

## Comparison of image quality and diagnostic accuracy of 0.5 molar gadobenate dimeglumine and 1.0 molar gadobutrol in contrast-enhanced run off MRA of the lower extremities

J. T. Heverhagen<sup>1,2</sup>, M. Achenbach<sup>1</sup>, J. Figiel<sup>1</sup>, C. Weiss<sup>1</sup>, A-C. Stamm<sup>1</sup>, and K. Klose<sup>1</sup>

<sup>1</sup>Department of Diagnostic Radiology, Philipps University, Marburg, Germany, <sup>2</sup>Department of Radiology, The Ohio State University, Columbus, Ohio, United States

**Introduction:** With the advent of NSF, contrast agent dose is an important factor in contrast enhanced MR angiography. The purpose of this study was to compare image quality and diagnostic accuracy of 0.5 molar gadobenate dimeglumine and 1.0 molar gadobutrol in contrast-enhanced run off MRA of the lower extremities.

**Method And Materials:** A total of 74 patients (21 female; 53 male; mean age: 67.0 years) were included in prospective IRB approved trial. All patients underwent run off MRA of the lower extremities for suspected peripheral arterial occlusive disease. Patients were randomized into two groups of 37 patients each. Group A received 0.2 mL/kg bodyweight gadobutrol, group B 0.2 mL/kg bodyweight gadobenate dimeglumine. This emulated clinical routine. Signal to noise ratio (SNR) and contrast to noise ratio was assessed for all depicted vessels. Mean values and standard deviation were compared between the patient groups. Two independent Radiologists evaluated the results for image quality and presence, number and severity of stenoses. Image quality was assessed on a four point scale from 1 excellent to 4 non-diagnostic. In addition, the presence of venous opacification was assessed on a 5 point scale (1: excellent; 2: good; 3: satisfactory; 4: evaluable; 5: inadequate). Severity of stenoses was evaluated on a 5 point scale (1: no stenosis; 2: diameter stenosis below 51%; 3: 51% to 70%; 4: 71% to 99%; 5: occlusion). In addition, stenoses were classified in non-significant (grades 1, 2 and 3) and significant (4 and 5). Interobserver variation as assessed by a Cohen's kappa statistic.

**Results:** SNR and CNR did not show any significant differences between contrast agent groups ( $p > 0.05$ ). Group A (B) demonstrated a mean SNR of  $97.5 \pm 60.8$  ( $85.0 \pm 49.7$ ) and CNR of  $98.7 \pm 55.8$  ( $88.3 \pm 42.7$ ). Median image quality was rated as good from both observers. Observer 1 found 86 significant stenoses, observer 2 found 89. The Cohen's kappa statistic revealed a significant almost complete agreement of 0.83.

**Conclusion:** Application of a single dose gadobenate dimeglumine and a double dose gadobutrol in contrast-enhanced run off MRA of the lower extremities did not show any significant differences in image quality and diagnostic accuracy. Gadolinium dose could be reduced without a loss of image quality or diagnostic accuracy by the application of a single dose of gadobenate dimeglumine for CE run off MRA of the lower extremities.



**Figure 1:** Run off CE MRA in two patients with suspected paod with gadobutrol (left) and gadobenate dimeglumine (right).