

## Late spontaneous recanalization of internal carotid artery: case report

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### ABSTRACT

Late spontaneous recanalization of internal carotid artery is an unusual event that has received little attention. The authors report a case of a 73-year-old male patient, hypertensive, with previous history of cerebral vascular accident 3 years ago, with sensorimotor sequela in the right upper limb. Duplex scanning and arteriography showed total occlusion of the internal carotid artery. The patient progressed after 2 years with new episodes of recurrent transient ischemic attacks. When submitted to new imaging examinations to assess extra- and intracranial circulation, vessel recanalization was demonstrated, with severe stenosis. Left carotid endarterectomy was uneventfully performed. The patient progressed without new episodes after a 1-month follow-up. Considering the case rarity and the lack of literature on late carotid artery recanalization that can be surgically repaired, we decided to present this case focusing on the importance of following carotid artery occlusions.

Keywords: Carotid artery stenosis/surgery, carotid artery stenosis/ultrasonography, spontaneous remission, internal carotid artery, cerebral angiography, stroke.

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### RESUMO

A recanalização espontânea tardia da carótida interna é um evento incomum e pouco estudado. Os autores relatam o caso de paciente de 73 anos, masculino, hipertenso, com antecedente de acidente vascular cerebral há 3 anos, com seqüela motora e sensitiva em membro superior direito,

apresentando ao mapeamento dúplex e arteriografia oclusão total da carótida interna. Evoluiu após 2 anos com novos episódios de ataques isquêmicos transitórios de repetição. Submetido a novos exames de imagem para avaliação da circulação cerebral extra e intracraniana, evidenciou-se recanalização do vaso, com estenose severa. Foi realizada endarterectomia de carótida esquerda, sem intercorrências. Paciente evoluiu sem novos episódios após 1 mês de seguimento. Considerando a raridade do caso e a parca literatura sobre recanalização tardia de carótida, passível de reparo cirúrgico, optamos pela apresentação do caso enfocando a importância do acompanhamento de oclusões carotídeas.

Palavras-chave: Estenose carotídea/cirurgia, estenose carotídea/ultra-sonografia, remissão espontânea, artéria carótida interna, angiografia cerebral, acidente vascular cerebral, acidente cerebrovascular.

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## Introduction

Spontaneous recanalization of the internal carotid artery (ICA) is a rare and little investigated event.<sup>1</sup> Its low incidence is probably due to the fact that, until some years ago, its definitive diagnosis could only be obtained by arteriography, an invasive examination.<sup>2</sup>

Evolution of patients with acute occlusion of the ICA can be negative, with disabling deficits and mortality rates as high as 55%.<sup>3</sup>

Occurrence of recanalization in the acute stage is more frequent than late recanalization, and it may occur in up to 33% of cases in some studies.<sup>1,2,4</sup>

Our study aims at reporting a case of spontaneous, symptomatic recanalization of the ICA, confirmed by duplex scan, arteriography and intraoperative finding, as well as stressing the importance of following patients with ICA occlusion.

## Case description

M., 73 years old, hypertensive, with history of ischemic stroke 3 years ago, with right upper limb paresis and amaurosis fugax. At that time, the patient was submitted to brain computed tomography (Figure 1) and duplex scan of the carotid arteries, which showed, respectively, ischemic stroke in the left parietal region and left ICA occlusion in its origin. This was confirmed by digital subtraction arteriography (DSA) with selective catheterization of the left common carotid artery, besides selective catheterization of the right common carotid artery and late acquisition of imaging from the left internal carotid artery, as an attempt to visualize distal bed and definition as to type of injury (type I, subocclusion; type II, segmental occlusion; or type III, in which there is only filling of the carotid siphon and the petrous portion of the internal carotid artery, through Willis polygon flow and ophthalmic artery). Since it turned out to be a type III occlusion, we chose to perform clinical treatment with platelet antiaggregating agents and anti-hypertensive drugs.



Figure 1 - Brain computed tomography showing lesion in the left temporoparietal region.

Two years after the ischemic event, the patient progressed with new episodes, characterized by amaurosis fugax to the left, aphasia, buccal angle deviation to the left and temporary worsening of motor deficit, which regressed spontaneously.

The patient was submitted to a new duplex scan of the carotid arteries, which showed stenosis greater than 70% in the left ICA, with peak systolic velocity of 245 cm/s and final diastolic velocity of 78.5 cm/s. DSA confirmed vessel recanalization, with severe stenosis and no signs that could suggest distal ICA filling to the point of occlusion by collateral veins or *vasa vasorum* (Figure 2).

