MR diagnosis of cerebellar infarction due to vertebral artery dissection in children

Abstract  Posterior circulation infarction is uncommon in children. We describe the clinical presentation and radiological findings in two children with cerebellar infarction resulting from dissection of the vertebral artery. We emphasize that vertebral artery injury should be considered in a child with acute symptoms and signs of ischaemia in the posterior circulation. MRI and MRA may be helpful in the diagnosis of cerebellar infarction and vertebral artery abnormality.

Introduction

Posterior circulation vascular occlusive disease in children is a rare and uncommonly reported event [1, 2]. Unlike adults, in whom underlying vascular disease accounts for a high percentage of posterior circulation infarction, the most commonly reported cause of vertebrobasilar occlusion in children is traumatic injury to the cervical vertebral artery [1, 2]. We describe two pediatric cases of cerebellar infarction in the vertebral artery territory associated with blunt trauma.

Case reports

Case 1

A 4-year-old boy presented with a 7-day history of ataxic gait, particularly to the left. The symptom had been severe for 5–6 h from the onset and then gradually resolved, except for the left-sided weakness. In retrospect, his parents noted that he had fallen while enjoying rocking horse play with his father 12 h prior to the onset of symptoms. Five days prior to admission, he showed decreased alertness and nystagmus on horizontal gaze. On neurological examination, his mental status, pupillary reflexes and fundoscopic examination were normal. Myotonic reflexes were symmetrical and plantar responses were flexor bilaterally. Complete blood cell count, serum lactic acid, routine chemistry and echocardiography were normal. Coagulation profile was normal, including platelet
count, prothrombin time, antithrombin III, protein C and anti-
lupus anticoagulant.

MRI revealed well-circumscribed nodular lesions involving the
posterior and inferior aspect of the cerebellum and medulla
(Fig. 1a,b). The lesions were hypointense on T1-weighted (T1-W)
images and uniformly hyperintense on T2-weighted (T2-W) im-
ages. On MRA, the left vertebral artery was not visualized. Left
vertebral angiography showed irregular narrowing and dilata-
tion of the left vertebral artery, the so-called ‘pearl and string’
sign (Fig. 1c). These findings suggested multiple lacunar infarctions
due to left vertebral artery dissection. The patient was placed
on aspirin and made a full recovery over a 1-month period.

Case 2

A 12-year-old boy presented with 2-day history of dizziness and
dysphasia. He had complained of headache and dizziness after
playing soccer 6 h prior to the onset of symptoms. There was no
history of similar events in the past. On neurological examination,
his mental status, pupillary reflexes and fundoscopic examina-
tion were normal. Central type of facial palsy and grade IV left-side
weakness were noted. Sensory perception was symmetrical and in-
tact. There was no deviation of tongue or uvula. Myotonic reflexes
were symmetrical and plantar responses were flexor bilaterally.
Complete blood cell count, serum lactic acid, routine chemistry
and echocardiography were normal. Coagulation profile was nor-
mal.

MRI was obtained 1 week after the onset. A round low-signal
mass was demonstrated in the ponto-medullary cistern on T2-W
images. There was also focal infarction in the left cerebellar hemi-
sphere (Fig. 2a). Contrast enhanced T1-W sagittal MRI revealed a
mixed-intensity tubular structure surrounded by an enhancing
rim (Fig. 2b). MRA well demonstrated intramural haematoma in
the left vertebral artery extending to the basilar artery, which was
displaced (Fig. 2c). The extracranial portion of the left vertebral
artery was not visualized on MRA. Irregular narrowing and dilata-
tion of the basilar artery was demonstrated by right vertebral arte-
riography (Fig. 2d). Despite several attempts, left vertebral
angiography was unsuccessful. These findings were thought to in-
dicate left vertebral artery dissection with a chronic intramural
haematoma causing cerebellar infarction. The patient was placed
on aspirin and made a full recovery.

T2-W MRI obtained 6 years later showed an ecstatic basilar and
left vertebral arteries in the ponto-medullary cistern (Fig. 2e). Sig-
nal intensity of the basilar artery was heterogeneous with a rim of
high-signal, which had a target-like appearance. The external di-
ameter of the basilar artery was smaller than on the previous study.
The basilar and right vertebral arteries were patent and the cervi-

**Fig. 1a–c** A 4-year-old boy with gait disturbance. **a** Axial T2-W
MRI shows high-signal lesions in left side of the medulla and cere-
bellum. **b** Sagittal T1-W MRI shows a low-signal lesion in the inferi-
or aspect of the left cerebellum. **c** Vertebral angiogram shows diffuse
narrowing of the cervical portion of the left vertebral artery (ar-
rows) and irregularly narrowed intracranial portion (arrowheads).

**Fig. 2a–g** A 12-year-old boy with dizziness. **a** Axial T2-W MRI
shows high-signal lesions in the left cerebellum and a low-signal,
tortuous mass-like lesion anterior to the pons. **b** Contrast enhanced
sagittal T1-W MRI shows a tubular lesion anterior to the brain
stem with heterogeneous signal intensity and an enhancing rim,
suggesting intramural haematoma of the vertebralbasilar artery.
**c** MRA shows diffuse narrowing of the basilar artery and intramu-
ral haematoma in the left vertebral artery extending to the basilar
artery (arrow). The cervical portion of the left vertebral artery is
not visualized. **d** Digital subtraction angiography of the right verte-
bral artery reveals irregular narrowing and dilatation of the prox-
imal basilar artery with lateral displacement (arrows). **e** Follow-up
T2-W MRI through the pons shows the ecstatic basilar artery con-
taining intraluminal high signal mixed with central low signal, sug-
gest ing arterial dissection. The external diameter of the basilar
artery has decreased since the previous MRI (**a**). **f** Follow-up
MRA shows the tortuous basilar artery with diffuse luminal nar-
rrowing and irregularity of its proximal portion (arrows) (**f**). The ex-
tracranial portion of the left vertebral artery (arrow) is faintly
visualized (**g**).