was used to predict the probability for the presence of a stenosis per graft type using multiple MRA variables followed by receiver-operator-characteristics (ROC) analysis to assess the sensitivity and specificity of MRA.

Results: The sensitivity(90% CI) / specificity(90% CI) of MRA in detecting single vein grafts with a stenosis >=50% and with a stenosis >70% was 94% (90-98)/63% (48-79) and 98% (97-100)/98% (94-100) respectively with ROC-areas(95% CI) of 0.883 (0.82-0.97) and 0.996 (0.985-1.00). In sequential vein grafts these values were 91% (97-98)/99% (97-100) and 94% (83-100) / 91% (52-89) respectively with ROC-areas of 0.87 (0.75-1.00) and 0.88 (0.77-0.99). Similar ROC-areas were obtained in arterial grafts.

Conclusions: The presented MRA protocol accurately identifies grafts with moderate or severe stenosis. This approach allows noninvasive detection of graft stenosis in patients who present with recurrent chest pain after CABG in an outpatient setting prior to an invasive diagnosis.

1071-50 Noninvasive Detection of Internal Carotid Artery Stenosis: A Head-to-Head Comparison Between Ultrasonography and Magnetic Resonance Angiography

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Background: Color Doppler Ultrasonography (CDUS) and 3D-enhanced magnetic resonance angiography are non-invasive techniques for detecting internal carotid artery (ICA) stenosis. High 2D-echo image resolution and high operator expertise for CDUS, and contrast enhancement magnetic resonance angiography technique with 3D reconstruction postprocessing made both techniques competitive with digital subtraction angiography (DSA).

Aim of the study: to compare CDUS and CEMRA, both at the state of the art techniques, with DSA for detecting and grading severity of ICA stenosis.

Methods: 50 ICA of 25 pts (20 Males, 57±8 years) were evaluated. Patients underwent CDUS, CEMRA and DSA in different days and within 30 days of each other. ICA stenosis severity was graded as follows: moderate (40-70%) and severe (>70%) to 100%). The results obtained by each technique were reported blind.

Results: 36 ICA stenosis were detected with DSA. Of these, 16 were moderate (42%, 95% CI 68-59, 22 severe (58%, 95% CI 40-79). Similarly, specificity and diagnostic accuracy were 100%, 91.6% and 98% for CEMRA and 94.7 (p=0.55 vs CDUS) and 25 severe (64%, 95% CI 47 to 79, p=ns vs DSA and CEMRA) and 20 severe (54%, 95% CI 37 to 70, p=ns vs DSA).

Conclusions: CDUS and CEMRA have similar diagnostic accuracy in the detection of ICA stenosis with CDUS having a tendency to understate and CEMRA to overestimate ICA stenosis severity.

1071-51 Real-Time MRI Angioplasty Using Intravascular GuideWires Collars

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Background: Direct MRI-guided cardiovascular intervention entails compromises between spatial and temporal resolution. Intravascular guidewires (IVGC) may visualize more distal branches, motion-insensitivity, and ability to perform multiple low-flux volumes within the stent lumen showed pulmonary regurgitant flow (31.9±3.4%) in the animal with the stent placed across the pulmonary valve, but not in animals with a stent placed distal to the pulmonary valve. No complication of the interventional procedure such as stent migration or aneurysms was noted. Position and morphology of the stents were confirmed with x-ray angiography.

RESULTS: The results of the study show that MRI can guide stent placement in the pulmonary position. Immediate postinterventional evaluation of the stents was possible using bFFE and VEC MRI. The advantage of this new technique is that it provides simultaneous information about the anatomy and physiology of the pulmonary system before and after deployment of the stents.

1071-52 Magnetic Resonance Imaging Guided Deployment and Postinterventional Assessment of Endovascular Stents in the Pulmonary Position in Swine


BACKGROUND: MRI has been used for quantification of pulmonary flow in patients with pulmonary stenosis (PS) and insufficiency (PI). Recently, endovascular and valved stents have gained wide acceptance in treatment of PS and PI. The aim of the study was to use MRI (1) to guide stent placement in the pulmonary position, and (2) to assess stent morphology and blood flow within the stent lumen after placement.

METHODS: The study was performed in a laboratory consisting of a x-ray angiography and a 1.5T short bore MRI unit. In 5 pigs related stents were placed in the pulmonary position using MRI guidance. Image acquisition was performed with a balanced Fast Field Echo (BFFE) and a T1 weighted Turbo Field Echo sequence, which were partially ECG gated. Tracking of the interventional instruments was based on susceptibility and catheters dipped with 1% Gadolinium solution. After stent deployment the morphology of the stent and pulmonary artery were assessed using multiplanar bFFE. Blood flow volume within the lumen of the stents were measured using velocity encoded cine (VEC) MRI. The results of the MRI guided intervention were validated with x-ray angiography.

RESULTS: Stent deployment was successful in all animals. In one animal the stent was placed across and in four animals 1-5 mm distal to the pulmonary valve. Measurements of blood flow volumes within the stent lumen showed pulmonary regurgitant flow (31.9±3.4%) in the animal with the stent placed across the pulmonary valve, but not in animals with a stent placed distal to the pulmonary valve. No complications of the interventional procedure such as stent migration or aneurysms was noted. Position and morphology of the stents were confirmed with x-ray angiography.

CONCLUSION: The results of the study show that MRI can guide stent placement in the pulmonary position. Immediate postinterventional evaluation of the stents was possible using bFFE and VEC MRI. The advantage of this new technique is that it provides simultaneous information about the anatomy and physiology of the pulmonary system before and after deployment of the stent.

1071-57 Intravascular GuideWires Collar Facilitated Invasive Real-Time Magnetic Resonance Angiography

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Background: Real-time MRI (rMRI) vascular intervention will require angiography. We report feasibility of invasive rMRI catheter-tracking and selective gadolinium (Gd) MR angiography (rSMRA) facilitated by an intravascular guidewire collar (IVGC).

Methods: Gd and MRA were performed using a GE 1.5T scanner and custom reconstruction engine, surface coils and in-room consoles. In 5 pig larynges, a loopless 0.95 IVGC (Surgi-Vision, Gaithersburg, MD) was directed percutaneously using the interventional instruments were based on susceptibility and catheters dipped with 1% Gadolinium solution. Tandem IVGC catheter movement permitted non-roadmapped navigation at 4-5 frames/s and 1.25x1.67mm resolution. Coronary, renal, mesenteric, and iliac arteries were engaged, and rSMRA conducted using 30mM Gd hand-injections, saturation-preparation, Cartesian and projection-reconstruction gradient echo sequences.

Results: Gd enabled rMRI navigation and selective engagement. 2nd and 3rd branches were delineated as were peripheral and venous phases. Proximal coronaries were engaged and visualized but mid and distal vessels were not of diagnostic quality. Conclusions: Tandem catheter movement with an IVGC facilitates accurate navigation and selective arteriography under rMRI. Advantages of rSMRA over non-Invasive MRA include: time-resolved imaging, absence of venous and parenchymal overlap, ability to visualize more distal branches, motion-innsensitivity, and ability to perform multiple low-flux contrast injections.