Surgical correction of the lesion was chosen, using endarterectomy of the left carotid artery and arteriorrhaphy using Dacron patch. The patient was discharged on the fourth day after the surgery and remains asymptomatic so far, after 1 month of outpatient follow-up.

## Discussion

Diagnosis of ICA recanalization is not frequent, with no accurate data in the literature about its incidence or most common period of occurrence, because its definitive diagnosis is dependent on an invasive examination that is not free from complications (DSA).<sup>2</sup>

Research on ICA recanalization is often neglected by vascular surgeons due to the impression of therapeutic impossibility and presumable asymptomatic evolution in most cases.<sup>5</sup>

In 1969, Fieschi & Bozzao observed the disappearance of a distal ICA occlusion in the angiographic follow-up 2 to 3 weeks after acute status.<sup>6</sup> More recently, recanalization 1 to 2 hours after an ischemic event has been reported.<sup>7</sup>

This phenomenon occurs more frequently than previously supposed. Meves, in a prospective study, observed spontaneous recanalization of 33% in up to 7 days in 18 patients with ICA occlusion.<sup>4</sup>

Several series of cases report occurrence of such fact between 6 hours and 2 weeks after vessel occlusion.<sup>2,8,9</sup> Consequently, it is a little observed event by vascular surgeons, who, most of the times, deal with chronic occlusions, investigating potentially surgical carotid stenosis.<sup>1</sup> In the literature, there are few reports of spontaneous recanalization of the ICA.<sup>1,5,10,11</sup>

The mechanism by which recanalization of late occlusions occurs is still little known. Lammie, in 1999, suggested the possibility of occlusions resulting from ulcerated plaque thrombosis presenting long-term recanalization by thrombolysis.<sup>12</sup>

Calleja, in 2004, suggested the possibility of occlusions resulting from intraplaque hemorrhage inducing a local edema, which causes occlusion. When such endothelial edema regresses, the vessel recanalizes spontaneously. This theory could justify earlier recanalizations.<sup>13</sup>

Colon, in 1999, published a series of four cases of spontaneous recanalization of the ICA, which through imaging examinations and intraoperative finding, proved to be a hypertrophy of *vasa vasorum*, causing reperfusion of the ICA distal to the occlusion.<sup>14</sup>

The *vasa vasorum*, in large-caliber vessels, such as the ICA, are present both in adventitia and tunica media. In case of myointimal hyperplasia or atherosclerotic disease, a neovascularization is induced, which, in the long term, can allow perfusion distal to vessel occlusion.<sup>14</sup>

Persistence of some embryonic vessels can also account for the complete nonocclusion of the whole internal carotid artery segment, allowing action of varied mechanisms for vessel recanalization.

Nowadays some groups have been following patients with carotid occlusions, with the aim of better evaluating the natural history of such lesions.<sup>5</sup>

Verlato, in 2000, published a cohort study including 41 patients with carotid occlusion, followed by 44.5 months in average, and identified one case of asymptomatic carotid occlusion that had spontaneous recanalization 3 years after the diagnosis, remaining without symptoms for the whole period.<sup>5</sup>



**Figure 2 -** Patient arteriography showing occluded and recanalized carotid artery (internal carotid artery filling can be seen, with no identification of collateral veins, *vasa vasorum* or embryonic branches filling the vessel, which suggests spontaneous recanalization)

However, as reported in our case, recanalization can progress symptomatically, with distal embolizations and subject to repair. Surgical tactics is also discussed in the literature for these cases.

Klonaris, in 2006, reported a case of a patient who, after a 1-year follow-up of carotid occlusion, progressed with vessel recanalization, choosing open repair and avoiding the endovascular approach due to the anatomic characteristic of the lesion, which prevented the passage of a protection system, besides a high risk of embolization of a possible local thrombus, which was not observed during the surgery.<sup>1</sup>

Kim, in 2006, presented the case of a patient with status of brain ischemia, with recent occlusion of the left ICA, which had spontaneous recanalization 4 weeks after the diagnosis. Angioplasty was performed without using a protection system, and the patient progressed uneventfully, confirming that the endovascular treatment is also feasible in these cases.<sup>2</sup>

## Conclusion

Carotid occlusion follow-up allowed us to observe vessel recanalization, which progressed symptomatically, requiring surgical intervention for its treatment.

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