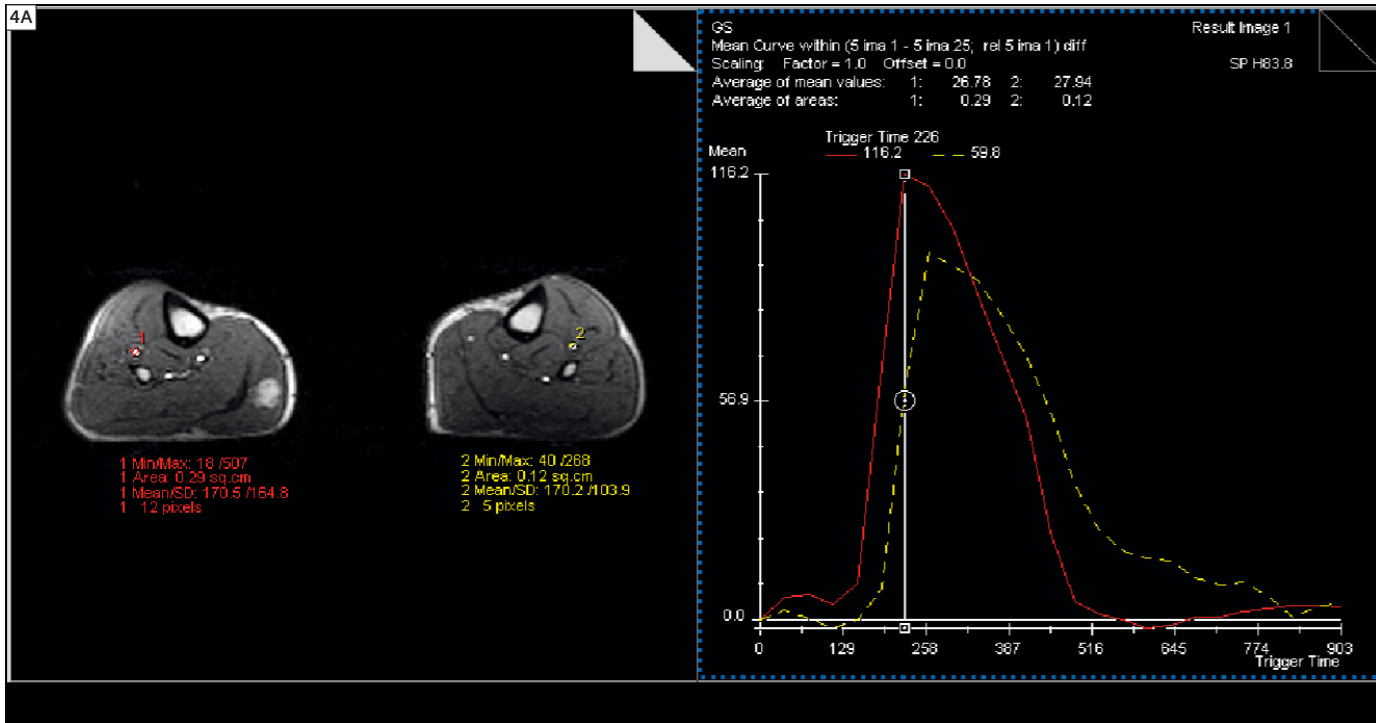




3 syngo Native TrueFISP performed in an arteriopath patient with bilateral renal artery stenosis. (Courtesy of Dr. G. Houston, S. Gandy, Ninewells Hospital, Dundee, Scotland)



4 Cross sectional cine imaging in the region of interest allows determination of times of maximal and minimal flow within the cardiac cycle. This information can also be useful in determining the presence of asymmetric flow or complete absence of pulsatility which would decrease the likelihood of successful visualization of the vessel in this area.

4B

1.6 4.0 [s]

NATIVE 3D Mode

TT min flow 0 ms

TT peak flow 300 ms

Measurements 2

is very similar to current angiographic techniques. Typical scan times are around three to four minutes per anatomical location (depending on heart rate). Success with *syngo* Native SPACE depends on the accurate identification of the fast and slow flow times in relation to the trigger source (typically ECG is used). This is easily achieved with a simple cine FLASH sequence which is performed with the slice oriented perpendicular to the flow direction. Evaluation of this in "Mean Curve" allows precise detection of the fast and slow flow periods which can be used directly as input into the trigger delay times for fast and slow flow (Fig. 4).

The contrast generating mechanism, therefore, depends on the maintenance of a degree of pulsatility in the vessel of interest – if this disappears or is significantly attenuated the method may be challenging. However it seems that in many cases of chronic ischemic disease pulsatility is maintained to a sufficient degree, even in collateral vessels, to generate sufficient contrast. It should be kept in mind that there may be cases where the pulsatility which this technique relies on may not be present – in which case the visualization of the vessel of interest may not be possible.

Summary

syngo Native SPACE and *syngo* Native TrueFISP are complimentary methods for MR angiography. Native SPACE being more appropriate in areas where large fields of view are required and where the area of interest is stationary (to accommodate the subtraction necessary for this method). Native TrueFISP is more suited to imaging of abdominal vessels where the integration of respiratory and cardiac synchronization can be of benefit. Native TrueFISP is a targeted method where the vascular anatomy which is demonstrable is determined by the volume of blood entering the prepared territory whereas Native SPACE requires pulsatility in the vessel to visualize it. An understanding of the basic contrast mechanisms will enable appropriate choice of sequence and appropriate choice of scan parameters to produce optimal image quality.



5 Maximum intensity projection of composed three-station study. Typical achievable resolution is 0.9 x 0.9 x 1.5 mm with scan times around three to four minutes per station, depending upon heart rate.

References

- 1 Non-Contrast Enhanced Renal MR Angiography Using NATIVE TrueFISP: Initial Experience for Clinical Imaging of Patients with Renovascular Disease <<http://cds.ismrm.org/protected/09Presentations/404/>>. S Gandy et al Oral Presentation 404, ISMRM 2009. Hawaii.
- 2 Renal transplant: nonenhanced renal MR angiography with magnetization-prepared steady-state free precession. Liu et al. Radiology. 2009 May;251(2):535-42.

Contact

Peter Weale
Siemens Medical Solutions USA, Inc.
Cardiovascular Research and Development
737 N Michigan Ave.
STE 1600
Chicago, IL 60611USA
peter.weale@siemens.com