FIRST-PASS WHOLE-BODY MAGNETIC RESONANCE ANGIOGRAPHY AT 3T WITH THE BLOOD-POOL CONTRAST AGENT GADOFOSVESET AND THE EXTRACELLULAR CONTRAST AGENT GADOTERATE: A RANDOMIZED STUDY.

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Purpose:

To investigate the diagnostic performance of first pass whole-body magnetic resonance angiography (WB-MRA) with the intravascular contrast agent gadofosveset or the extracellular contrast agent gadoterate, using the built-in body coil for signal reception and digital subtraction angiography (DSA) as the gold standard.

Methods and Materials:

16 consecutive patients (7 male, mean age 71 years, range 49-82) with sympthomatic peripheral arterial occlusive disease (PAOD) underwent 3D WB-MRA and DSA. MRA was performed in a 3T system (Acheiva, Philips Medical Systems, The Netherlands) capable of whole-body examinations. Datasets were acquired using a 3D fast gradient echo sequence (Fast Field Echo). Sequence parameters: TR 4 ms, TE 1.3 ms and flip angle 20º. The patients were randomized to WB-MRA with either 0.03 mmol/kg gadofosveset or 0.30 mmol/kg gadoterate. For gadofosveset we used a monophasic injection at a rate of 0.7 ml/s, for gadoterate a biphasic injection of 1.3 ml/s for the first half of the contrast and 0.7 ml/s for the remaining. Contrast injection was followed by a 30 ml saline flush at 0.7 ml/s in all patients.The arterial system was divided into 46 segments for evaluation. The presence of steno-occlusive disease was compared with findings from DSA. The segments were classified as having significant stenosis (≥50% luminal reduction) or no significant stenosis (<50%). Presence or absence of arterial stenosis was evaluated indepently and masked by two readers. Sensitivity and specificity for detection of significant arterial stenosis with WB-MRA were determined for the two readers. Inter reader agreement was calculated using kappa statistics.

Results:

WB-MRA was successfully performed in 12 patients. In 4 patients (gadofosveset n=3, gadoterate n=1), one vessel region could not be evaluated because of bolus/acquisition mistiming. No adverse events occurred.

Sensitivities for detection of significant arterial stenoses with gadofosveset enhanced WB-MRA in the two observers were: 61 and 69%. Specificities were 93 and 81%.

Sensitivities for detection of significant arterial stenoses with gadoterate enhanced WB-MRA in the two observers were: 64 and 64%. Specificities were 74 and 87%. Inter reader agreement was good with kappa: 0.61.

Conclusion:

Gadofosveset and gadoterate enhanced WB-MRA at 3T with body-coil acquisition has a moderate to high sensitivity and specificity for detection of significant arterial stenoses in patients with PAOD.