Evaluation of the Recipient Vessels after Orthotopic Liver Transplantation by Non-Contrast Magnetic Resonance Angiography: a SLEEK sequence

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Introduction

The recipient vessels after orthotopic liver transplantation (OLT) are often evaluated by CT and MRI, but the recipient vessels either may be contaminated by other vessels or may not be presented distinctly due to the individual hemodynamics changes. In addition, Gd or iodine contrast media are applied to CT and MRI for displaying the recipient vessel which may cause nephrogenic systemic fibrosis (NSF) and contrast-induced nephropathy respectively. Therefore, a non-contrast magnetic resonance angiography (NC-MRA) is desirable to develop for presenting the recipient vessels. In this study, we propose a new NC-MRA (Spatial LabEling with multiple invEsion pulses, SLEEK) has the ability to delineate the recipient vessel after OLT.

Methods

The prospective NC-MRA study was performed on 16 OLT recipients (12 males and 4 females; age range 17–52 years). NCE-MRV using SLEEK sequence was carried out on a 1.5 T MR system (EXCITE HD, GE, Healthcare, Waukesha, WI, USA). The SLEEK preparation adopted multiple various transversal broad bands to present hepatic artery (HA), portal vein (PV), hepatic vein (HV), and inferior vena cava (IVC) respectively with an in-flow effect. The schematic picture was present in Fig 1. TI is selected to null the inflow blood signal. Adiabatic SPIR chemical saturation pulse is applied prior to the data acquisition for fat signal saturation. The diagram of the pulse sequence was shown in Figure 2. All postprocessing techniques of anastomosed vessels were evaluated by two experienced radiologists with a joint reading performed in consensus. NC-MRA diagnosis was compared with CE-MRA.

Results

16 OLT recipients include 12 whole liver transplantations, 3 right lobe transplantations and 1 left lobe transplantation. The excellent correlation between NC-MRV and CE-MRA was found in predicting the presence of anastomosed site on HA, PV, HV and IVC. NC-MRA is superior to CE-MRA in displaying the third and fourth order segmental branches of PV and HV in the hepatic parenchyma. NC-MRA revealed abnormal findings in 4 out of 16 recipients, including PV stenosis or thrombosis in 2, HA stenosis in 1 and evidence of celiac hematoma in 1. NC-MRA with SLEEK has the possibility of overestimating the degree of anastomosed vessel stenosis.

Conclusion

NC-MRA using SLEEK may provide a precise assessment of the recipient vessels for OLT recipients. It is feasible for evaluating vascular lesion after OLT.