Paediatric Traumatic Vertebral Artery Dissection: A Case Report

MS Kodik[1], C Eraslan[2], S Yalcinli[1], M Ersel[1]

ABSTRACT

A case of vertebral artery associated with cerebellar stroke in a child due to cranial trauma. The patient admitted to emergency department and hospitalized with symptoms such as unconsciousness, nausea and vomiting. The results of general inspection was; Glasgow coma scale E4M4V4, pupillary isochoric, the pupillary light reflex +/+, no gaze defects and facial asymmetry, and presence of left-sided motor paresis. In the cranial computed tomography (CT) of the patient, significant hypodense area was detected in the left cerebellar hemisphere; left vertebral artery V3 segmental distention – and V4 segmental dissection was seen in computed tomography angiography. Magnetic resonance angiography showed acute ischaemia in the left half of the left middle cerebellar pedicle and left cerebellar hemisphere, subacute stage ischaemia area in the left thalamic region, left vertebral artery dissection.

Keywords: Child, stroke, vertebral artery dissection

From: [1]Department of Emergency Medicine, Ege University School of Medicine and [2]Department of Radiology, Ege University School of Medicine, Izmir, Turkey.

Correspondence: Dr MS Kodik, [1]Department of Emergency Medicine, Ege University School of Medicine. Turkey. Email: songurm@yahoo.com

INTRODUCTION

Craniocervical arterial dissection in childhood is seen in 2.5 out of 100 000 children per annum, and often related with the indications of acute ischemic stroke or transient ischemic attack (1). Aneurysmal dilatation that may occur secondary to the partially damaged vessel wall and occlusion often occurs in the C1-C2 vertebral circulation in children (2, 3). Trauma in the strokes due to vertebral artery dissection occurring during childhood is an important factor. We present a case of vertebral artery dissection associated with a cerebellar stroke that occurs in a child who falls and hits his head against the stairs while playing with a ball.

CASE REPORT

A 7-year-old young boy fallen while playing with the ball, and hit his head to the stairs. Then he was taken to the emergency service with complaints of nausea and vomiting. During the examination, he was unconscious. The results of general inspection was; Glasgow Coma Scale: E4M4V4, pupillary isochoric, the pupillary light reflex +/+, no gaze defects and facial asymmetry, and presence of left-sided motor paresis. His cranial nerve examination was normal, no presence of nystagmus and in the confrontation test he had full visual fields. No signs of excessive joint laxity and visual, dental, skeletal, dermatological, or cardiac abnormalities were seen.

Laboratory findings that include complete blood count, coagulation profile, liver and kidney function tests and electrolytes were in normal limits. In the cranial computed tomography (CT) of the patient, significant hypodense area was detected in the left cerebellar hemisphere; left vertebral artery V3 segmental distention –and V4 segmental dissection was seen in CT

angiography. Magnetic Resonance (MR) angiography showed acute ischaemia in the left half of the left middle cerebellar pedicle and left cerebellar hemisphere, subacute stage ischaemia area in the left thalamic region, left vertebral artery dissection (Figs. 1, 2). The patient was hospitalized in intensive care for further examination and treatment.

