Carotid artery stenosis - evaluation with multislice CT

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Case Type: Clinical Cases
Authors: B. Tomandl, B. Stemper, M. Lell
Patient: 64 years, male

Clinical History:

Right hemispheric stroke

Imaging Findings:

The patient was admitted with left-sided hemiparesis. An initial CT scan showed no early signs of ischaemic stroke or haemorrhage. CT-perfusion (CTP) did not reveal a perfusion deficit. In addition, we performed CT-angiography (CTA) of the extracranial and intracranial blood vessels responsible for brain perfusion. CTA showed a severe stenosis of the right internal carotid artery (ICA).

Discussion:

CT is still the method of choice for the fast and reliable evaluation of patients with stroke. The first step is to exclude intracranial haemorrhage. Non-enhanced CT (NECT) performed within the first six hours after onset of symptoms may show subtle "early signs" of ischaemic stroke, indicating irreversible brain damage. If irreversible damage of brain tissue has not yet occurred and the patient is admitted within four hours after the onset of symptoms, thrombolysis is a therapeutic option. However, NECT fails to reliably differentiate between brain with sufficient and insufficient perfusion. This differentiation is essential in deciding whether the patient can undergo thrombolysis. Thrombolysis might be harmful if the patient presents with large areas of non-perfused brain. CT-perfusion (CTP) was introduced to improve the evaluation of insufficiently perfused brain, so-called "tissue at risk". Evaluation of the large extracranial and intracranial vessels assuring brain perfusion can be performed safely and non-invasively using CT-angiography (CTA).

In this patient, neither CTP nor NECT - performed immediately after admission and repeated 24 hours later - showed any evidence of ischaemic stroke. In contrast, CTA revealed a high degree stenosis of the right ICA as a probable reason for the patients’ symptoms.

In conclusion, with the recent introduction of multislice CT, comprehensive imaging of stroke became possible. Multislice CT combines the information of non-enhanced CT (NECT), CTP and CTA within 15 minutes.

Differential Diagnosis List: Carotid artery stenosis
Final Diagnosis: Carotid artery stenosis

References:

Figure 1

Description: Initial NECT, 3 hours after the onset of symptoms, showing no early signs of ischaemic stroke. Origin:
Figure 2

Description: CTP: Colour map of cerebral blood volume showing no evidence of ischaemia. Origin:
Description: CTP: Colour map of time to peak showing no evidence of ischaemia and no areas of delayed enhancement. Origin:
**Figure 3**

Description: MIP-Visualization of the right carotid bifurcation showing severe stenosis of the ICA.

Origin:
Description: Curved MPR demonstrates both the residual lumen and the intraluminal soft plaque.
Origin:
Description: Direct volume rendering illustrates the carotid stenosis in relation to the bony structures of the skull. Origin:

Description: Axial slice image allows a precise evaluation of the degree of stenosis of the right ICA (arrow). Origin: