Case 5

Diagnosis of an Aneurysm and an Arteriovenous Malformation using CTA

By N. Tjongarero, FcRAD. Diag., SA.

Department of Radiology, Welwitschia Hospital, Walvis Bay, Namibia

History

A 51-year-old male patient, complaining of a first episode of convulsions, generalized convulsions, and severe headaches after convulsions, was referred for a cerebral CT scan. The result of a native CT scan suggested a subarachnoid hemorrhage, featuring a ruptured ANCOM aneurysm. A cerebral CT angiography (CTA) was performed for further investigation.

Diagnosis

CTA images showed an aneurysm arising from the anterior communicating artery (Fig. 1), as well as a large arteriovenous malformation (AVM) nidus with enlarged arterial feeders and
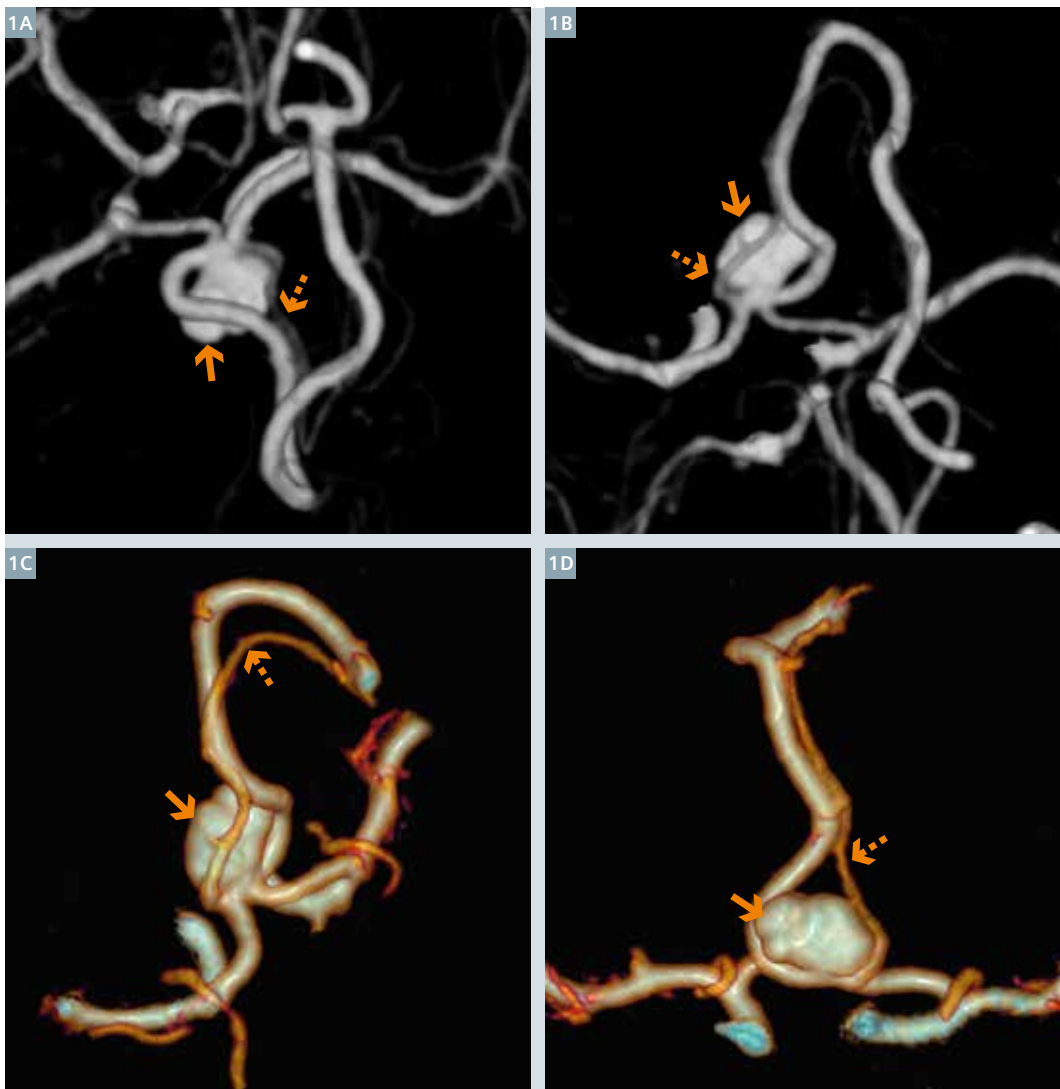
1 VRT images from different views show an aneurysm (arrows) arising from the anterior communicating artery, whereas the right ACA (dashed arrows) appears to be smaller in caliber.

dilated draining veins. The AVM was located para-midline in the right posterior parietal area (Fig. 2). The aneurysm measured 10.4 (AP) × 12.4 (TRV) × 9.2 (CC) mm in size and the right anterior cerebral artery (ACA) appeared to be relatively smaller in caliber. The arterial feeders of the AVM seemed to originate bilaterally from the posterior communicating arteries (PCA) and the superior cerebellar arteries (SCA). The draining veins appeared to be the posterior parietal cortical veins (PPCV) and the straight sinus (SS).

