Case Report: Conjoined Twins Evaluation Using *syngo* TWIST and *syngo* Diffusion Tensor Imaging

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### Patient history
11-month-old* craniopagus conjoint twins were referred for evaluation of venous anatomy to plan separation surgery. Repeated MR examinations were undertaken to plan the surgery and MR venography using *syngo* TWIST enabled surgeons to study the results of embolization and surgical venous occlusion.

### Sequence details
The patients were placed in a partial left decubitus position on the scan table of our MAGNETOM Trio, A Tim System. The decubitus position was necessary due to congestive cardiac failure brought about by twin–twin circulation. The Body Matrix coil was used as it provided a balance between signal-to-noise ratio (SNR), the availability of integrated Parallel Acquisition Techniques (iPAT) and the volume of interest. 3D MPRAGE (TR 1900 ms, TE 2.6 ms, TI 900 ms, Flip angle 9°, FOV 270 mm, PAT factor 2, 320 x 90 %, 60 % phase oversampling) isotropic 0.9 mm resolution was initially performed to aide with pre-
1:1 3D plastic model to provide an anatomical depiction of the venous sinus and the sculls of the twins.
scribing T2-weighted imaging planes. The 3D data was loaded into the 3D card and true anatomical planes (axial, coronal and sagittal) were identified and image stamps saved that were then imported into the Exam card. These image stamps were used to copy the image position to define the imaging planes for the anatomical acquisitions. T2-weighted Turbo Spin Echo (TSE) data sets were obtained in three planes (TR 5000 ms, TE 144 ms, 2 Acquisitions, spatial resolution 0.6 x 0.5 x 3.5 mm. syngo DTI acquisition was performed using TR 10460 ms, TE 90 ms, B = 1000, 

1 To aid with sequence planning in this complex case and to identify the true anatomical planes for both twins, a 3D MPRAGE measurement was performed initially and loaded into the 3D task card. The true anatomical planes could then easily be identified and used for further planning of 2D MR imaging.
spatial resolution of 2.2 x 2.2 x 2 mm, 60 directions, PAT factor 2, FOV 280 mm, 80 slices.
synogo TWIST imaging to evaluate the twin-twin venous connection was performed. Each twin was injected separately. TR 2.56 ms, TE 0.95 ms, spatial resolution 1.2 x 0.8 x 1.2 mm (FOV 320, 384 x 70%), slice resolution 64%, PAT factor 4, 20 measurements, virtual temporal resolution 2.29 sec, synogo TWIST sampling central A = 33% peripheral B 50%. TWIST images show clearly the communicating vein between the twins. These images proved to be

4A 4B 4C 4D

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useful in guiding the partial embolization and the following ligation process.

**Comments**
The use of syngo TWIST aided the surgical planning (4D InSpace) because it could be viewed as individual 3D volumes or as a dynamic 4D model. Data was used to generate a 3D physical model to plan subsequent surgeries. The neuroradiologists and neurosurgeon found the TWIST acquisitions more beneficial in planning surgery.

* The safety of imaging fetuses/infants has not been established.