Evolution of Internal Carotid Artery Occlusion in Non-Traumatic Carotid Dissection

Octavia RUSU; Mihai VASILE; Ovidiu BAJENARU; Florina ANTOCHI

aEmergency University Hospital, Bucharest, Romania
bDepartment of Neurology, “Carol Davila” University of Medicine and Pharmacy, Bucharest, Romania

ABSTRACT

Cervical artery dissection is becoming a more frequently identified cause of ischemic stroke among the young and middle-aged patients. The pathogenesis of non-traumatic dissection has not been yet entirely elucidated, but certain risk factors have been reported. We present the case of a young patient with ischemic stroke in the middle cerebral artery territory secondary to internal carotid artery dissection and occlusion, in whom we identified two rarely incriminated risk factors: migraine and recent infection (pneumonia).

Keywords: spontaneous cervical artery dissection, stroke, young, migraine, recent infection

INTRODUCTION

Cervical artery dissection (CAD) is becoming a more frequently identified cause of ischemic stroke among the young and middle-aged patients. The pathogenesis of non-traumatic dissection has not been yet entirely elucidated, but certain risk factors have been reported: \( \alpha \)-1-antitrypsin deficiency, hyperhomocysteinemia, connective tissue disorders, vessel abnormalities, fibromuscular dysplasia, hypertension, diabetes mellitus, hypercholesterolaemia, smoking, oral contraceptives use, migraine, recent infection and genetic factors (1).

The prognosis of CAD patients depends mainly on the severity of the initial stroke, the recurrence risk and also on the arterial repermeabilisation. Recanalisation of occluded vessels occurred in up to 90% cases, in recent studies (2).

CASE REPORT

A 39-year-old female was admitted in the Neurology Clinic of the Emergency University Hospital Bucharest for abrupt onset of slurred speech accompanied by left laterocervical pain which developed a week before presentation. The patient had a history of migraines without aura, in the last several years and a upper respiratory tract infection with fever and cough three weeks ago, self-medicated with antibiotics. She denied smoking, the use of oral contraceptives and did not report any neck injury.
On admission, the neurological examination showed right central facial palsy, mild right hemiparesis, Babinski reflex on the right side and non-fluent aphasia. Laboratory findings revealed leukocytosis and an inflammatory syndrome.

She underwent cerebral CT-scan which demonstrated early signs of cerebral ischemia in the left middle cerebral artery territory.

Doppler ultrasonography examination of the cervico-cerebral arteries exhibited the presence of a thin flapping fold of the vessel wall, distal of which a thrombus occluded the origin of the left internal carotid artery.

Cervical region contrast-enhanced CT angiography illustrated gradually narrowing of the left internal carotid artery, with the absence of blood flow at the level of the second cervical vertebrae and a circumferential parietal hematoma. Cerebral angiography confirmed the occlusion of the left internal carotid artery at the origin and the presence of collateral flow through the circle of Willis.

Completing the course of investigations, we stated our final diagnosis: cerebral ischemic stroke due to occlusion of the left internal carotid artery secondary to artery dissection.

In evaluating the risk factors for CAD, we tested for connective tissue disorders – serum complement, anti ds-DNA, anti-U1RNP antibodies –, for hypercoagulant status – $\alpha_1$-antitrypsin serum level, homocysteinemia, antiphospholipid antibodies – all these had normal titers.

The thoracic CT scan showed diffuse alveolar infiltrates and “ground-glass” appearance with partial confluence in the superior lobe of the left lung, suggesting pneumonia.

Our patient underwent a favorable course on receiving dual antiplatelet therapy with aspirin and clopidogrel, beta-blocker, statin, antibiotic therapy for the lung infection, with obvious improvement of neurological status. At the three months follow-up visit, the ultrasonography of the cervico-cerebral arteries revealed almost complete spontaneous recanalisation of the left internal carotid artery, also confirmed by cerebral angiography, which demonstrated minimal residual stenosis.

**DISCUSSION**

Carotid artery dissection should always be included in the differential diagnosis of
ischemic stroke, in a young patient, even with the absence of vascular risk factors or a negative history of trauma, especially when pain in the neck area is one of the symptoms (3).

In addition to trivial trauma, several other potential risk factors for CAD occurring in younger people should be investigated, as stated earlier – history of smoking, use of oral contraceptives, hypertension, diabetes mellitus, connective tissue disorders, hematologic dyscrasias and genetic predisposition. Some of these factors superimpose those for atherosclerosis and ischemic stroke, but CAD is not in all cases an atherosclerotic disease (4).

In the case presented, our patient had neither obvious risk factors for atherosclerosis, hypercoagulability, nor connective tissue disorders, conversely she had a history of migraines and a recent lung infection, both incriminated as potential risk factors for CAD.

According to a number of studies, the underlying pathophysiological mechanism of the ischemic stroke in CAD is embolic in nature (5).

This phenomenon occurs through the detachment of microemboli from the distal part of the occluding thrombus by the retrograde flow coming from collateral pathways. This is documented as carotid stump syndrome (6). We speculate that this is also the case of our patient, in whom the dissection and thrombus occurred three weeks earlier than the embolic stroke, time during which the collateral flow developed.

In the acute phase of CAD, both anticoagulant and antiplatelet drugs are accepted, aiming the prevention of a primary or recurrent ischemic event. There are no evidence-based...
guidelines for the therapy, thus there is lack of a uniform approach among clinicians (7,8). In our case, we opted for dual antiplatelet therapy as secondary prevention, considering that the acute dissection had taken place earlier than the stroke, given the collateral flow that had developed through the circle of Willis, as revealed by the cerebral angiography.

CAD is a potentially serious condition and may generate a poor prognosis with permanent deficits or even fatal outcomes, depending on the severity of the initial stroke and the risk of recurrence, estimated at 0.3 to 3.4% (1). The rate of complete recanalisation of occluded vessels occurs in 50% of cases at three months, and 60% at six months on evaluation by ultrasound imaging (5). In our case, at three months follow-up by cerebral angiography, the patient presented almost complete recanalization of the left internal carotid artery, with good functional outcome.

CONCLUSIONS

Our case report illustrates the requirement of taking into consideration the spontaneous dissection of cervical arteries as a potential cause of stroke in young people, who most often lack the risk factors of ischemic stroke. After establishing an accurate diagnosis, the potential cause of the vascular pathology should be investigated, starting with detailed history-taking and pursuing with more elaborate tests to assess blood dyscrasia or connective tissue disorders.

CAD warrants further research for a better understanding of its pathophysiology and associated risk factors, consequently improving the treatment and prevention strategies.

Conflict of interests: none declared.
Financial support: none declared.

REFERENCES