Pediatric Craniopharyngioma Encasing the Cerebral Segment of the Internal Carotid Artery

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History

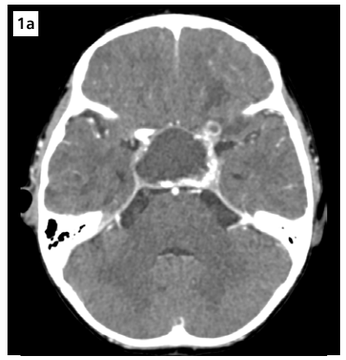
An 8-year-old boy, suffering from recurrent headaches and dizziness, was presented to the hospital for a checkup. The headaches had been progressive over the past 3 years and were accompanied by gradual vision loss in the left eye within the past six months. A native CT scan was performed, followed by a Dual Energy (DE) CT angiography (CTA) for further evaluation.

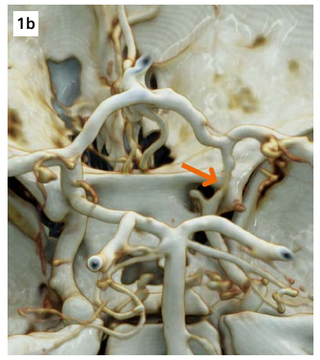
Diagnosis

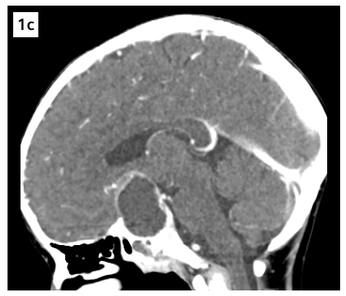
A mixed solid and cystic mass, with calcification and rim enhancement, was shown in the suprasellar and intrasellar area. The mass extended inferiorly to the left, causing encasement and severe stenosis of the C1 segment of the left internal carotid artery (ICA). The left posterior communicating artery (PCA) was not seen. There were no signs of ventricle involvement or hydrocephalus. A craniopharyngioma was suspected and surgery was subsequently scheduled.

Comments

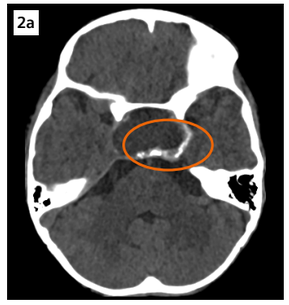
A craniopharyngioma is a benign, extra-axial, slow-growing tumor that predominantly involves the sella and the suprasellar space. The imaging hallmarks are calcification and cyst formation. CT is more specific and superior in the visualization, although MRI is considered to offer more accurate assessment of tumor extension. DE CT acquires the attenuation measurements from two different kV settings simultaneously and calculates a so-called "hard plaque" image in which enhanced vessels can be differentiated from calcifications. This allows the visualization of the calcification in a contrast scan. The bony structures, which obscure the vasculature, can be removed using *syngo*.CT DE Direct Angio in an automated workflow. Here, the 3D perspectives of the tumor are better demonstrated in relation to the Circle of Willis, using cinematic volume rendering technique (cVRT). This provides improved depth and shape perceptions. ●

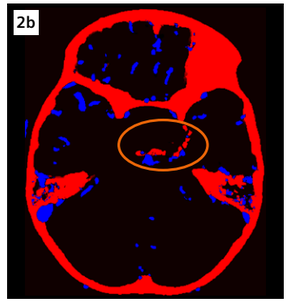






1 **MPR images (1 mm; Fig. 1a, axial; Fig. 1c, sagittal; Fig. 1d, coronal) show a mixed solid and cystic mass with calcification and rim enhancement in the suprasellar and intrasellar area. The mass extended inferiorly to the left, encasing the C1 segment of the ICA. The resulting severe stenosis (arrow) is better seen in the cVRT image (Fig. 1b). The left PCA is not present.**





2 **An axial noncontrast image (Fig. 2a) and a DE hard plaque image (Fig. 2b) demonstrate the corresponding calcifications of the tumor. The calcifications are color coded in red and the enhanced vessels in blue in the hard plaque image.**

3 **3D posterior view of the arteries above the aortic arch with bony structures removed. The spatial perspectives of the tumor and the Circle of Willis are clearly demonstrated in cVRT images.**

Examination Protocol

Scanner	SOMATOM Force		
Scan area	Head and Neck	**Rotation time**	0.25 s
Scan mode	Dual Source Dual Energy	**Pitch**	0.7
Scan length	271.6 mm	**Slice collimation**	192 × 0.6 mm
Scan direction	Caudo-cranial	**Slice width**	1.0 mm
Scan time	1.7 s	**Reconstruction increment**	0.7 mm
Tube voltage	90 / Sn150 kV	**Reconstruction kernel**	Qr40 (ADMIRE 3)
Effective mAs	68 / 53 mAs	**Contrast**	370 mg/mL
Dose modulation	CARE Dose4D	**Volume**	15 mL + 20 mL saline
$CTDI_{vol}$	3.54 mGy	**Flow rate**	2.5 mL/s
DLP	113 mGy cm	**Start delay**	Bolus tracking with 80 HU at aortic arch + 3s

The outcomes by Siemens Healthineers customers described herein are based on results that were achieved in the customer's unique setting. Since there is no "typical" hospital and many variables exist (e.g., hospital size, case mix, level of IT adoption), there can be no guarantee that other customers will achieve the same results.

In clinical practice, the use of ADMIRE may reduce CT patient dose depending on the clinical task, patient size, anatomical location, and clinical practice. A consultation with a radiologist and a physicist should be made to determine the appropriate dose to obtain diagnostic image quality for the particular clinical task.