See the Flow Pattern in 3D
Supported by *syngo* Dyna4D*

Courtesy of Azam Ahmed, MD, David Niemann, MD, Beverly Aagaard-Kienitz, MD, and Charles Strother, MD

University of Wisconsin, Madison, USA

Patient History

48-year-old female with acute right parietal hemorrhage and acute right fronto-parietal sub-dural hematoma.

Diagnosis

Large parietal arteriovenous malformation (AVM).

Treatment

After evacuation of the sub-dural and parietal hematoma, a DSA was performed (Fig. 1). This revealed a complex AVM with supply from the right-middle and anterior cerebral arteries, and the right-posterior cerebral arteries. This diagnosis had been improved by 4D DSA (*syngo* Dyna4D). Treatment included successful embolization and subsequent resection of the AVM.

Comments

4D DSA (*syngo* Dyna4D) was very useful in allowing clear visualization of the internal features of the nidus of this AVM (Fig. 2). Seeing just how the feeding arteries entered the nidus, the way venous drainage exited from the nidus, and the presence of intra-nidal aneurysms supported the strategy decision for embolization and the positioning of the patient for surgical excision of the lesion. A small flow-related aneurysm was noted on the proximal portion of the right-posterior cerebral artery. A small cortical artery was incorporated into this aneurysm. This was more clearly seen with *syngo* Dyna4D than with the other DSA studies (Fig. 3).

This case is an excellent example of how the ability to see any view of an abnormality at any time of its opacification adds value to the care of patients with such complex vascular diseases. This new technology allows for a more tailored treatment planning to the individual patient.

Protocol

Contrast amount:
18 cc, injection rate: 3 cc/s,
X-ray delay: 0 s, no contrast dilution (100 % Omnipaque 350)

"It is already apparent that this technology (syngo Dyna4D) will translate into fewer X-rays and therefore less radiation exposure for the patient, but also into lower costs."

Charles Strother, MD,
University of Wisconsin, Madison, USA

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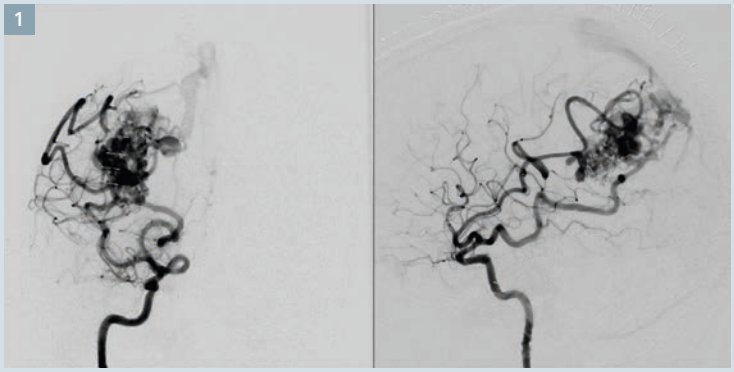
Charles Strother, MD, who has treated countless patients in a clinical career spanning more than 45 years, is one of the world's leading experts in interventional neuroradiology. He has researched and invented numerous successful treatment methods and technologies. The latest one is *syngo* Dyna4D, which he developed in cooperation with Siemens, realizing that 3D modeling with the contrast medium flowing through the vessel should also include temporal information in the interventional image dataset.

Dr. Strother is an Emeritus Professor at the University of Wisconsin School of Medicine and Public Health in Madison. In 2014, he was the recipient of the ASNR Foundation Outstanding Contributions in Research Award. As an expert in interventional neuroradiology, including stroke, Dr. Strother is the author of four books and more than 150 scientific publications, including some of the most frequently cited publications in this discipline.

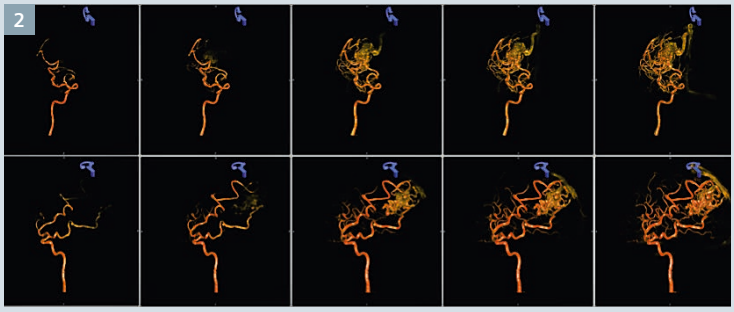
*Artis with PURE® is pending 510 (k) clearance, and is not yet commercially available in the United States or other countries.

"This case confirmed the new 4D technique has better spatial and temporal resolution than any other imaging modality. It is an excellent example of how the ability to see any view of an abnormality at any time of its opacification adds value to the care of patients with such complex vascular diseases."

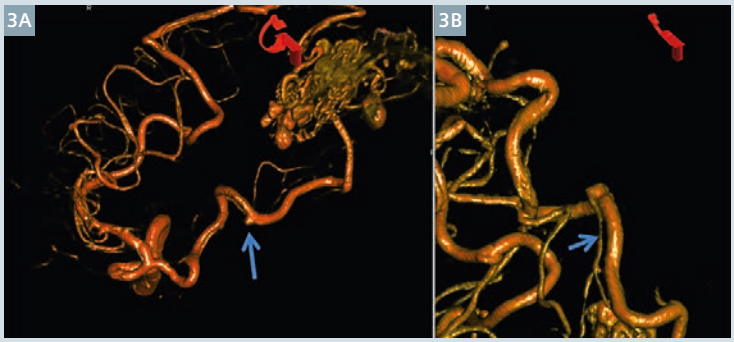
Beverly Aagaard-Kienitz, MD,
University of Wisconsin, Madison, USA



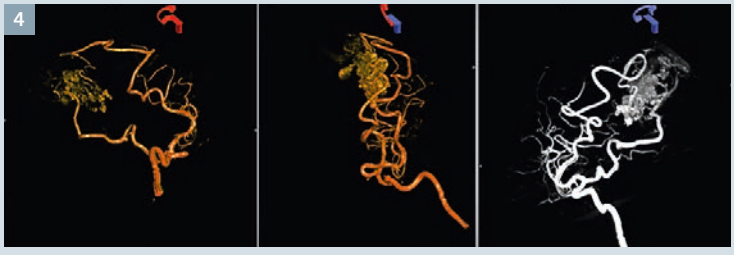
1 2D DSA images showing the angioarchitecture of the AVM.



2 Time-resolved 4D DSA (*syngo* Dyna4D) from AP and lateral views.



3 Early 4D DSA (*syngo* Dyna4D) time frame highlighting the small flow-related aneurysm (3A) and the small cortical artery emerging from the aneurysm (3B). Please note that these projection views are not possible with conventional 2D DSA.



4 The flexibility of 4D DSA (*syngo* Dyna4D) allows for visualization of any time point at any view angle for optimal visualization of the AVM nidus, feeding arteries, and draining veins. Visualization can be enhanced with volume rendering (VRT) or maximum intensity projection (MIP) rendering.