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Contrast-enhanced MR Imaging of CNS Lesions: Results of a Large Scale Intraindividual Crossover Comparison of Gadobenate Dimeglumine versus Gadopentetate Dimeglumine

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PURPOSE
To compare a 0.1 mmol/kg dose of the higher-relaxivity gadolinium agent gadobenate dimeglumine (Gd-BOPTA) with an equivalent dose of gadopentetate dimeglumine (Gd-DTPA) for enhanced MR imaging of CNS lesions using a multicenter, double-blind, randomized, intra-individual, crossover design.

METHOD AND MATERIALS
151 patients referred for MRI of the brain or spine underwent two MRI examinations at 1.5 T, one enhanced with Gd-BOPTA at 0.1 mmol/kg and the other with Gd-DTPA at the same dose. Contrast injection was performed in a blinded and fully randomized manner with an interval of 2–7 days between administrations. Imaging parameters were identical for the two examinations: pre-dose T1wSE and T2wFSE sequences; an identical T1wSE sequence post-dose (at 3–7 min post-dose, but precisely equivalent post-dose acquisition time for the two examinations in each patient). Images were evaluated by three independent and fully blinded neuroradiologists in terms of diagnostic information (lesion border delineation, definition of disease extent, visualization of lesion internal morphology, lesion contrast enhancement, global diagnostic preference) and quantitative (% lesion enhancement, contrast-to-noise ratio [CNR]) parameters. Preferences were evaluated using scales containing objective image interpretation criteria for the selected endpoints. Between group comparisons were performed (Wilcoxon signed rank test) and inter-reader agreement (weighted kappa statistics) determined.

RESULTS
Out of the 151 patients enrolled, readers 1, 2 and 3 demonstrated global diagnostic information preference for Gd-BOPTA in 75, 89 and 103 patients, respectively, compared with 7, 10 and 6 patients for Gd-DTPA ($p<0.0001$; all readers). Similarly highly significant ($p<0.0001$; all readers, all comparisons) preference for Gd-BOPTA was demonstrated for all individual diagnostic information endpoints, for % lesion enhancement and for CNR. Inter-reader (3-reader) agreement was good for all evaluations (kappa values from 0.43 to 0.57).

CONCLUSION
The higher relaxivity agent, Gd-BOPTA, provides significantly better contrast enhancement and diagnostic information compared to Gd-DTPA at equivalent dose.

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