The Usefulness of Time-Resolved Three-Dimensional Phase-Contrast MRI Using PC-VIPR in Renal Transplantation

Introduction and Objectives: The aim of the study is to analyze the usefulness of a new time-resolved three-dimensional (3D) phase-contrast magnetic resonance (MR) angiography for anatomic and hemodynamic assessment of the parent and implanted renal vessels.
Materials and Methods: A total of 8 patients with renal transplant were assessed with ECG gated phase contrast vastly undersampled isotropic projection reconstruction (PC-VIPR) on Discovery 750 3.0T with phased array torso coil (GEMS). Patients ranged from 26 to 59 years of age, and the interval between transplantation and MR imaging ranged within 6 months. Patients were managed conservatively, remained asymptomatic (with normal laboratory values), and creatinine levels that kept improving postoperatively (Cr levels; 1.0-2.0mg/dl).
Results: MRI using PC-VIPR was successfully acquired in all patients without using any contrast media. Vascular anatomy of parent vessels and implanted renal vessels were depicted in 3D fashion, and their flow measurements were successfully performed at the arbitrary segments. The intraoperative findings concerning the vascular anatomy were well correlated to the reconstructed anatomy with PC-VIPR. Measured renal flow well reflected the laboratory data.
Conclusion: MRI using PC-VIPR can depict vascular morphologies and hemodynamics of the parent and implanted vessels. This completely non-invasive, gadolinium-free method may be useful in detecting surgical complications and acute rejection after renal transplantation.