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Embolic Stroke Complicating Cervical Aneurysm

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Introduction

Dissection of the cervical internal carotid artery (ICA) leads to a persistent aneurysm in about one third of cases [1]. The risk of a late ischemic event associated with this arterial sequel is not clearly known and its treatment is still being debated, especially regarding the need for arterial repair. Two series have shown a benign course of medically treated cervical dissecting aneurysms with a mean clinical follow-up of 3 years [2, 3]. Herein, we report two cases of aneurysm of the cervical ICA revealed by an embolic stroke. In both cases, the aneurysms were supposed to be caused by a cervical ICA dissection that had occurred several months prior to the stroke. The size and morphology of aneurysms may influence the risk of late embolic strokes, so that an arterial repair could be justified in selected cases.

Case Reports

Case 1

A 61-year-old woman complained of monoplegia of the left arm, which resolved spontaneously 1 h later. Brain magnetic resonance imaging (MRI) was normal, but cervical MRI and cerebral angiography disclosed a partially thrombosed 40-mm-wide sacciform aneurysm of the subpetrous portion of the right ICA (fig. 1), without signs indicating arteriosclerosis. A cardiovascular diagnostic work-up including transesophageal echocardiography and Holter was normal. This transient ischemic attack was attributed to a thromboembolism originated in the aneurysm, which was considered secondary to an unnoticed chronic ICA dissection. This hypothesis was supported by the history of an acute cervicgia that occurred 4 months before and was not investigated at that time. Low-molecular-weighted heparin and aspirin were started and endovascular occlusion of the right ICA was considered the safest way to cure the chronic dissecting aneurysm at that time (1997). During the interval between the intervention and 1 month after the antithrombotic treatment, the patient presented a new and durable episode of monoplegia of the right arm associated with a moderate aphasia. A right deep sylvian ischemia was identified and interpreted as a recurrent embolism. After performing an occlusion test of the right ICA, definitive endovascular ICA occlusion

was achieved using detachable coils. The 5-year clinical follow-up was uneventful.

Case 2

A 41-year-old woman complained of clumsiness of her left hand followed by a left hemiparesis with moderate aphasia. MRI showed a right temporoparietal ischemia (fig. 2). Complete cardiovascular work-up was normal. Cerebral angiography disclosed a 21-mm-wide sacciform aneurysm of the subpetrous portion of the right ICA showing a heavily calcified wall, without signs of intracranial atherosclerosis. It was attributed to a sylvian infarct due to thrombus migration from the aneurysm. Endovascular ICA repair with stent angioplasty was then considered. Using a previously reported technique [4], the aneurysm neck was bridged with a self-expandable stent leading to the exclusion of the aneurysm. The patient was discharged on the following day and the clinical follow-up was uneventful after 2 years.

Discussion

Origin of the Aneurysms

Although diagnosis of an initial carotid dissection was not established in these patients, many arguments indicate that these aneurysms were related to the disease. Indeed, saccular aneurysms of the cervical internal carotid artery are known to usually arise as sequelae of a previous dissection of the vessel [5, 6]. The subpetrous location of the aneurysms presented by our patients and the lack of angiographic signs of atherosclerosis were highly suggestive of a dissecting origin [1–3, 7]. Finally, patient 1 presented a cervical pain suggesting an initial dissection. Other causes of cervical aneurysms are very rare compared with dissection. Atherosclerotic aneurysms were reported to be fusiform and located at the level of the carotid bifurcation [8, 9], characteristics that were missing here. Mycotic aneurysms are extremely rare [10], and were clinically excluded in our study.

Late Stroke in ICA Dissecting Aneurysms

In both our cases, stroke was interpreted as being the consequence of a thromboembolic migration from the aneurysm because no other possible sources of ischemia could be identified. Moreover, in case 1, the aneurysm was largely filled with thrombus.

Guillon et al. [2] and Touzé et al. [3] followed 16 and 35 patients with dissecting aneurysms of the ICA for 3 years, and no late stroke was reported. Based on our observations, we analyzed the specificity which could explain the occurrence of stroke. First, because the aneurysms were revealed by strokes, neither of these 2 patients received antithrombotic treatment before the embolic event, treatment which is usually prescribed in dissecting aneurysms. Moreover, such treatment does not provide total protection, as demonstrated by patient 1, who presented a new embolic episode despite 1 month of treatment with heparin and aspirin.

Fig. 1. Patient 1. a Initial angiogram of the right ICA in lateral view showing the circulating part of the aneurysm (arrow). b Cervical T₂-weighted MRI showing a partially thrombosed aneurysm of the right ICA (arrowheads). c Brain computed tomography scan after the second ischemic event showing an ischemic lesion in the deep territory of the right middle cerebral artery (arrowheads).

Fig. 2. Patient 2. a Initial fluid attenuation inversion recovery-weighted brain MRI showing a right temporoparietal ischemic lesion (white arrows). b Cervical computed tomography angiography disclosing a 20-mm-wide aneurysm of the right cervical ICA, with a calcified aneurysmal wall (white arrowheads). c Initial angiogram of the right common carotid artery (black arrow). d Immediate control angiogram after stent deployment showing exclusion of the aneurysm (black arrows).

The second specificity is related to the morphology of the aneurysms. The two aneurysms reported here were sacciform and larger than 20 mm. A combination of these characteristics could increase the tendency of intra-aneurysmal thrombus formation and further thromboembolism. Indeed, it is likely that the larger the vascular cavity, the higher the risk of thrombus generation. Besides, the sacciform shape creates a vascular cavity connected to the normal arterial flow with a higher tendency to induce flow stagnation than a fusiform dilation. In their studies, Guillon et al. [2] and Touzé et al. [3] reported a saccular shape in 11 of 16 and in 13 of 36 aneurysms, respectively; however, the size of the aneurysms was not specified.

Technique of ICA Repair

Because surgical carotid repair carries an important risk of injury to the lower cranial nerves [11], endovascular treatment was preferred in both patients. Case 1 was treated in 1997, and at that time, we did not have long-term follow-up of carotid stenting for dissection. Because the patient had shown recurrent thrombus migration, parent artery occlusion appeared the surest way to protect her against further embolism. However, in light of results obtained in stenting of ICA dissection [12–15], a carotid stenting would certainly be proposed now at our institution, as was the case for patient 2.

Conclusion

Although the number of cases is limited, our observations show that late thromboembolic complications may occur in ICA dissecting aneurysms. Accordingly, a persisting aneurysm justifies at least lifetime antiplatelet treatment. Endovascular carotid repair could be considered in the case of large sacciform aneurysms, especially when they contain thrombus.

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Khat Chewing Can Cause Stroke

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Introduction

The leaves of the tree *Catha edulis*, known as khat, are chewed by the adult population of Yemen, Somalia and other East African countries for their stimulating and euphoric effect. The psychoactive constituents are the cathines, which consist of norpseudoephedrine, norephedrine and cathinone, an alkaloid with a structure resembling amphetamine. Khat precipitates psychosis and causes arterial hypertension, angina pectoris and myocardial infarction. We present a young man in whom khat chewing was associated with a major stroke.

Case Report

A 41-year-old male of Somalian origin, who had been living in Belgium for several years, presented with a sudden onset of left hemiplegia (upper limb strength MRC 0, lower limb MRC 2) that had started 2 h after khat chewing.