MEDTRONIC
MEDICAL AFFAIRS
CORNER

SPONSORED BY
Medtronic

Proximally Protected Carotid Artery Stenting in a Symptomatic Patient: A Case Report

By Eugenio Stabile, MD, PhD

The necessity of embolic protection devices during carotid artery stenting (CAS) is indisputable. This can be accomplished either by using a filter or occlusion balloon placed distal to the lesion or with proximal occlusion. Although there is no large, prospective, randomized trial establishing the superiority of one method over another, a meta-analysis showed a reduction in the number of CAS-related brain embolizations with proximal occlusion versus distal filter protection.[1]

Proximal occlusion has some unique benefits that may contribute to this reduction. Most notably, neuroprotection is established before initial lesion crossing. There is no requirement for an internal carotid artery (ICA) filter "landing zone," thus minimizing the anatomic exclusion criteria. Additionally, debris of all sizes is more efficiently captured as filter wall apposition, and filter pore size is not of concern.[2] The following report describes a challenging case with an unstable, difficult-to-cross thrombotic lesion.

CASE REPORT

A man in his mid-80s was admitted to the emergency room for left arm paresis lasting for 2 hours. At 1 hour from the initial evaluation, the patient became asymptomatic and the functional status of his left arm recovered.

Clinical assessment revealed the presence of a right cervical systolic murmur. The electrocardiogram showed his sinus rhythm at 66 bpm with atypical ST-segment/T-wave abnormalities. The echocardiography, chest x-ray, and head CT scan revealed the absence of pathologic findings. The patient had undergone CAS 3 years previously and was on medical therapy for heart failure and chronic obstructive pulmonary disease (COPD) when he presented to the emergency room. Duplex assessment revealed the presence of a stent in the left ICA, free of restenosis, and hypoechogenic plaque creating severe stenosis of the right ICA. The patient's symptoms were thought to be related to this right ICA severe stenosis, and he was scheduled for carotid revascularization.

After collegial discussion among the vascular team, CAS was selected as a revascularization strategy given the presence of heart failure, COPD, and advanced age. On the third day after hospital admission, the patient underwent selective carotid angiography, confirming the presence of complicated plaque that was causing severe stenosis of the right ICA (Figure 1).

Due to the thrombotic appearance of the plaque, the operator decided to perform the procedure using a proximal protection device, which allows for lesion crossing and any manipulation to happen only after the protection system is already in place. Moreover, this protection system allows the operator to select their preferred wire to navigate the complex lesion.

The Mo.Ma Ultra™ proximal cerebral protection device (Medtronic) is the only commercially available proximal embolic protection device. In this case, the procedure was conducted using a 9-F Mo.Ma Ultra device placed into the common carotid artery (CCA) via a stiff wire placed in the external carotid artery. With the Mo.Ma Ultra device in place, the distal balloon was inflated (Figure 2), and selective angiography was performed for more accurate imaging of the target lesion.

By inflating the proximal compliant balloon in the CCA, flow in the ICA is halted, and as previously discussed, the lesion can be crossed with any variety of wire after flow

arrest is instituted. The operator attempted to navigate the lesion with a 0.014-inch nonhydrophilic wire that became stuck in the plaque. At this point, it was decided to aspirate the stagnant column of blood to capture emboli prior to deflating the proximal and distal balloons and resuming antegrade flow. Angiographic control allowed for proper positioning of a new 0.014-inch hydrophilic wire (Figure 3).

The proximal balloon was reinflated, the second wire was advanced in the distal ICA, and a closed-cell carotid stent was implanted from the proximal ICA to the distal CCA and postdilated. At the end of the procedure, blood was again manually aspirated from the sheath. The proximal and distal balloons were then deflated before resuming antegrade flow (Figure 4). Femoral hemostasis was managed

