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CASE REPORT **OLGU SUNUMU**

TRANSIENT NEUROLOGICAL DEFICITS DUE TO PROXIMAL PROTECTION IN CAROTID ARTERY STENTING

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ABSTRACT

The most feared and frequent complication of carotid artery stenting is distal embolization during the intervention.. To prevent to embolization in clinical practise, roughly two categories of embolic protection devices (EPDs) are routinely used: distal EPDs with flow preservation using filters, and the proximal occlusive protective systems. We report a case with transient neurological deficit such as monoparesia and anosognosia following of the internal carotid artery stenting using a proximal EPD (the Mo.Ma system). The proximal occlusive protective system may cause transient signs and symptoms due to cerebral hypoperfusion without distal embolization.
Key Words: Carotid artery stenting, proximal protection, transient neurologic deficit.

KAROTİS ARTER STENTLEMEDE PROKSİMAL KORUMAYA BAĞLI GEÇİCİ NÖROLOJİK FONKSİYON KAYIPLARI

ÖZET

Karotis arter stentlemenin korkulan ve sık karşılaşılan komplikasyonu işlem esnasında oluşacak distal embolidir. Distal embolizasyonu önlemek için kabaca 2 çeşit emboli koruma cihazı veya sistemi geliştirilmiştir. Bunlardan biri lezyon distaline filtre konulması, diğeri ise lezyonun proksimalinde kan akımının kesilmesi ile yapılan koruma sistemidir. Proksimal koruma sistemi (Mo.Ma sistemi) ile karotis artere stent koyduğumuz bir hastada monoparezi ve anosognozi ile giden geçiçi nörolojik defisit gelişmiştir. Proksimal koruma sistemi ile distal emboli olmaksızın serebral hipoperfüzyona bağlı geçici nörolojik belirtiler ve bulgular gelişebilmektedir.
Anahtar Sözcükler: Karotis stentleme, proksimal koruma, geçici nörolojik defisit.

INTRODUCTION

Carotid artery stenosis is an important cause of approximately 20-25% of ischemic strokes (1). Although carotid endarterectomy (CEA) is a standard treatment for carotid artery stenosis, the carotid artery stenting (CAS) instead of CEA in some patients is adopted to be a valid alternative, considering recent advances in carotid angioplasty and stenting techniques. The most distressing event in the patients who were treated with CAS is distal embolism. In order to prevent embolism, the emboli protection devices (EPDs) were developed (2). Transient neurological functional losses developed in a patient whom we placed stent using proximal protection (Mo.Ma system) method, the subject will be discussed here with the case.

CASE

A 58-year-old female patient was admitted to the city hospital in recent weeks due to dizziness and fainting accompanied by loss of consciousness. Upon the Carotid Doppler Ultrasonography and Computed Tomography Angiography (BTA) examinations made there, a 90% stenosis was found on the proximal of the right internal carotid artery (ICA) and referred to us. The 4 system digital subtraction cerebral angiography (DSA) confirmed the 90% stenosis located at the proximal of right ICA (Figure I A). Also, at the proximal of left ICA, a 40% stenosis was observed. Approximately 3 hours after the DSA, a sudden bradycardia followed by cardiac arrest developed The patient's cardiac rhytm restored after a short intervention.

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The patient with a history of cardiac arrest in previous years was evaluated by cardiology department and it was found that she had bradycardia and the fainting could be related to it. After cardiac stabilization, stent placement in the right ICA stenosis was planned. The method was determined by considering that the patient was suitable for proximal protection method. The reasons for being suitable for proximal protection; the cerebral collaterals were developed well on the right ICA where 90% stenosis is present, that's on the side where procedure will be performed. The right ACA was filling via AcomA from the left side of ICA (Figure I B). Some right MCA area was fed by posterior circulation via right PcomA. The right ICA ending as right MCA (Figure I C). After evaluating other factors besides the facts that right ICA stenosis is severe, the right ACA is filled from left side through AcomA, the proximal protection method was found more appropriate and initiated. After placement of 9F Mo.Ma system, the predilatation was made with 2.5x20 mm balloon with accompaniment of 1 ampule of atropine. Thereafter, the stent was placed (Protege Rx 7x40). The common carotid artery flow was cut off for 4 minutes during these procedures. Post dilatation was not performed due to adequate passage (Fig. I D). No bradycardia was observed during the procedure. The procedure was ended, as there was no finding showing a right MCA's branch occlusion on the right posterio-anterior and lateral images taken while ending the procedure. (Figure II A-B). While ending the procedure, the patient's wakefulness slightly worsened and her responses to the questions slowed down. While the lower extremity was normally moving at the left side, a 0-1/5 weakness developed at left upper extremity, in addition, the patient was unaware of the loss of strength (anosognosia) and was neglecting the events and environment at the left side. Soon after, the patient began asking questions like where my arm is, and she became aware of the loss of strength in her arm. The patient's TAs was around 100/80 mm Hg. The patient was admitted to intensive care. The patient's complaints gradually improved after 10 minutes and she was almost completely relieved within 3 hours, however the TA was hypotensive and the cardiac rhythm was bradycardic during first 24 hours. The patient who was stabilized with fluid and atropine treatment was taken to the service, and discharged 2 days later.

