Study Protocol

Flow diverter stenting of large intracranial aneurysm

Neuro Interventions

The *syngo* Dyna4D clearly showed how slow the inflow of blood into the aneurysmal structure had become after flow diverter placement, confirming the expected effect.

Courtesy of
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Supported by
syngo Dyna4D
syngo DynaCT Micro

System & Software
Artis Q biplane VD11,
syngo X Workplace VD10

Case Description

Patient history
60-year-old male patient with large intracranial aneurys

Diagnosis
Large intracranial aneurysm located in the cavernous segment of the internal carotid artery. The diameter of the aneurysm at its largest point was 17 mm.

Treatment
A flow diverter (Covidien Pipeline®) was inserted under general anesthesia according to the general guidelines for flow diverter (FD) treatment in Japan. After initial deployment of the flow diverter, the following 3D acquisitions were performed:

A native 20 s DynaCT Micro run in zoom 3 (22 cm) to visualize the metal implant (flow diverter) followed by a 6 s Dyna4D run to obtain information about the vessels' architecture and the flow dynamics. A secondary reconstruction of the DynaCT Micro run was performed, then this volume was fused with the Dyna4D volume.

Based on these images, the physicians concluded that the apposition of the FD to the vessel wall was sub-optimal (see red arrows in the following image) and could lead to thrombo-embolic events in the future. Therefore, they returned and performed a post-dilatation of the flow diverter, followed by a second DynaCT Micro run.

The post-dilatation *syngo* DynaCT image was then fused with the available Dyna4D volume (since the patient was under general anesthesia, it was assumed, observed, and confirmed that there was no head motion between the scans).

By displaying the images side by side, the physicians were able to clearly see the achieved improvement in stent apposition:

The *syngo* Dyna4D clearly showed how slow the inflow of blood into the aneurysmal structure had become, confirming the expected effect.

Tips & Tricks
Perform a secondary reconstruction of the DynaCT Micro run with "Sharp" image characteristics to improve visibility of stent struts.

General comments
The physicians were impressed by the image quality, the level of detail achieved, and the accuracy of the fusion functionality. The case was very successful, and the physicians unanimously emphasized that the imaging capabilities of the Artis Q system with the PURE® platform enabled them to better visualize the vessels and the device during the procedure and to significantly improve their treatment decisions and outcome.

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First and second DynaCT Micro run

Acquisition protocol	20s DCT Head Micro	

Injection protocol

Contrast medium (CM)	248	n/a

Reconstructions	Primary	Secondary
Name	DynaCT Head Micro	DynaCT Head Micro
VOI size	Full	Full
Slice matrix	512 × 512	512 × 512
Kernel type	HU	HU
Image characteristics	Normal	Sharp
Reconstruction mode	Nat fill	Nat fill
Viewing preset	DynaCT Head	DynaCT Hea

Acquisition protocol	6s DSA Dyna4D Head

Injection protocol

Contrast medium (CM)	270 mg iodine/mL
Dilution	No
Injection volume	18 mL
Power injector used	Yes
Injection rate	3 mL/s
Duration of injection	6 s
X-ray delay	0 s
Catheter position	Internal carotid artery

| Reconstructions	Primary
Name	Dyna4D Sub4D
VOI size	Full
Slice matrix	512 × 512
Kernel type	HU
Image characteristics	Auto
Reconstruction mode	Sub
Viewing preset	Dyna4D

