# Multicenter, Intraindividual Comparison of Gadobenate Dimeglumine and Gadopentetate Dimeglumine for MRA of the Peripheral Arteries

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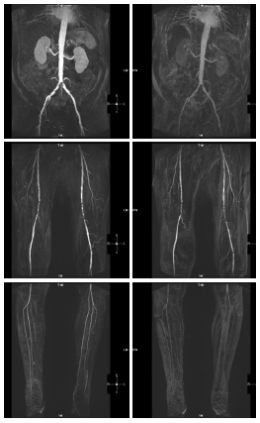
**Purpose:** To intraindividually compare 0.1 mmol/kg bodyweight doses of gadobenate dimeglumine (MultiHance®; Gd-BOPTA) and gadopentetate dimeglumine (Magnevist®; Gd-DTPA) for contrast-enhanced magnetic resonance angiography (CE-MRA) of the peripheral vasculature.

**Materials and Methods:** 96 patients (mean age: 63.7±10.4 years) with peripheral arterial occlusive disease (90% Fontaine's stage of disease IIb, 5% stage III, and 5% stage IV) were enrolled in 7 centers in Europe and underwent 2 identical CE-MRA exams of the peripheral arterial vasculature at 1.5T using 3D spoiled GRE sequences and 0.1 mmol/kg (0.2 ml/kg) doses of Gd-BOPTA or Gd-DTPA. The order of contrast administration was randomized: 52 patients received Gd-BOPTA first and Gd-DTPA second; 44 patients received the agents in reverse order. Initial on-site image assessment was performed for technical adequacy and quality of vessel visualization. Thereafter, 3 independent off-site blinded readers evaluated matched pairs of image sets for vessel anatomical delineation, detection/exclusion of pathology, and global diagnostic preference at 23 arterial segments covering the pelvis, thigh, and calf, along with an assessment of overall global diagnostic preference for all territories combined. The Wilcoxon signed rank test was used to compare data between groups and generalized κ statistics were used to assess interreader agreement. Quantitative contrast enhancement was assessed at each territory in terms of contrast-to-noise ratio (CNR).

**Results:** Of the 96 patients enrolled, 92 received both contrast agents. On-site investigators reported a significantly ($p<0.0001$) lower technical failure rate with Gd-BOPTA (20/564 segments [4%]) compared to Gd-DTPA (67/564 segments [12%]). Similarly, more vascular stations were rated good or excellent with Gd-BOPTA than with Gd-DTPA (87% vs 74%; $p<0.0001$). Off-site blinded readers 1, 2, and 3 reported overall global diagnostic preference for Gd-BOPTA in 75 (82%), 75 (82%), and 70 (76%) patients, respectively, compared with 4 (4%), 7 (8%) and 8 (9%) patients, respectively, for Gd-DTPA ($p\leq0.0001$; all readers). A similar highly significant ($p\leq0.0001$; all evaluations) preference for Gd-BOPTA was expressed by each reader for each qualitative endpoint in each vascular territory. Interreader agreement was good to excellent for each qualitative endpoint in each territory (3-reader agreement for 73% of patients [$\kappa=0.46$] for overall global diagnostic preference). Significantly ($p\leq0.0001$) higher CNR was noted for Gd-BOPTA by each reader in each vascular territory.

**Conclusions:** Gd-BOPTA at 0.1 mmol/kg demonstrated significantly better diagnostic performance compared to an equivalent dose of Gd-DTPA for CE-MRA of the peripheral vasculature.



Gd-BOPTA Gd-DTPA

**Table 1:** Diagnostic Preferences of Off-Site Readers for Qualitative Endpoints*

| Qualitative Endpoint | Reader | Pelvis (n=91) | | Thigh (n=90) | | Calf (n=91) | |
|---|---|---|---|---|---|---|---|
| | | Gd-BOPTA preferred, n (%) | Gd-DTPA preferred, n (%) | Gd-BOPTA preferred, n (%) | Gd-DTPA preferred, n (%) | Gd-BOPTA preferred, n (%) | Gd-DTPA preferred, n (%) |
| Vessel Anatomical Delineation | 1 | 59 (64.8) | 11 (12.1) | 66 (73.3) | 5 (5.6) | 60 (65.9) | 3 (3.3) |
| | 2 | 52 (57.1) | 6 (6.6) | 70 (77.8) | 3 (3.3) | 63 (69.2) | 5 (5.5) |
| | 3 | 61 (67.0) | 6 (6.6) | 75 (83.3) | 8 (8.9) | 62 (68.1) | 8 (8.8) |
| Pathology Delineation/ Exclusion | 1 | 45 (49.5) | 8 (8.8) | 52 (57.8 ) | 1 (1.1) | 49 (53.8) | 0 |
| | 2 | 42 (46.2) | 5 (5.5) | 61 (67.8) | 3 (3.3) | 56 (61.5) | 4 (4.4) |
| | 3 | 43 (47.3) | 6 (6.6) | 60 (66.7) | 6 (6.7) | 55 (60.4) | 7 (7.7) |
| Global Diagnostic Preference | 1 | 58 (63.7) | 11 (12.1) | 65 (72.2) | 3 (3.3) | 61 (67.0) | 0 |
| | 2 | 52 (57.1) | 5 (5.5) | 70 (77.8) | 5 (5.6) | 63 (69.2) | 5 (5.5) |
| | 3 | 61 (67.0) | 7 (7.7) | 71 (78.9) | 8 (8.9) | 57 (62.6) | 11 (12.1) |

*All comparisons were highly statistically significant ($p<0.0001$) in favor of Gd-BOPTA