DISCUSSION

In order to avoid emboli to the brain during stent placement procedure in carotid stenosis, there are 2 types of EPD devices used in practice, distal EPD and proximal EPD device. In Distal EPD, an umbrella-like device is expected to open in the vessel beyond the stenosis and to retain the clots that break off during the procedure. However, in distal protection, the EPD device should pass through the stenosis area without protection even once prior to the stent placement, and this imposes a serious risk. Its advantages are that the blood flow continues during the procedure, the placement is relatively easy, and commonly known to the operators as they are used for years. Their disadvantage is that they frequently cause vasospasm (2,3).

In Proximal EPD, a balloon is blown up in external carotid artery (ECA) and common carotid artery (CCA), and hence the forward blood flow in ICA is cut off. In the meantime, a retrograde flow is induced in the ICA. In the proximal EDP procedure, the stenosis area is never passed through and never touched. Before the end of the procedure, the blood in the process area is aspirated several times and it is checked whether or not there is a debris. The aspiration is continued until no more debris comes out. A tolerance problem may occur during these procedures due to prolonged cut off of the blood flow and patient factor (collateral status). The intolerance was observed between 1.2% to 14% in previous studies. The proximal EPD is a protection way preferred in the patients with high risk plaque (recent symptomatic, ulcereous plague, heterogeneous and lipid rich plague) and intramural hemorrhage and intraluminal thrombus, as there is no need to pass through the stenosis area, although the placement is more difficult comparing to distal EPD placement (2,4). Although there are evidences that proximal EPD protects the brain against the microembolization more than distal EPD (5), this difference cannot be identified clearly in meta-analyzes (3). Because cerebral blood flow is discontinued in proximal EPD, transient neurological symptoms (aphasia, contralateral motor loss, disorientation) are observed especially in patients with weak collaterals and occlusion of the opposite side. Transient neurological symptoms are relieved in most patients after the balloon is deflated. A study revealed that around 40% of patients had

