

Incidental direct carotid-cavernous fistula in a patient with high-grade internal carotid artery stenosis

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ABSTRACT

The concurrent occurrence of internal carotid artery (ICA) stenosis and carotid-cavernous fistula (CCF) is infrequent. We report the case of a 59-year-old man with symptomatic high-grade stenosis of left ICA who was referred to our hospital for surgical treatment. An ipsilateral direct CCF was found incidentally during operation. Ultimately, the two lesions were successfully treated with a covered stent while the ICA was preserved. The result of our study may provide further insight into this rare combination of diseases.

KEY WORDS: Carotid stenosis, Carotid-cavernous fistula, Minimal symptom, Covered stent.

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INTRODUCTION

Clinically, both direct carotid-cavernous fistula (CCF) and internal carotid artery (ICA) stenosis are common vascular diseases. However, the occurrence of concomitant ICA stenosis and direct CCF is a rare combination.

We herein describe a patient who was diagnosed with a co-incidental direct CCF and a

high-grade stenosis of the cavernous segment of ipsilateral ICA, and treated with a covered stent successfully in one stage. The etiology, clinical presentations and treatment options are discussed here and may, provide further information on such condition.

CASE REPORT

A 59-year-old man presented with a 7 month history of intermittent dizziness. On admission to another hospital six months ago, digital subtraction angiography (DSA) demonstrated a high-grade stenosis in the cavernous segment of the left ICA (Fig. 1a, 1b). Recently, he was admitted to our hospital for surgical treatment of the stenosis. Two days before admission, he complains of a sudden onset of tinnitus in his left ear. He had no history of head trauma or family history of collagen vascular disease.

Physical examination was unremarkable except for a bruit in the left orbit which disappeared on carotid compression. Computed tomography (CT) scan on admission showed no anomaly. The patient was scheduled for endovascular therapy of the ICA stenosis. He was started on clopidogrel (75mg) and bayaspirin (300mg) daily for three days prior to the endovascular treatment.

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Three days after admission, endovascular treatment was performed after informed consent. During the procedure, cerebral angiography demonstrated an 80% stenosis of the left ICA and an ipsilateral direct CCF draining into the contralateral cavernous sinus via the intercavernous sinuses, posteriorly into the internal jugular veins through the inferior petrosal sinuses (Fig. 1c, 1d).

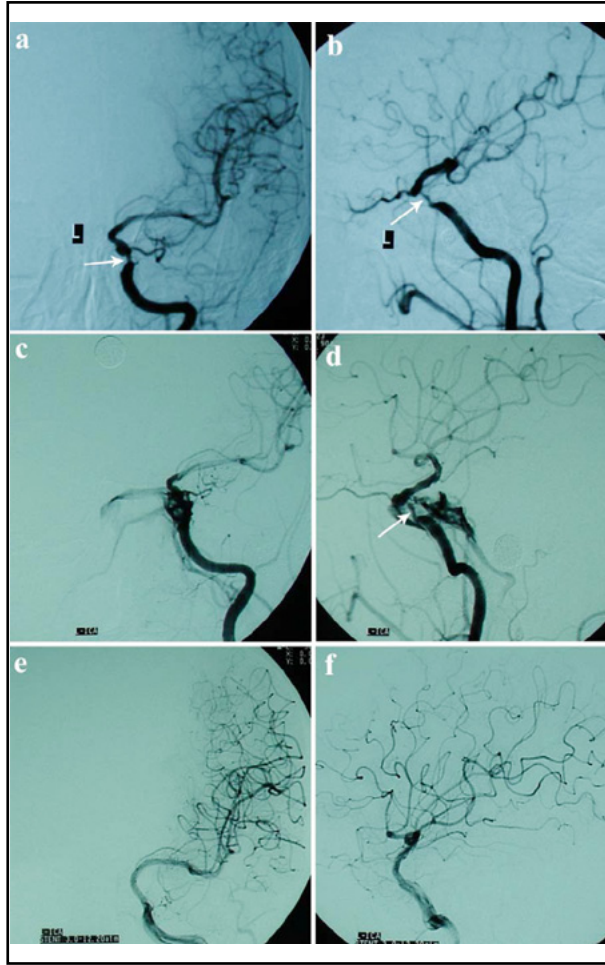


Fig.1: a and b Digital subtraction angiography (DSA) showing a high-grade stenotic lesion (white arrows) at the cavernous segment of the left internal carotid artery (ICA) 6-month ago. c and d Left ICA angiography showing the high-grade stenosis (white arrow) and a direct carotid-cavernous fistula (CCF) that drained into contralateral cavernous sinus via the intercavernous sinuses, and posteriorly into the internal jugular veins through the inferior petrosal sinuses. e and f Left ICA angiography at the end of the covered Jostent (3×12 mm) placement with a pressure of 20 atmospheres showing complete occlusion of the CCF and dilatation of the ICA.

