

Vertebral-Artery Dissection Following a Judo Session: A Case Report

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Abstract

A few days after a judo session, an 11-year-old boy presented with an ischemic stroke with dizziness, aphasia and ataxia. CCT scan revealed a left thalamic infarct. Angiography showed a fibromuscular dysplasia (FMD) of the left vertebral artery probably complicated by dissection. Subsequent evolution was favorable. This observation points out the fact that the association of a cervical pain with neurological signs of vertebrobasilar stroke, especially occurring after a cervical trauma or rotatory motion, should alert to the possibility of vertebral-artery dissection. The diagnosis is mainly based on angiographic criteria. Accurate diagnosis has implications for prognosis and probably for acute medical treatment.

Key words

Dissection – Extracranial vertebral artery – Thalamic infarct – Child – Fibromuscular dysplasia

Introduction

Vertebral-artery dissection is the separation of the layers of the arterial wall by circulating blood. Since the 1980's vertebral artery dissection in young adults is well-known, occurring most often after cervical trauma whereas it is uncommon in children.

This report describes an 11-year-old boy with a thalamic ischemia secondary to a left vertebral-artery dissection. Two etiologic factors were discovered: a minor cervical trauma during a judo session and an FMD of the third segment of the vertebral artery.

Case report

An 11-year-old boy was admitted to our hospital in June, 1992. His personal and family medical history revealed no abnormalities until June 2, 1992. On this day, during a judo session, he was victim of a rotating motion of the

cervical column. Immediately he complained of a latero-cervical pain. During the night, he suffered from diffuse headaches and vomiting. Similar episodes recurred the following days. He also became progressively lethargic, developed a dysphasia and his walking became unstable.

On June 16, 1992 he had left ptosis and diplopia during one day. He suffered from a reduction of speech fluency with many perseverations as well as axial ataxia and a left cervical stiffness. An EEG revealed slow activity over the left temporo-occipital region. A CCT scan demonstrated a low-density lesion in the left thalamus (Fig. 1).



Fig. 1 Left thalamic infarct involving the tuberothalamic territory (arrow).

On admission on June 18, his neurological status was the same as two days before. A selected 4-axis angiography performed by transfemoral catheterization, demonstrated a "string of beads" lesion on the V3 segment of the left vertebral artery (Fig. 2). No abnormalities were noted in the other vessels. An MRI confirmed the left thalamic infarct, in the tubero-thalamic territory.

Anticoagulation with heparin was performed for 15 days and an oral anticoagulation was given for 3 months. With this treatment, bed rest, and cervical support with a soft collar, the symptoms disappeared and the boy was discharged after two weeks, without complaints.

Three months later, the examination was normal. The selective angiography performed was unchanged. The oral anticoagulation was stopped and followed by Aspirin.

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Discussion

Children's vertebral-artery dissection is uncommon. The average age for vertebral dissection is about 40 years with a female preponderance. Only a few childhood cases have been published.

In 1978, *Zimmerman* et al reported the case of a 7-year-old boy who presented a vertebral-artery dissection occurring after a chiropractic manipulation (10). *Perez-Higuera*s et al in 1988 reported the case of a 9-year-old boy with cerebellar infarct produced by Type 1 fibromuscular dysplasia complicated by a spontaneous dissection (5).

The obvious and inaugural symptom of vertebral-artery dissection in about 80 % of the cases (2, 4) is a pain located in the posterior neck or in the occiput and sometimes accompanied, like in our case, by diffuse headaches and cervical stiffness.

For most patients, the symptoms and signs have a progressive or stuttering onset, varying from hours to days, but they were stabilized within 1 or 2 weeks (3).

Transient ischemic attacks are rarely the only manifestation of vertebro-basilar ischemia. Strokes reveal the extracranial vertebral dissection in 87 % of the cases. The most frequent patterns observed were lateral-medullary infarction (30 % of the cases) or cerebellar infarction (23 % of the cases) (4). Thalamic infarcts are rarely described probably because of the lack of sensitivity of CCT scan in the detection of small thalamic infarctions. Thalamic infarction was suggested in our case by lethargia and speech disturbance explained by the dysfunction of anterior thalamic nucleus (1). The thalamic infarction in this case is probably due to an embolism, arising from the site of dissection up to the tubero-thalamic arteries.