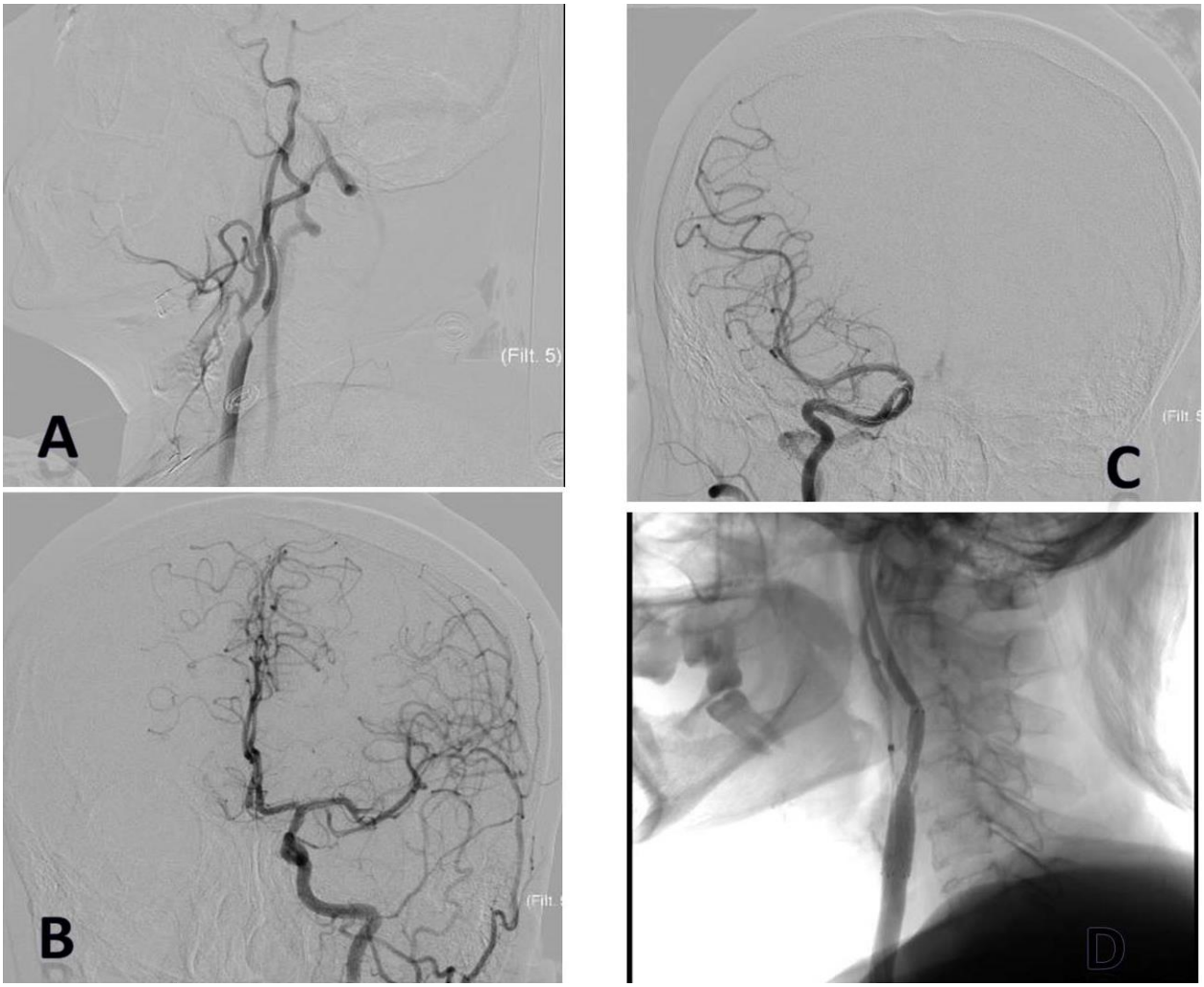

Figure I. 90% stenosis at the proximal of right ICA (A), Right ACA is filled from left side via AcomA (B), Right ICA ends as right MCA (C), image of right ICA after stent is placed (D).

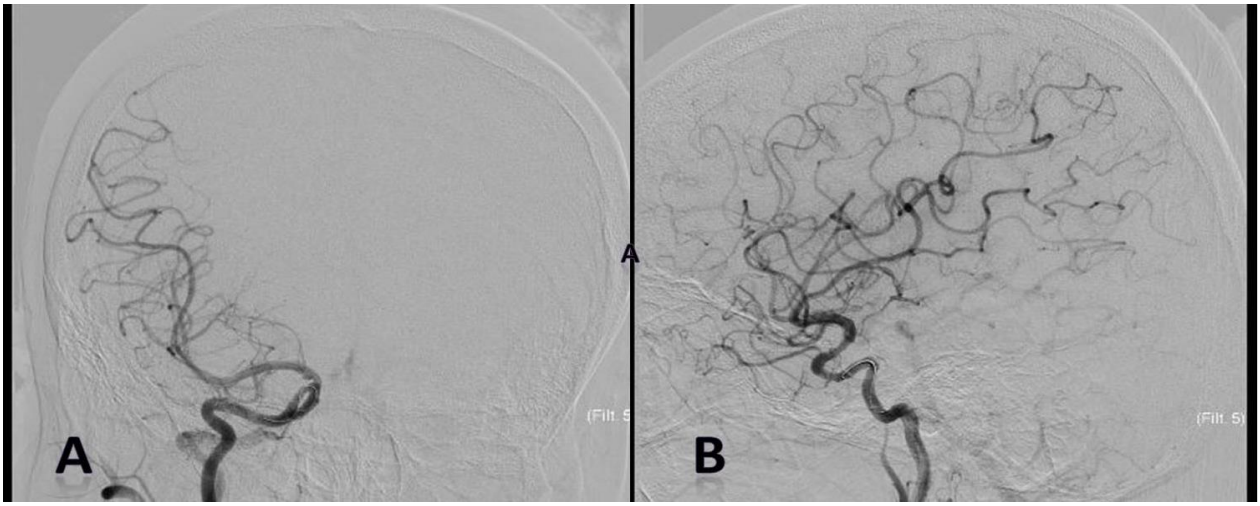

Figure II. Right MCA branches look normal in anterio-posterior (A) and lateral (B) images taken after the procedure is completed.

neurological intolerance and 88% of them were transient (6). In our patient, the symptoms and signs suggesting anosognosia and neglect were observed. While the anosognosia occurred in the right parietal lobe lesions was defined as unawareness of the loss of function or the denial of the loss of function, the neglect was defined as spatial semi-negligence on the left side (7). In conclusion, a patient who undergoes a serious neurological deficit during or after the procedure distresses the operator a lot. Severe neurological deficities, as in our patient, does not correspond to the control angiographic images taken at the end of the procedure, supports the hypoperfusion of a large area rather than a focal emboli, and increases the expectation that a transient deficit might occur.

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