The fistulas point was not remarkable. A decision was made to attempt to place a 3×12 mm covered Jostent (Abbott Laboratories, Illinois, USA) for dilatation of the stenotic ICA and obliteration of the fistula, instead of sacrificing left ICA, and this was successful. Under angiographic monitoring, the stenosis was significantly dilated and the fistula was completely occluded when a covered stent was inflated with a pressure of 20 atmospheres (Fig. 1e, 1f). The anteroposterior radiograph showed the stent in place (Fig.2).

After operation, low-molecular-weight heparin (nadroparin calcium, 0.4IU, twice a day) was given within the first three days. A 3-month postoperative course of clopidogrel (75mg) and bayaspirin (300mg) daily were instituted. Symptoms including dizziness and bruit disappeared after stent placement. The patient has remained asymptomatic for nearly six months since surgery.

DISCUSSION

Generally, occurrence of simultaneous high-grade ICA narrowing and direct CCF is unusual, especially such lesions occur in the cavernous segment of same ICA in a patient.

To date, the association between the two lesions is poorly understood. Hemodynamic change associated with ICA stenosis is an important risk factor in the development of cerebral aneurysms.¹ Héman

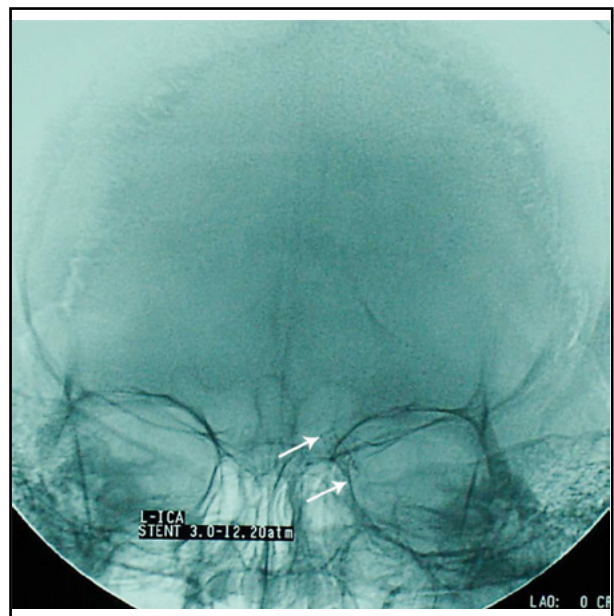


Fig.2: Anteroposterior radiograph shows deployment of the stent (between the 2 arrows).

et al² have reported that intracranial aneurysms appear higher in patients with ICA stenosis than in a general population and the frequency of aneurysms located in cavernous ICA was 19.7%. In the presence of a severe ICA stenosis the flow velocity in the weakened artery increases drastically, and this may lead to rupture of cavernous ICA aneurysm which may result in CCF.

The common classic symptoms of CCFs are bruit, proptosis and chemosis. The symptom of his direct CCF was only bruit. Direct CCF presenting with minimal symptoms is rare.³ Clinical diagnosis of a spontaneous CCF is simple by auscultation of the pulsatile bruit which can be the only primary presentation of a direct CCF.⁴

Generally, surgical treatment is recommended for patients with symptomatic or moderate to high-grade of carotid stenosis including carotid endarterectomy, angioplasty/stenting and artery bypass.⁵ With advances in neuroendovascular techniques and materials, a mounting body of endovascular treatment options for direct CCFs, such as coils, detachable balloon, stents, and liquid embolic agents, are available by transarterial or transvenous embolization. Occlusion of direct CCFs with a detachable balloon is widely preferred. In this study, the use of a covered stent to treat the two lesions in one stage is safe, effective, and affordable for the patient. Notably, iatrogenic direct CCFs after correction of the stenosis have been reported in the literature.⁶ Thus, iatrogenic complications should be kept in mind as enthusiasm for endoluminal treatment of vascular lesions is increasing.

In conclusion, placement of a covered stent is a safe and effective alternative treatment option for our patient. Moreover, further studies are needed to ascertain the relationship between the two lesions.

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