Clinical Images
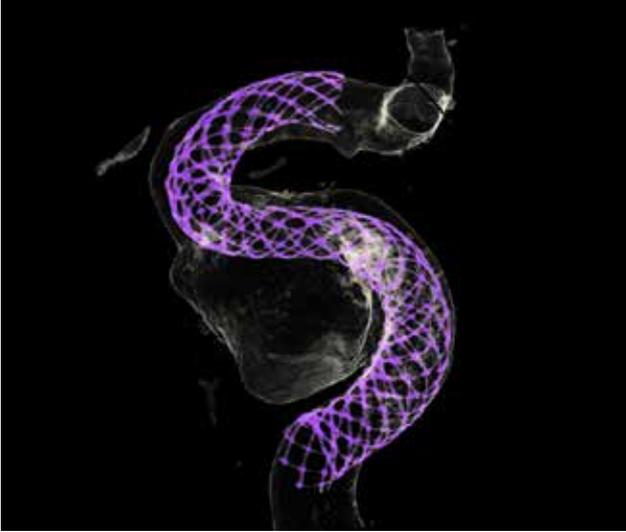
Figure 1: Fused visualization of secondary reconstruction of first DynaCT Micro run with Dyna4D run
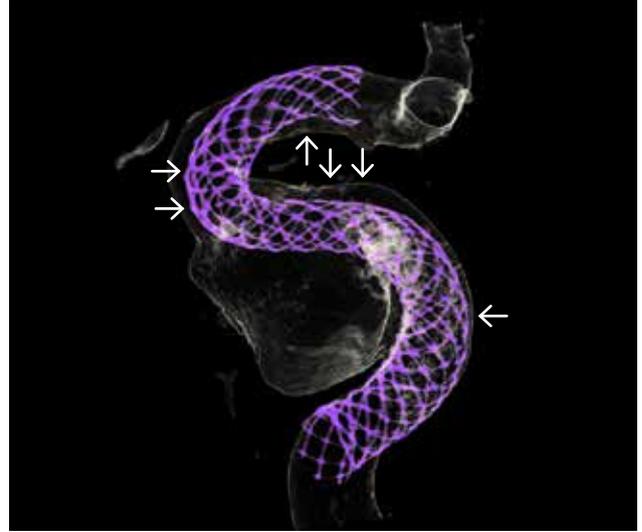

Figure 2: Sub-optimal apposition of FD to the vessel wall (white arrows)
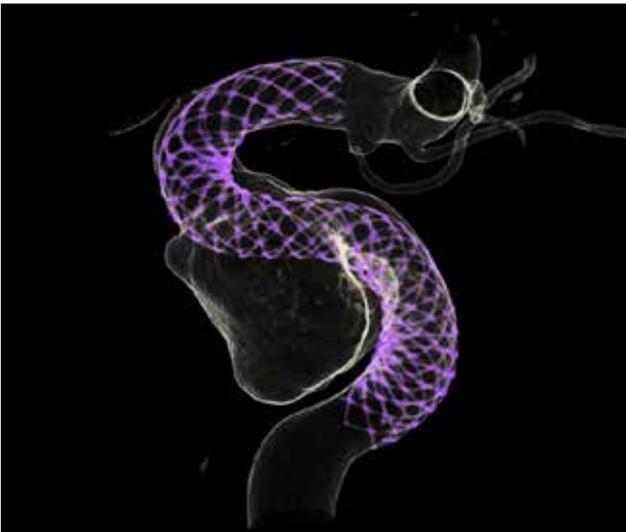
Figure 3: After post-dilatation
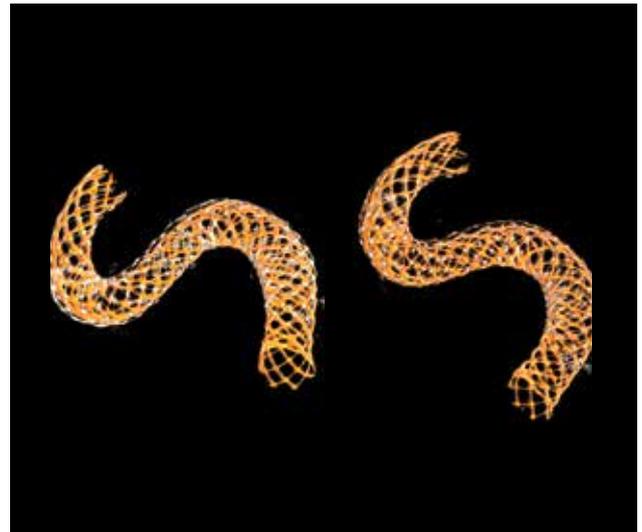
Figure 4: Before post-dilatation in orange, after in white, withmeasurements showing the shortening and the differences in wall location

Clinical Images

Figure 1: VRT time ranges. Dyna4D volume fused with DynaCT Micro volume, before post-dilatation

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