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Summary of Results

EudraCT number: 2007-000410-37

Full title of the study: Determination of glomerular filtrations rate (GFR) using MR nephrography in patients with chronic kidney disease

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Summary: Determination of glomerular filtration rate (GFR) using plasma disappearance curves requires the injection of a filtration marker and repeated timed blood collections. Gadolinium-containing contrast media are excreted exclusively by glomerular filtration and could provide a novel approach to quantifying GFR using magnetic resonance (MR) imaging.
The aim of this study was to demonstrate the feasibility of measuring GFR by the clearance of gadoliniumcontaining contrast medium in patients with chronic kidney disease (CKD).
Methods: Informed consent was obtained from stable CKD patients in stages 1, 2 or 3 (n=16; 5 women, 11 men; median age 54 years). GFR was measured after a bolus injection of gadobutrol (4 mL, approximately 0.05 mmol/kg) and calculated from the washout of the signal intensity obtained over the liver. The obtained MR-GFR was compared with simultaneously measured plasma clearance of inulin and gadobutrol.
Results: Technical failure occurred in 2 patients. The mean obtained MR-GFR was 71 ± 25 (SD) mL/min per 1.73 m² and agreed well with the mean inulin-GFR (70 ± 24 mL/min per 1.73 m²). Pearson's correlation coefficient was r=0.91. The mean of the paired differences was 1 ± 10 mL/min per 1.73 m² and not significantly different from zero. GFR obtained from gadobutrol plasma clearance also agreed well with inulin-GFR and MR-GFR (r=0.92 and r=0.75, respectively).

Conclusions: We describe a novel method of determining GFR from MR imaging using a low dose of gadobutrol in patients with reduced GFR that enables the absolute quantification of GFR after routine contrast-enhanced MR imaging.
Key words: Gadobutrol, Glomerular filtration rate, Magnetic resonance imaging

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