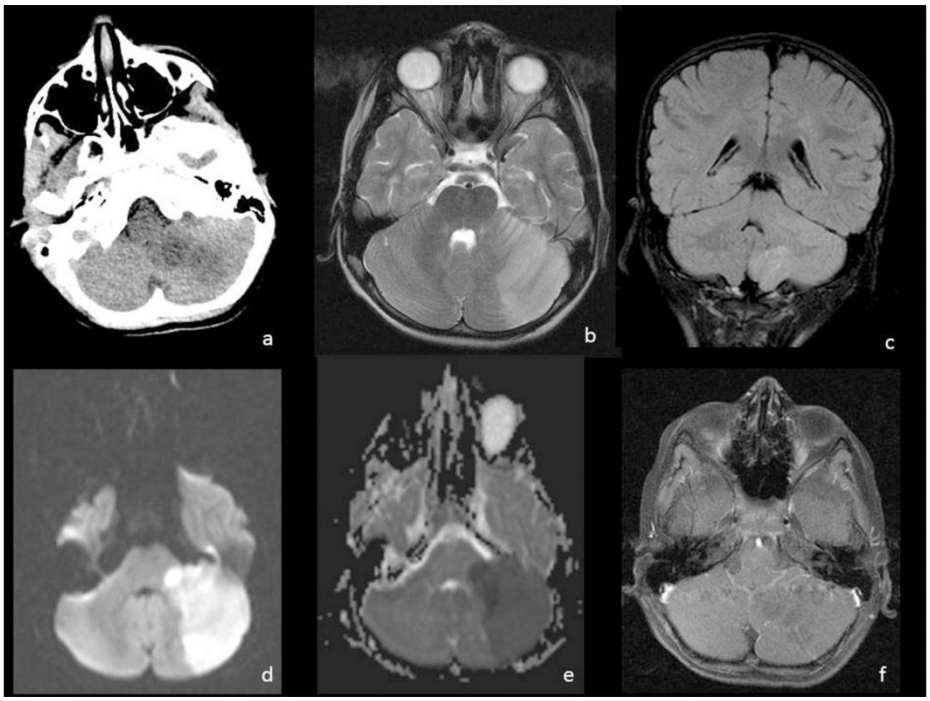

Fig. 1: CT image (a), axial T2 (b), coronal Flair (c) MR images, diffusion b1000 (d) image, apperant diffusion coefficient map (e) and postcontrast axial T1 images obtained just a few hours later after the onset of the complaints. Hypodensity on CT image and hyperintensity on T2 and Flair images at the left cerebellary hemisphere are seen. Diffusion restriction is also seen on diffusion weighted images at the left cerebellary hemisphere and left middle cerebellary peduncle compatible with acute ischaemia. There is no enhancing after contrast administration on postcontrast image.

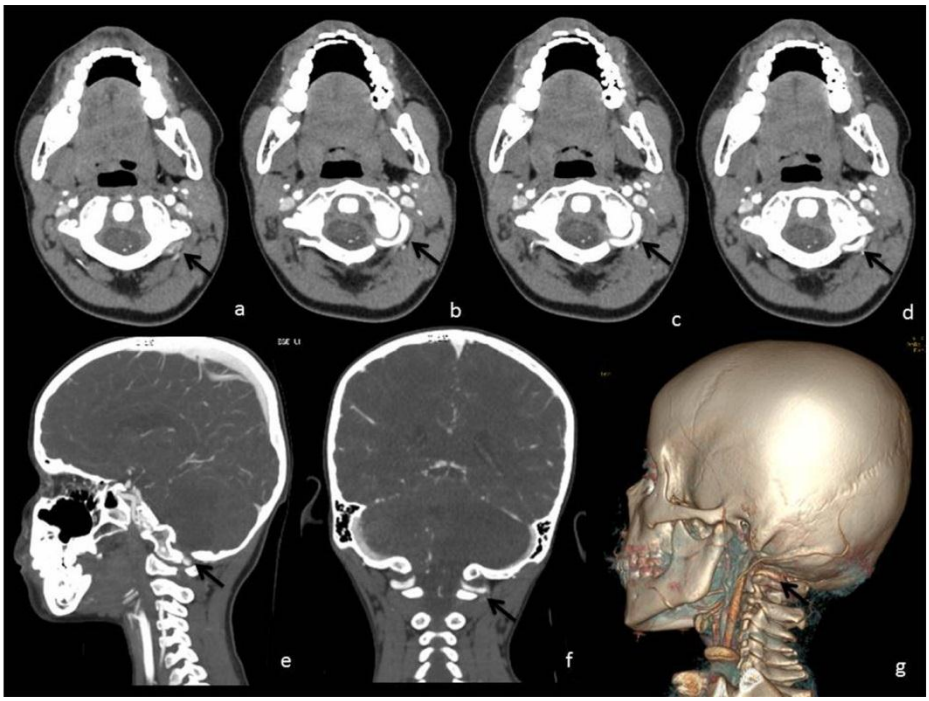

Fig. 2: Axial CT angiography images (a, b, c, d), sagittal (e) and coronal (f) reformatted CT angiography images and volume rendering image. Arrows demonstrate the dissected left vertebral artery V3-V4 segments.

