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# Use of HASTE MRI in the evaluation of acute injury to left atrial wall caused by RF ablation

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## Introduction

Atrial fibrillation (AF) is the most common cardiac rhythm disturbance affecting more than 2 million people in the United States. Pulmonary vein isolation (PVI) procedure using RF ablation has emerged as a new promising treatment of AF. Reported procedure success rates vary significantly with recurrences ranging from 40-86%. With introduction of EP-MRI suites, patients may be re-ablated immediately after assessment of the extent of LA wall injury, if necessary. Late gadolinium enhancement (LGE) [1,2] and double inversion recovery (DIR) prepared T2-weighted (T2w) fast/turbo spin echo (FSE/TSE) [3-5] were proposed to evaluate acute LA wall injury. The main disadvantages of these sequences are a long scan time and a strong dependence of image quality on heart rate regularity.

## Purpose

Develop a fast imaging technique for assessment of acute injury in patients undergoing RF ablation treatment of atrial fibrillation (AF).

## Methods

HASTE is a single shot imaging technique with strong T2-weighting. These features of the pulse sequence make it a good candidate for assessment of the extent of LA wall injury immediately after ablation. Twenty-five AF patients underwent pulmonary vein isolation and debulking of the septal and posterior walls. All patients were imaged pre- and immediately post ablation using a 3 Tesla MRI scanner (Verio, Siemens Healthcare). Acute injury was assessed using a DIR-HASTE, DIR-TSE, and LGE sequence coving the entire LA. HASTE parameters were: TE = 73 ms, TR = one respiratory cycle, fat suppression using spectral adiabatic inversion recovery (SPAIR), in-plane resolution of 1.25 × 1.98 mm, slice thickness of 5 mm, GRAPPA with R = 2 and 34 reference lines. DIR-TSE parameters were: TE = 83 ms, TR = 2RR, fat suppression using SPAIR, in-plane resolution of 1.25 × 1.25 mm, and slice thickness of 4 mm. All sequences were respiratory navigated, ECG gated with data acquisition during LA diastole.

## Results

Typical DIR-TSE and DIR-HASTE are shown in Fig. 1. Both sequences visualize post-ablation edema clearly. Typical scan time for HASTE sequence was about 2 minutes whereas scan time for DIR-TSE exceeded 6 minutes. Image quality for DIR-TSE was strongly dependent on regularity

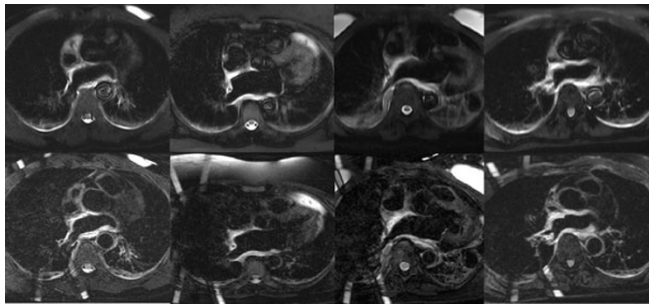

**Figure 1**
**Visualization of acute injury of LA wall caused by RF ablation**. Top row: DIR-HASTE. Bottom row: DIR-TSE

of heart rate while HASTE sequence gave good images regardless.

## Conclusion

The proposed HASTE sequence enables a good visualization of injury to left atrial wall immediately post-ablation.

## References

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