Evaluation of carotid artery stenosis with different imaging modalities: DSA, MRA and multidetector spiral CT

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Section: Cardiovascular
Imaging Technique: MR-Angiography
Imaging Technique: CT
Case Type: Clinical Cases
Authors: V. Cantisani, F. Pediconi, S. Fiori, L. Limiti, V. Votta
Patient: 71 years, female

Clinical History:

The patient was admitted because of a monolateral carotid stenosis detected by ultrasound examination.

Imaging Findings:

The patient was admitted because of a monolateral carotid stenosis detected by ultrasound examination. Her medical history included hypertension, smoking (45 cigarettes per day), and angina. Her neurological symptoms were aspecific: aphasia, amnesia and confusional status. The patient underwent a CT examination to evaluate the cerebral parenchyma and the epiaortic vessels. She then underwent MR angiography and, two days later, selective arteriography of the epiaortic vessels. All these examinations detected the presence of a moderate-grade stenosis localised at the origin of the right internal carotid artery with parietal calcifications.

Discussion:

Stroke is the third most common cause of death in the western world and in 70% of patients it is associated with atherosclerotic disease of the carotid artery. Imaging of the epiaortic vessels is of great importance in screening, evaluating therapeutic indications and for the follow-up of these patients. The diagnostic imaging techniques used to evaluate this patient were: multidetector angio-CT, which showed a plaque with parietal calcifications at the right carotid bifurcation, causing a moderate-grade stenosis of the vessel; angio-MRI, which showed a high-grade stenosis (in contrast with the CT findings), but was inferior in the detection of the parietal calcifications; and DSA of the epiaortic vessels, performed thorough selective catheterisation of the common carotid, which confirmed the CT findings of a moderate-grade stenosis at the origin of the right internal carotid.

Analysing the findings obtained with these different techniques, the spiral multidetector CT seems to offer real advantages for the characterisation of the atherosclerotic plaque morphology and to suggest the most appropriate therapeutic indication for every patient. Furthermore, CT examination was able to detect the presence of calcification...
and the irregular morphology of the plaque, which were not seen with the other techniques, thus demonstrating the superiority of spiral multidetector row angio-CT in the study of atherosclerotic plaques.

**Differential Diagnosis List:** Moderate-grade stenosis of the right common carotid artery

**Final Diagnosis:** Moderate-grade stenosis of the right common carotid artery

**References:**

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Critical review of non- or minimally invasive methods (duplex ultrasonography, MR- and CT-angiography) for evaluating stenosis of the proximal internal carotid artery.  

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Outcome, observer reliability, and patient preferences if CTA, MRA, or Doppler ultrasound were used, individually or together, instead of digital subtraction angiography before carotid endarterectomy.  

Hirai T, Korogi Y, Ono K, Nagano M, Maruoka K, Uemura S, Takahashi M.  
Prospective evaluation of suspected stenoocclusive disease of the intracranial artery: combined MR angiography and CT angiography compared with digital subtraction angiography.  

Moll R, Dinkel HP.  
Value of the CT angiography in the diagnosis of common carotid artery bifurcation disease: CT angiography versus digital subtraction angiography and color flow Doppler.  

Carotid artery stenosis: prospective comparison of CT, three-dimensional gadolinium-enhanced MR, and conventional angiography.  
Description: Common carotid selective arteriography shows a moderate-grade stenosis of the internal carotid immediately above its origin. Origin:
Description: Angio-MR with MIP reconstruction shows a high-grade stenosis at the origin of the internal carotid at the bifurcation. Origin:

Description: Angio-spiral multirow CT with MIP reconstruction on the sagittal plane shows the presence of a calcific plaque with moderate-grade stenosis. Origin: