

Vessel Wall Enhancement on MRI After Stent-Retriever Thrombectomy

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Introduction

Animal and in vitro studies have demonstrated histologic iatrogenic endothelial injury after stent-retriever thrombectomy. However, non-contrast vessel wall magnetic resonance imaging (MRI) studies have failed to demonstrate vessel injury. Our prospective study examines iatrogenic endothelial damage after stentretriever thrombectomy in vivo utilizing high-resolution contrastenhanced vessel wall MRI (VW-MRI).

Learning Objectives

1- Understanding the importance of contrast administration in detection of endothelial injury

2- Development of highly specialized protocols for evaluation of endothelial injury

Methods

We evaluated 11 patients, including post-thrombectomy and control subjects, on a Signa HDx 3.0-T MRI scanner with an 8-channel head coil. Pre- and post-contrast T1-weighted CUBE vessel wall images and MR angiograms were acquired with attention to the Circle of Willis. Parenchymal imaging included diffusion, susceptibility, and T2 FLAIRweighted images. The primary endpoint was vessel wall enhancement, as determined by two independent, blinded board-certified neuroradiologists prior to examination of parenchymal imaging. Additional covariates were age, NIHSS, level of occlusion, stroke etiology, devices utilized, number of passes required for thrombectomy, TICI reperfusion score, stroke volume, and 90-day

Conventional Angiography Demonstrates Occlusion and Reperfusion of Target Vessel





LAO angiograms of the left anterior circulation demonstrating occlusion (top image) and subsequent complete recanalization (bottom image) of the inferior divsion of the left MCA.

Pre- and Post-Contrast MRI **Following Stent-Retriever** Thrombectomy



VWMRI performed following mechanical thrombectomy pre and post contrast. Comparison of precontrast and post-contrast demonstrates enhancement of the wall of the inferior division of the MCA in the distribution of the mechanical thrombectomy.

Results

Post-contrast T1-weighted vessel wall enhancement was detected in the MCA M2 segment in 100%, the M1 segment in 83%, and the ICA in 50% of thrombectomy patients. One patient demonstrated A1 segment ACA enhancement, and was prospectively identified by both radiologists as having undergone ACA thrombectomy due to embolism during MCA thrombectomy (Figure 1). Postcontrast T1-weighted vessel wall enhancement was detected in 0% of control patients.

Conclusions

Our findings suggest that vessel wall injuries incurred during stent-retriever thrombectomy can be detected utilizing contrast-enhanced 3 Tesla VW-MRI. Our results further demonstrate greater endothelial injury when the thrombectomy device is oversized relative to the target vessel. Further studies are needed to evaluate the clinical significance of endothelial injury and differential effects of the device employed.

References

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See abstract for complete list of references