In our case it is difficult to ignore the temporal association between the minor cervical trauma with neck torsion and the subsequent symptoms. The clinical course began with a latero-cervical pain occurring just after a neck-torsion during a judo session, followed a few days later by symptoms of brain ischemia.

The traumatic circumstances of vertebral-artery dissection are extremely variable. It is commonly a minor, non-penetrating trauma of the neck in connection with ordinary daily activities like ceiling painting, yoga, gymnastics. It can also occur after chiropractic manipulations.

The vertebral artery is susceptible to mechanical injury because of its relationship to the neighbouring bony structures and ligaments, especially in the third atlanto-axial segment (V3). Anatomical studies have demonstrated that a flexion or extension of less than 45° along with a tilt of 30° is needed to produce a decrease in vertebral artery-flow (7).

The diagnosis of vertebral artery dissection is classically based on angiographic criteria. However, angiographic diagnosis of vertebral artery dissection cannot always be made with complete confidence (3). In fact, the most common angiographic aspects are stenosis or thrombosis. Pseudoaneurysm is only observed in about 10 % of the cases occurring in V3 or V4 (2) and the typical feature of double-



Fig. 2 Angiography: Type 1 fibromuscular dysplasia ("string of beads" lesion) (arrow) with arterial dilatations (arrowhead) and strictures on the V3 segment of the left vertebral artery.

lumen is exceptional. At least 85 % of the stenosis resolve or substantially improve within 2 or 3 months (2, 3, 4). Regression of thrombosis of pseudoaneurysm is less frequent.

In our case the arteriography alone does not allow to make the diagnosis of arterial dissection with certainty. This can be related to the fact that the arteriography was realized 16 days after the presumed time of the dissection. This delay is sufficient for the disappearance of angiographic signs. However, the typical clinical course, the findings on CCT scan and the presence of FMD lesions predisposing to arterial dissection, allows to make with quasi certainty the diagnosis of traumatic vertebral artery dissection.

FMD is a segmental non-atheromatous stenotic disease involving small- to medium-sized arteries. The disease is uncommon, its frequency is estimated to 1 % of cerebral angiograms. First described in the renal artery, it is now known to affect other vessels including cervicocerebral ones. The internal carotid artery is involved most frequently, followed by the vertebral artery. The involvement of the vertebral artery is mostly unilateral (70 % of the cases) and associated with internal carotid artery lesions (85 %). The distribution of the lesions shows a marked predominance of the involvement of the V3 segment (5). Pathologically, the lesion reflects a disorganized fibrosis of the intima, media, or occasionally, adventitia. The involved portions show alternating thick and thin areas of the vessel wall. The narrowed arterial segments show degeneration of elastic tissue, disruption and loss of the muscular coat, as well as an increase in fibrous tissue. The dilatations are due to atrophy of the vessel wall.

The most common radiographic finding is the so-called "string of beads" (Type 1) created by the formation of a chain of arterial dilatations which are separated from one another by localized strictures. A second pattern, which is less common, is unifocal and characterized by tubular stenosis (Type 2). A third angiographic type of FMD has been called atypical: one wall of the affected segment is spared, and on the opposite wall an elongation, ovoid diverticulum, sharply circumscribed at either end by a noncircumferential narrowing, resembling a localized FMD constriction (8).

Cerebral ischemia is the regular consequence of the lesion but the cause of ischemia is often unsettled. The FMD is the principal arteriopathy predisposing to arterial dissection. Arterial dissections are observed in 15 % of the cases of FMD, respectively in the series of vertebral artery dissections the percentage of FMD can reach 23 % (4). In these cases the dissection is classically medial, involving the V3 segment in 70 % of the cases. Vertebral-artery dissections have also been described in association with other arteriopathies such as the *Ehlers-Danlos* syndrome Type 4 (7) and the *Marfan* syndrome (9).

Our patient was treated with anticoagulants. This might, at first, appear contraindicated in a disorder with bleeding into arterial wall. However, when the dissection is extracranial, most of the authors agree to prescribe a treatment with heparin for two weeks followed by oral anticoagulation for three months. In the same way, when dissection occurs during unusual activities or minor trauma, it may be advisable to avoid such potential precipitants in the future.

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