

INTRODUCTION

Persistent or recurrent symptoms after carpal tunnel release (CTR) represent a diagnostic challenge. In the peri-operative period following open carpal tunnel release (OCTR), magnetic resonance imaging (MRI) has been proposed as a viable diagnostic test to evaluate complete release of the flexor retinaculum.

Previous studies have demonstrated an ability to detect complete release of the flexor retinaculum at 3 months following OCTR. In contrast, MRI at 3 months following endoscopic carpal tunnel release (ECTR) failed to demonstrate a discrete defect in the flexor retinaculum. MRI has been shown to have some utility in evaluating median nerve morphology following ECTR.

AIMS

Determine if MRI can conclusively demonstrate a complete release of the flexor retinaculum immediately after ECTR and 6 weeks following ECTR.

To evaluate, in comparison to pre-operative baseline MRI studies, the morphologic changes to the median nerve within one hour of ECTR and at 6 weeks following ECTR.

METHODS

We enrolled 10 consecutive patients with carpal tunnel syndrome confirmed by both clinical exam and EMG study who were undergoing ECTR (Micro-Aire uniportal system, Charlottesville, VA) by a single surgeon.

Patients received a preoperative MRI followed by repeat MRI scans within one hour post-operatively and at 6 weeks post-operatively. All scans were performed on a 1.5T GE magnet (Fairfield, CT) with a dedicated 8-channel wrist coil. Slice thicknesses were 4 mm with 1-mm gaps.

Images were analyzed by a musculoskeletal trained radiologist and an orthopaedic hand surgeon to determine median nerve morphologic changes and to determine if a discrete gap or separation of the flexor retinaculum could be appreciated.

RESULTS

10 patients were enrolled. 9 patients completed all imaging studies and were included in the study. All patients achieved complete relief of their preoperative symptoms by their 6 weeks post-operative visit.

At one hour post-operatively all patients demonstrated a distinct gap and separation of the flexor retinaculum consistent with a complete release. By 6 weeks, however, a clear gap or separation in the flexor retinaculum was not visible on MRI.

No statistically significant changes were seen in median nerve height to width ratios at either the immediate postoperative or six week intervals. Median nerve cross-sectional area at the level of the pisiform increased from baseline by 37.5% immediately postoperatively, declining to 28.0% at 6 weeks postoperatively.

CONCLUSIONS

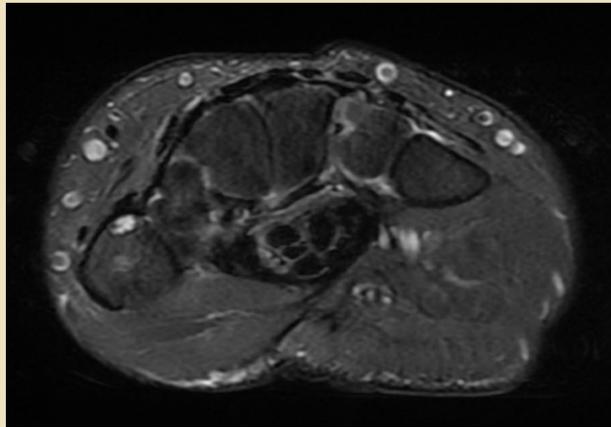
MRI of patients immediately after ECTR demonstrates a discrete gap in the flexor retinaculum overlying the median nerve, consistent with a complete release. In contrast, complete release cannot be verified by MRI at 6 weeks postoperatively.

While morphologic changes can be noted in the median nerve following ECTR, the use of MRI after ECTR is of limited clinical value.

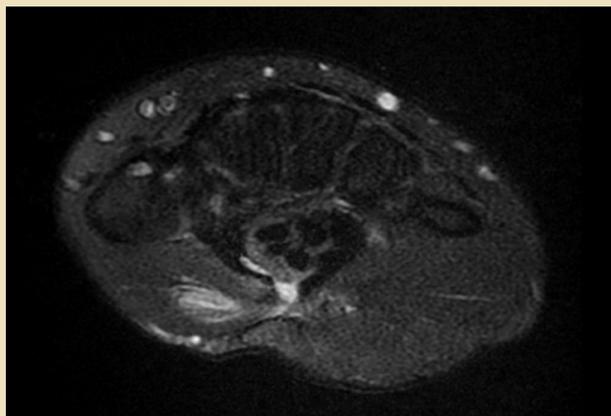
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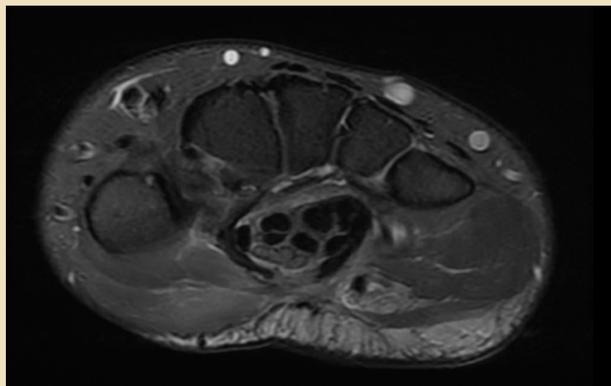
Measurement	pre-op	Immediate post op	6 weeks post op	3 months post op
Median nerve cross sectional area (mm²) at level of:				
Pisiform	10.91	15	13.97	14.08
Hook of Hamate	10.03	11.66	12.31	13.34
Median nerve width (mm) at level of:				
Pisiform	6.37	6.9	6.88	6.45
Hook of Hamate	5.81	6.09	6.26	6.1
Median nerve height (mm) at level of:				
Pisiform	2.46	2.84	2.7	2.89
Hook of Hamate	2.32	2.52	2.44	2.65
Median nerve ratio (width/height) at level of:				
Pisiform	2.59	2.43	2.55	2.39
Hook of Hamate	2.5	2.42	2.57	2.13
Mean distance between skin & volar margin of median nerve (mm)	11.83	11.22	12.13	10.86 (7.4-13.3)



Pre carpal tunnel release, flexor retinaculum clearly defined



Immediate postoperatively, discrete separation of the flexor retinaculum and 0.4-cm gap



Evidence of prior carpal tunnel release with persistent retinacular gap but some scarring/regrowth.