

Meeting abstract

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## 2121 spin-labeled projection MR angiography of the carotid arteries

Koktzoglou Ioannis\*, Wei Li and Robert R Edelman

Address: Evanston Northwestern Healthcare, Evanston, IL, USA

\* Corresponding author

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### Introduction

Magnetic resonance angiographic assessment of the extracranial carotid arteries is typically performed with use of gadolinium-based contrast media. Gadolinium-based contrast media, however, have been shown to be causative of nephrogenic systemic fibrosis [1].

### Purpose

To present an arterial spin-labeling method for rapidly generating projection MR angiograms of the carotid arteries without use of contrast media.

### Methods

This study was approved by our hospital's institutional review board. The imaging method is similar to that described by Sardashti [2] and Edelman [3] and consists of acquiring two images sets that, upon conclusion of the scan, are subtracted. The first image set is acquired after blood upstream of the imaging volume is tagged by an RF pulse, while the second image set is acquired without application of a tagging RF pulse. Subtraction of image sets in the complex domain eliminates background signal and creates a selective arteriogram. Imaging of 7 carotid arteries was performed on a Siemens Avanto 1.5 T scanner with a standard 6-channel head and neck coil. Imaging parameters were: sagittal-oblique slice orientation (parallel to the axis of the carotid bifurcation), single-shot balanced SSFP acquisition with TR/TE = 3.6/1.8 ms, 90 degree flip angle, GRAPPA acceleration factor of 2, 24 × 24 cm field-of-view, 256 × 256 matrix, 35 mm slice thickness, 2.5 sec between acquisition of image sets, 0.9 sec between RF tag and image acquisition, RF tag flip angle = 180

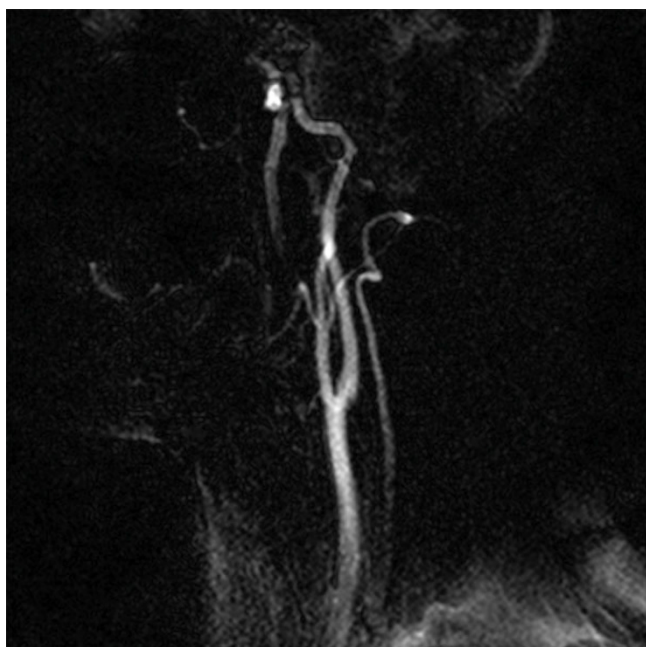
degrees, 4 averages, 20 sec imaging time. Contrast between the arterial and background signal, defined by the relation (A-B)/B where A and B denote arterial and background signal, was computed. Projected vessel lengths were also measured.

### Results

Figure 1 shows a carotid arteriogram generated by the proposed projection technique. The carotid artery was clearly visualized with little background signal. Mean contrast produced by the technique for depicting the common, internal, and external carotid arteries was 19.3 ± 4.6, 12.9 ± 2.5, and 13.6 ± 1.6 respectively. Mean projected vessel lengths for the common, internal, and external carotid arteries were 73.4 ± 5.3 mm, 112.6 ± 14.6 mm, and 75.5 ± 20.1 mm.

### Conclusion

The proposed projection-based arterial spin-labeled angiographic technique depicts extensive lengths of the extracranial carotid arteries in only 20 seconds. Moreover, unlike previously described non-contrast approaches, cardiac gating is not required. Future work will investigate the usefulness of the method as a fast screening technique and evaluate the technique's accuracy in grading arterial stenoses.



**Figure 1**

MR angiography is an accepted approach for assessing carotid artery disease. We report a projection angiography technique that depicts extensive lengths of the carotid arteries in 20 seconds without use of contrast media.

## References

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