Stenosis and aneurysm of internal carotid artery: a double endovascular procedure

Published on 08.08.2012

DOI: 10.1594/EURORAD/CASE.10262
ISSN: 1563-4086
Section: Interventional radiology
Area of Interest: Arteries / Aorta
Procedure: Education
Procedure: Computer Applications-3D
Procedure: Arthrography
Procedure: Filter insertions
Procedure: Stents
Procedure: Embolisation
Imaging Technique: CT-Angiography
Imaging Technique: Fluoroscopy
Special Focus: Aneurysms Haemodynamics / Flow dynamics Case Type: Clinical Cases
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Patient: 72 years, female

Clinical History:
A 72-year-old female patient, under drug treatment for hypertension and TIA history, presented at our emergency center for syncopal attack with vertigo.

Vital signs were checked (Pa 180/80 mmHg, PaO2 95%, normal ECG), and she underwent head-neck CT-angiography.

Imaging Findings:
Angio-CT revealed the presence of severe stenosis with simultaneous extracranial large aneurysm of the right internal carotid artery (ICA) [Fig. 1]. Two days after a failed surgical approach we decided to treat both diseases with endovascular technique. After written informed consent, a right trans-femoral approach was obtained and 8 Fr 10 cm long introducer sheath was placed. To catheterise the right common carotid artery 8 Fr 90 degree guide-catheter (Boston Scientific) and standard guidewire (Terumo) were used. The angiography confirmed the presence of stenosis and aneurism [Fig. 2]. We positioned an embolic protection device (EPD) (Emboshield, Abbott Vascular) in the distal portion of internal carotid artery and then, considering the Angio-TC plaque characterisation, a self-expandable closed-cells stent device was used (Wallstent, Boston Scientific) [Fig. 3-4]. After the retrieval of the EPD and an angiographic check, we embolised the aneurysm with Orbit Galaxy coils (Codman Neurovascular) [Fig. 5]. There was no peri-procedural complication.

Discussion:
Carotid stenosis is a narrowing of the carotid arteries and may be either symptomatic or asymptomatic. Symptomatic carotid stenosis often presents with transient ischaemic attacks (TIA), stroke or amaurosis fugax.

Aneurysms of the extracranial internal carotid artery are rare, accounting for only 0.1%-2% of carotid interventions [1]. Extracranial carotid artery aneurysms have been defined as a localised increase in calibre of >50% compared with the normal wall.
with the reference values. These reference values are 0.55–0.06cm in men and 0.49–0.07cm in women at the level of ICA, and 0.99 – 0.10 cm in men and 0.92 – 0.10 cm in women at the level of the carotid bulb [2].

Causes of aneurysm of the ICA are multiple and include atherosclerosis, dysplasia, trauma [3]. Although aneurysms of the extracranial ICA do not usually produce neurological symptoms, they may result in potentially serious problems, such as cerebrovascular events, consequence of thromboembolic phenomena or impairment of flow in the proximal carotid artery [4]. Isolated cranial neuropathies can also occur as the result of direct nerve compression [5].

Although in most cases for the extracranial internal carotid aneurysm a surgical treatment is preferred [6], in our patient the aneurysm of the right internal carotid artery was too close to the skull base, risky for a surgical approach, indeed failed two days before.

The simultaneous presence of ipsilateral carotid stenosis and aneurysm is very rare in literature and presents difficulties for both surgical and endovascular treatments.

Our intent was to obtain the complete stenosis resolution first and subsequently embolise the aneurysm: a carotid artery patency would allow us to work more easily and with less risk. In fact emboli are usually created during the filter’s passages and stent deployment, especially in sub-occlusive plaque or those with complex anatomy, due to the friction between the devices and plaque.

Stent sizes were chosen on the basis of pre-procedural CT evaluation. Pre-procedural assessment of carotid stenosis revealed a fibro-lipid plaque with a small ulcerate component; it was decided to place a closed-cells stent (Wallstent, Boston Scientific) in order to reduce the risk of a possible distal thrombo-embolisation.

The subsequent aneurysm embolisation was performed exclusively with coils, without stent-assisted, because the curve situated after the aneurysm did not allow a safe stent release.

It was widely demonstrated that CAS procedure is safe and reliable, with complications and mortality rates similar to TEA [7]. In our opinion, endovascular neuro-interventional procedures presents many advantages and limited risks, especially if performed by medical staff with proven experience.

Differential Diagnosis List: Stenosis and aneurysm of internal carotid artery., Giant cell arteritis, Congenital aneurysm

Final Diagnosis: Stenosis and aneurysm of internal carotid artery.

References:


Figure 1

Description: MIP-curved imaging show a consensual aneurysm and stenosis of internal carotid artery

Origin: University Hospital, Diagnostic Imaging. Molecular Imaging, Interventional Radiology and Radiation Therapy
Description: 3D reconstruction
Origin: University Hospital, Diagnostic Imaging. Molecular Imaging, Interventional Radiology and Radiation Therapy
Description: The angiography confirmed the consensual presence of stenosis and aneurysm.

Origin: University Hospital, Diagnostic Imaging. Molecular Imaging, Interventional Radiology and Radiation Therapy; viale Oxford 81 00133 Rome, Italy
Figure 3

Description: The imaging show the release of EPD. Origin: University Hospital, Diagnostic Imaging, Molecular Imaging, Interventional Radiology and Radiation Therapy; viale Oxford 81 00133 Rome, Italy.
Description: The imaging show the correct stent placement

Origin: University Hospital, Diagnostic Imaging, Molecular Imaging, Interventional Radiology and Radiation Therapy; viale Oxford 81 00133 Rome, Italy
Figure 5

Description: Control after procedure confirmed the complete aneurysm exclusion

Origin: University Hospital, Diagnostic Imaging, Molecular Imaging, Interventional Radiology, and Radiation Therapy; viale Oxford 81 00133 Rome, Italy