DISCUSSION

Among the entire trauma population, 0.08 to 0.4% was represented by the incident of traumatic dissection for carotid and vertebral artery (4). According to the review of the US National Pediatric Trauma Registry 1987–1997, an occurrence of 0.03% representing 15 out of 57 659 blunt trauma patients was reported (5). In the pediatric literature, it was reported that a major or minor history of trauma was seen in around 50% to 68% of the children with vertebral artery dissection (6). Also in our case, it was considered that vertebral artery dissection was related to the head trauma of the patient that occurred after the fall.

While children with traumatic carotid artery and vertebral artery dissection may be asymptomatic at the time of admission, they can also admit with the symptoms of cerebral

ischaemia; hemiplegia, aphasia, facial paralysis, speech pelting, monoplegia and cerebral ischaemia. In addition, these patients may also have complaints such as loss of consciousness, confusion and headache, which do not suggest ischaemia (7). The complaints of our patient were blurring of consciousness, weakness in left upper and lower extremities, recurrent nausea and vomiting.

The gold standard approach to vertebral artery dissection is cerebral angiography (8). However, cerebral CT angiography and MR angiography are also successful in the diagnosis of dissection (7). As the most reliable noninvasive screening method for blunt cerebrovascular injury, CT angiography ($\geq$ 16 slice) is considered. The detection of both the intramural thrombus and intimal flap, which are characteristic of vertebral artery dissection (VAD), can be both done via MR imaging (9). In literature, vertebral artery dissection is frequently reported to occur at C1-C2 cervical vertebra level. However, there are cases reported with less frequent occurrence outside this level (10). Also in our case, CT, CT angiography and MR angiography were used. In the C1 vertebra level, dissection was detected in V4 vertebral artery segment. At the same time, cerebellar ischaemia findings were detected.

Vertebral artery dissection is the general reason of stroke in the pediatric age group, and in this case, major trauma caused this situation. Emergency physicians should be alert to this diagnosis in children with trauma-induced neurological findings.

REFERENCES

1. Fullerton HJ, Johnston SC, Smith WS. Arterial dissection and stroke in children. Neurology. 2001; **57:** 1155–1160.
2. Tan MA, Armstrong D, MacGregor DL, Kirton A . Late complications of vertebral artery dissection in children: pseudoaneurysm, thrombosis, and recurrent stroke. J Child Neurol. 2009; **24:** 354–360.
3. Fusco MR, Harrigan MR. Cerebrovascular dissections-a review part I: Spontaneous dissections. Neurosurgery. 2011; **68:** 242–257.
4. Hughes KM, Collier B, Greene KA, Kurek S. Traumatic carotid artery dissection: a significant incidental finding. Am Surg. 2000; **66:**1023-7.
5. Lew SM, Frumiento C, Wald SL. Pediatric blunt carotid injury: a review of the National Pediatric Trauma Registry. Pediatr Neurosurg. 1999; **30:** 239-44.
6. Frosk P, Salman MS, Wrogemann J, Shah N, Rafay MF. Recurrent Posterior Circulation Stroke in an Infant With Basilar Artery Aneurysm. J Child Neurol. 2009; **24:** 1019-1020
7. Mortazavi MM, Verma K, Tubbs RS, Harrigan M. Pediatric traumatic carotid, vertebral and cerebral artery dissections: a review Child s Nervous System 27(12):2045-56
8. Fassett DR, Dailey AT, Vaccaro AR. Vertebral artery injuries associated with cervical spine injuries: a review of the literature. J Spinal Disord Tech. 2008; **21:** 252-8.
9. Lévy C, Laissy JP, Raveau V, Amarenco P, Servois V, Bousser MG et al. Carotid and vertebral artery dissections: three-dimensional time-of-flight MR angiography and MR imaging versus conventional angiography. Radiology. 1994 Jan; **190:** 97-103.
10. Kim SH1, Kosnik E, Madden C, Rusin J, Wack D, Bartkowski H. Cerebellar infarction from a traumatic vertebral artery dissection in a child. Pediatr Neurosurg. 1997; **27:** 71-7