence of pituitary microadenoma. Contrast-enhanced 3D TOF MR angiography showed the presence of an aneurysm of the left vertebral artery. Axial T1- and T2-weighted images showed the presence of an intramural haematoma of the left vertebral artery.

Discussion

Dissection of the carotid and vertebral arteries is considered to be a rare pathology given an incidence of 2.6-2.9 per 100,000 per year for the carotid branch and 1.3-1.5 per 100,000 per year for the vertebral branch. As many as 2% of strokes in patients aged 40-60 can be related to dissection. Spontaneous dissections can be related to minor neck traumas. A genetic basis has also been demonstrated in the cases of association with type IV fibromuscular dysplasia, Ehlers-Danlos syndrome, pseudoxanthoma elasticum, Marfan's syndrome and osteogenesis imperfecta. Initial neurological manifestations of vertebral artery dissection include unilateral headache associated with ipsilateral neck pain. Transient ischaemic attack or stroke may result from arterial occlusion or cerebral embolism. Artery dissection occurs when an intimal tear permits blood to enter the arterial wall reducing vessel diameter. Angiography has been considered as the gold standard for the diagnosis of this pathology. However, non-invasive methods such as MR and MR angiography have been developed and utilised, especially to assess the long-term follow-up of dissections. Features of dissections on MR imaging are visibility of the haematoma, increased diameter of the vessel and sometimes the presence of the so-called "intimal flap". MR angiography diagnostic criteria are stenosis or complete occlusion of the lumen associated with luminal irregularities. The haematoma generally shows a semi-lunar shape and sometimes it appears to be annular. In the subacute stage haematoma signal intensity is hyperintense due to the presence of methaemoglobin. This finding may allow a correct diagnosis. When haematoma penetrates the subadventitial plane, a focal aneurysmal dissection of the artery may be formed. Therapeutic options include intravenous heparine, calciparine, low-molecular-weight heparine and antithrombotic platelet-targeted drug (Aspirin or Ticlopidine); stent positioning and intra-arterial thrombolysis are also feasible. A better outcome is associated with successful reperfusion of the dissected vessel; poor outcome or death are usually associated with non recanalization, older age and hemorrhage. Recurrence of dissection is uncommon and usually represents a benign condition.

Final Diagnosis

Left vertebral artery dissecting aneurysm

Figure 1: 3D TOF (time-of-flight) MR angiography



Figure 1a

MR contrast-enhanced angiography shows the presence of an aneurysmal dilatation at V2 level of the left vertebral artery (black arrow).

Figure 2: T1-weighted axial imaging of the neck



Figure 2a

Note the presence of the semi-lunar intramural haematoma at the left vertebral artery level (white arrow).

Figure 3: T2-weighted axial imaging of the neck



Figure 3a

The presence of the previously documented left vertebral artery semi-lunar haematoma is also easily seen on T2-weighted axial images (white arrow).

MeSH:

[C10.228.140.300.350.875] Vertebral Artery Dissection

Dissection of the wall of the vertebral artery, leading to the formation of an aneurysm that may occlude the vessel. Thrombus formation may occur and give rise to emboli. Cervical fractures or related NECK INJURIES and CRANIOCEREBRAL TRAUMA are commonly associated conditions, although this process may occur spontaneously. Ischemia, infarction, and hemorrhage in the vascular distribution of the affected vertebral artery may complicate this condition.

[A07.231.114.955] Vertebral Artery

The first branch of the subclavian artery with distribution to muscles of the neck, vertebrae, spinal cord, cerebellum and

interior of the cerebrum.

[A07] Cardiovascular System

The HEART and the BLOOD VESSELS by which BLOOD is pumped and circulated through the body.

References:

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- [3] Klufas RA, Hsu L, Barnes PD, Patel MR, Schwartz RB. Dissection of the carotid and vertebral arteries: imaging with MR angiography. *AJR Am J Roentgenol.* 1995 Mar;164(3):673-7.
- [4] Levy C, Laissy JP, Raveau V, Amarenco P, Servois V, Bousser MG, Tubiana JM. Carotid and vertebral artery dissections: three-dimensional time-of-flight MR angiography and MR imaging versus conventional angiography. *Radiology.* 1994 Jan;190(1):97-103.

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