CTA confirmed a right ANCOM aneurysm as well as a right posterior parietal AVM. The aneurysm was the most likely cause of the extensive subarachnoid hemorrhage with intra-ventricular extension. An urgent neurosurgical referral was recommended.

Comments

The diagnosis of the cerebral aneurysm relied on the CTA as there were no facilities for conventional DSA at this site. Three-dimensional demonstration of the cerebral vascular structures provided morphological information, such as the relationship between the aneurysm and the surrounding brain tissue, the bony landmarks and the feeding and draining vessels of the AVM, and was critical for treatment planning. ■
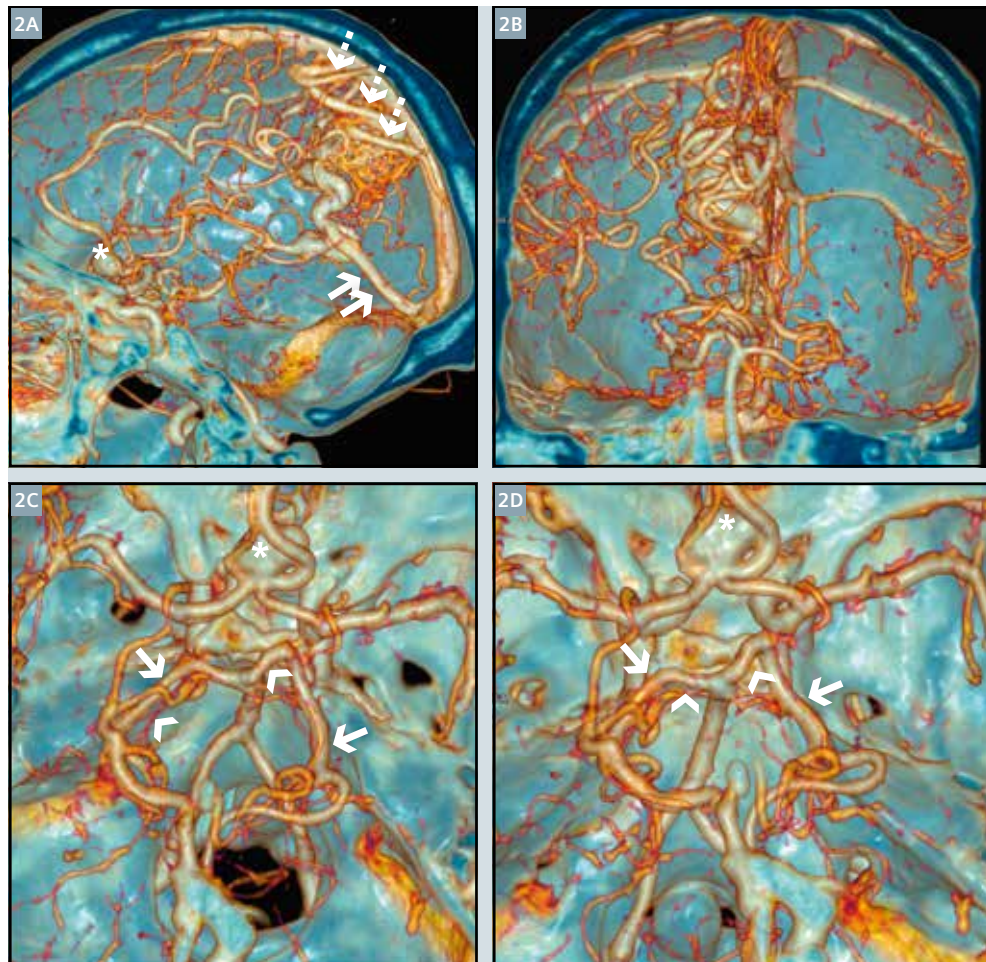
2 VRT images demonstrate a sagittal (Fig. 2A) and a coronal (Fig. 2B) overview of the cerebral vascular system, with zoomed views (Figs. 2C and 2D) showing the arterial feeders from bilateral PCA (arrows) and SCA (arrowheads), and the draining veins from the PPCV (dashed arrows) and the SS (double arrows). The aneurysm is also shown (asterisk).

Examination Protocol

Scanner	SOMATOM Scope		
Scan area	Head	Rotation time	1 s
Scan length	165 mm	Pitch	1.5
Scan direction	Caudo-cranial	Slice collimation	16 × 0.6 mm
Scan time	11.48 s	Slice width	1 mm
Tube voltage	110 kV	Reconstruction increment	0.5 mm
Tube current	80 eff. mAs	Reconstruction kernel	H30s
Dose modulation	CARE Dose4D	**Contrast**	
$CTDI_{vol}$	12.68 mGy	Volume	100 mL
DLP	240.92 mGy cm	Flow rate	5 mL/s
Effective dose	0.5 mSv	Start delay	Bolus tracking + 4 s