A case of hemiparesis and dysarthria after stenting of the left internal carotid artery

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History

A 67-year-old male patient, who had undergone radiation therapy due to laryngeal neoplasia, was presented to the neurology department with headaches, neck pain and paresis of the right abducens nerve (VI). Brain MRI was unremarkable. CT angiography (CTA) revealed a severe calcified stenosis of the middle section of the left internal carotid artery (LICA). The stenosis was treated by percutaneous transluminal stent angioplasty. Following a successful procedure, the patient developed right hemiparesis and dysarthria. A non-contrast brain CT showed hyperdensities in the left subarachnoidal space and frontoparietal cortex. The stent was patent. Cerebral perfusion CT was unremarkable. An additional Dual Energy (DE) brain CT without i.v. contrast was performed to rule out a suspected subarachnoid bleeding.

Diagnosis

Hyperdensities in the left subarachnoid and frontoparietal cortex were seen in DECT mixed images (comparable to conventional CT images) and iodine maps, however, not in the virtual non-contrast (VNC) images. This indicated a contrast stagnation in the subarachnoid causing the hyperdense impregnation of the frontoparietal cortex. A subarachnoid bleeding was ruled out. No further invasive cerebral arteriography was needed. The patient was transferred to the intensive care unit to continue post-stenting antiplatelet treatment and hydration for suspected contrast-induced encephalopathy. After 24 hours, the NIHSS score was improved. Three days later, the patient had completely recovered and was discharged.

Comments

Subarachnoid bleeding or contrast stagnation can both occur in patients undergoing intra-arterial interventions, such as the carotid stenting in this case. The differentiation is important, as it impacts the clinical decision on whether to continue anti-platelet treatment.

In conventional CT images, the differentiation is difficult as both are shown as hyperdensities. In DECT, images are acquired at two different energy levels. As bleeding and iodine have a different attenuation at a lower energy level, they can be differentiated using a three-material decomposition method.

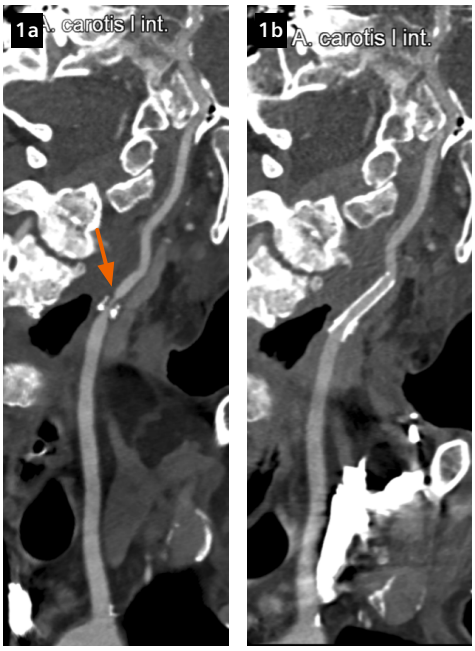
As shown in this case, with the help of DECT, subarachnoid bleeding is ruled out and the anti-platelet treatment could be continued, which benefits the outcome of the patient. ●

Examination Protocol

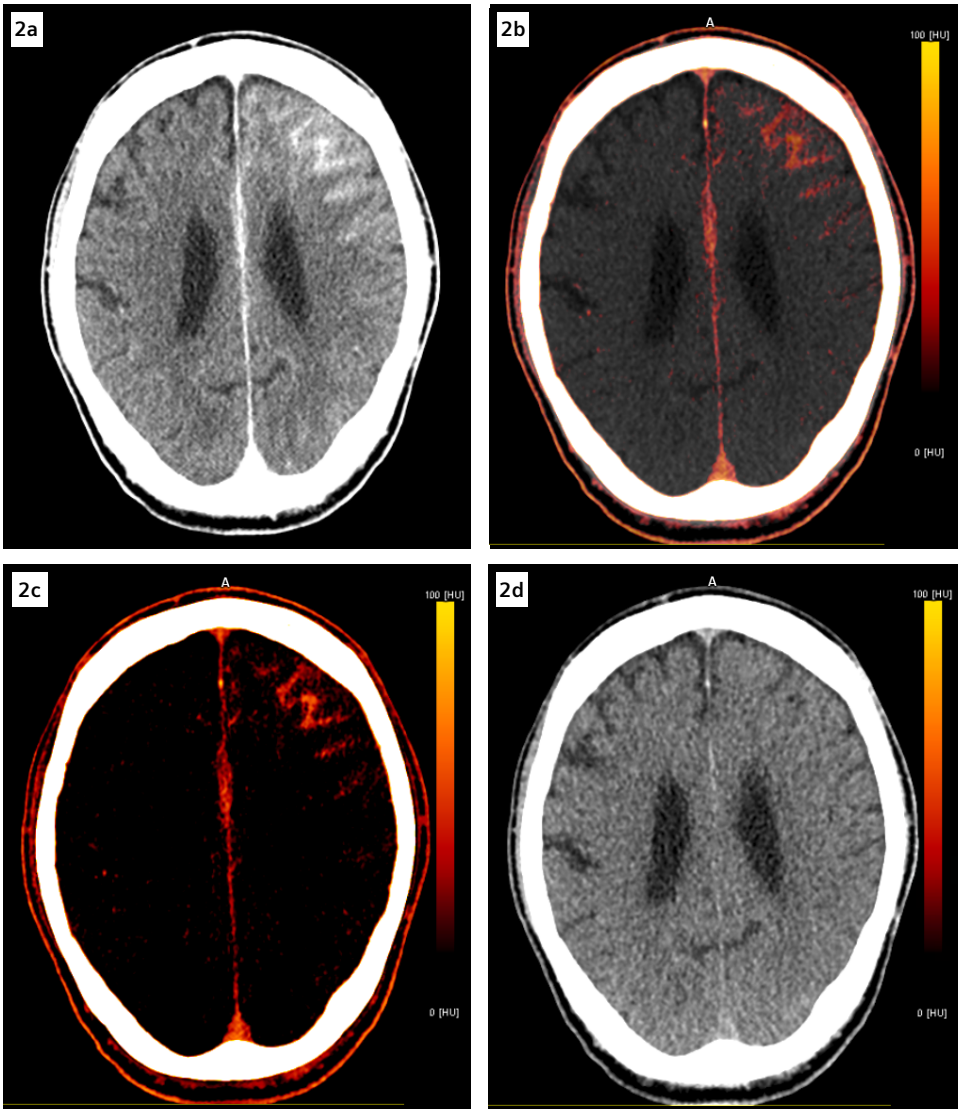
Scanner	SOMATOM Drive
Scan area	Brain
Scan mode	Dual Energy
Scan length	149.1 mm
Scan direction	Caudo-cranial
Scan time	8.9 s
Tube voltage	80 kV / Sn140 kV

Effective mAs	301 / 155 mAs
Dose modulation	CARE Dose4D
$CTDI_{vol}$	27.7 mGy
DLP	453.8 mGy*cm
Rotation time	0.5 s
Pitch	0.7

Slice collimation	40 × 0.6 mm
Slice width	1.0 mm
Reconstruction increment	0.3 mm
Reconstruction kernel	Qr40



1 Curved MPR images show a severe stenosis caused by calcified plaques in the mid LICA (Fig. 1a, arrow). The implemented stent is patent (Fig. 1b).



2 Hyperdensities in the left subarachnoid and frontoparietal cortex are seen in the mixed image (Fig. 2a), VNC/iodine overlay image (Fig. 2b), and iodine map (Fig. 2c), however, not in the VNC image (Fig. 2d), indicating a contrast stagnation.

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