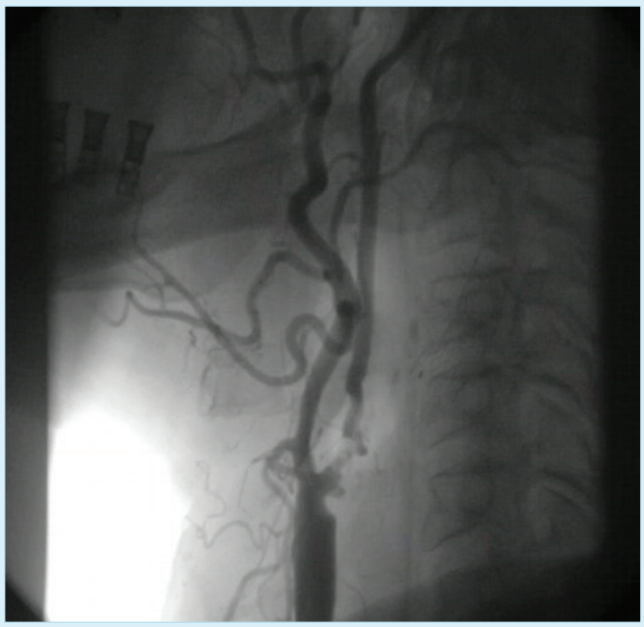

Figure 1. Selective carotid angiogram of the right ICA.

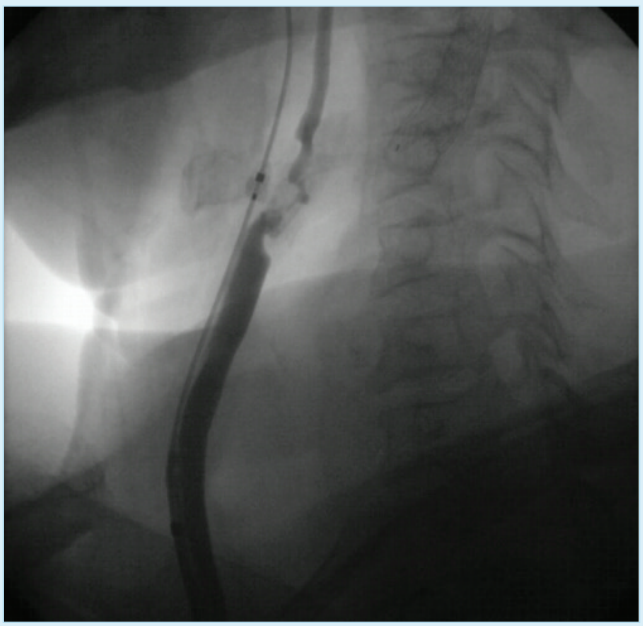

Figure 2. Selective carotid angiogram of the inflated distal balloon.

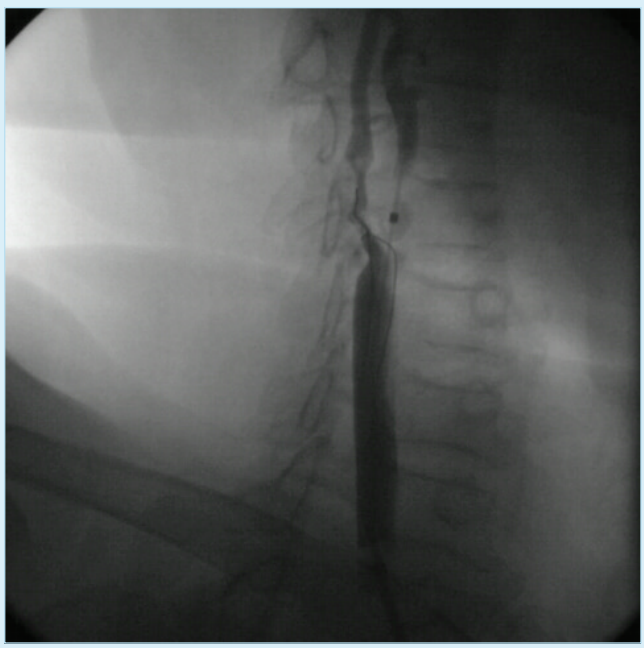

Figure 3. Selective carotid angiogram of the inflated distal balloon after the first unsuccessful wiring of the lesion.

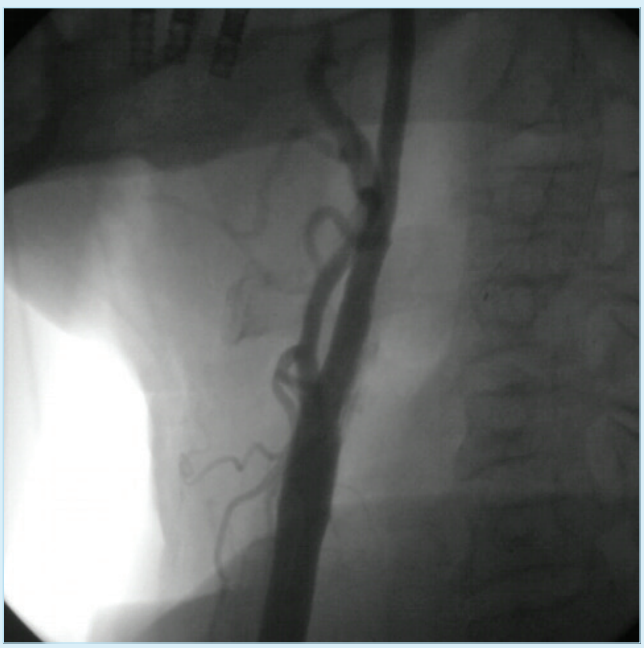

Figure 4. Selective postprocedural angiogram of the right ICA.

with a stitch-based closure device, and the patient was returned to the ward. The hospital stay was complication free, and the patient was discharged on the fifth day in good clinical condition.

CONCLUSION

This case is a good example of a patient who was at high risk for complications and therefore not a good endarterectomy candidate. Despite the unstable target lesion making it a challenging CAS procedure, the ability of the Mo.Ma Ultra device to establish cerebral protection before lesion crossing enabled this patient to be successfully treated endovascularly. ■

1. Stabile E, Sannino A, Schiattarella GGI. Cerebral embolic lesions detected with diffusion-weighted magnetic resonance imaging following carotid artery stenting: a meta-analysis of 8 studies comparing filter cerebral protection and proximal balloon occlusion. JACC Cardiovasc Interv. 2014;7:1177-1183. doi: 10.1016/j.jcin.2014.05.019
2. Schmidt A, Diederich KW, Scheinert S, et al. Effect of two different neuroprotection systems on microembolization during carotid artery stenting. J Am Coll Cardiol. 2004;44:1966-1969. doi: 10.1016/j.jacc.2004.08.049

Eugenio Stabile, MD, PhD

Associate Professor of Cardiovascular Diseases
Department of Advanced Biomedical Sciences
University "Federico II"
Napoli, Italy
eugenio.stabile@unina.it
Disclosures: None.

Medtronic

Mo.Ma Ultra™ proximal cerebral protection device Reference Statement (US)

Important Information: Prior to use, refer to the Instructions for Use supplied with these devices for indications, contraindications, suggested procedure, warnings and precautions.

Indications for Use: The Mo.Ma Ultra proximal cerebral protection device is indicated as an embolic protection system to contain and remove embolic material (thrombus/debris) while performing angioplasty and stenting procedures involving lesions of the internal carotid artery and/or the carotid bifurcation.

The reference diameter of the external carotid artery should be between 3-6 mm and the reference diameter of the common carotid artery should be between 5-13 mm.

CAUTION: Federal (USA) law restricts these devices to sale by or on the order of a physician.

Test data is on file at Medtronic Inc. Bench test results may not be indicative of clinical performance.

Indications for Use (EU)

The Mo.Ma Ultra cerebral protection device is intended to be used during angioplasty and stenting of lesions located in the ICA and/or lesions involving the carotid bifurcation. This device allows protection of the brain from cerebral embolism during the entire duration of the intervention, thus preventing severe and disabling complications. The system allows achieving cerebral protection before target lesion crossing plus allowing debris removal by blood aspiration at any stage during the procedure.

For the Mo.Ma Ultra double balloon

The Mo.Ma Ultra cerebral protection device is indicated to be used in patients eligible for carotid angioplasty and/or stenting with stenosis involving the ICA and/or the carotid bifurcation and reference diameter of ECA from 3 to 6 mm and reference diameter of CCA from 5 to 13 mm.

For the Mo.Ma Ultra mono balloon

The Mo.Ma Ultra cerebral protection device is indicated to be used in patients eligible for carotid angioplasty and/or stenting with occlusion of the ECA and stenosis involving the ICA and/or the carotid bifurcation and reference diameter of CCA from 5 to 13 mm.