Journal of Cardiovascular Magnetic Resonance

Meeting abstract

2111 Recent progress on non-contrast-enhanced MRA techniques

Mitsue Miyazaki*[1], Satoshi Sugiura[2], Yoshimori Kassai[2], Hitoshi Kanazawa[2], Nobuyasu Ichinose[2], Yoshio Machida[2], Katsumi Nakamura[3] and Junji Takahashi[4]

Address: [1]Toshiba Medical Research Institute USA, Vernon Hills, IL, USA, [2]Toshiba Medical Systems Corp, Otawara, Japan, [3]Tobata Kyoritsu Hospital, Kita-Kyusyu, Japan and [4]Toranomon Hospital, Tokyo, Japan

* Corresponding author

from 11th Annual SCMR Scientific Sessions
Los Angeles, CA, USA. 1–3 February 2008

Published: 22 October 2008

Journal of Cardiovascular Magnetic Resonance 2008, **10**(Suppl 1):A380 doi:10.1186/1532-429X-10-S1-A380

This abstract is available from: http://jcmr-online.com/content/10/S1/A380

Introduction

Recent relationship of gadolinium contrast material and nephrogenic systemic fibrosis (NSF) has made it essential to have non-contrast MRA examinations. In this paper, original non-contrast MRA techniques were briefly reviewed and new non-contrast MRA techniques are introduced especially for peripheral run-offs and renal arteries.

Purpose

To depict peripheral run-offs and renal arteries using non-contrast MRA techniques.

Methods

All experiments were performed on 1.5-T clinical imagers. A flow-spoiled fresh blood imaging (FS-FBI) technique, ECG-gated 3D partial Fourier FSE, allows separation of arteries from veins by applying appropriate flow spoiling gradient pulses in the read-out (RO) direction. To find suitable ECG delay time, ECG-prep scan, single-slice multiple phases, is applied to acquire single shot images with different ECG delay times. The application of the ECG-prep technique can be used as non-contrast time-resolved MRA like images by acquiring multiple phases across small incremental trigger delay times during the period of steep signal changes from systolic to diastolic phase. The renal artery examinations using non-contrast MRA techniques are a must for patients with renal insufficiency and vascular disease. In order to depict the multiple directional vasculatures of renal arteries, respiratory-gated balanced SSFP with an arterial spin labeling (time-spatial labeling inversion pulse; time-SLIP) technique was applied to gain superior in-flow effect using an axial scan. The marked blood by the time-SLIP traveled from the aorta to renal branches was acquired using balanced SSFP readout. The time-SLIP pulse was optimized to have good contrast between blood and background cortex and medulla. An inferior sat-band pulse was placed to eliminate venous flow.

Results

Both peripheral and renal non-contrast MRA techniques provide good contrast between arterial blood and background signals. FS-FBI depicts arterial blood vessels in multiple stations from iliac to popliteal regions. Time-SLIP using an appropriate TI time allows depiction of branches of renal MRA in details. In addition, non-contrast time-resolved MRA provides delayed in flow information.

Conclusion

Both FS-FBI and Time-SLIP techniques provide useful MRA images within reasonable scan time. Physiological study using non-contrast time-resolved MRA is still under the investigation.