Application of diffusion weighted MRI in the evaluation of acute myelopathy syndromes

S. Lee¹, D. Kim¹, D. Kim¹
¹Yonsei University College of Medicine, Seoul, Korea, Republic of

Synopsis

The authors applied diffusion weighted imaging in the evaluation of acute myelopathy syndrome. Acute phase of multiple sclerosis and spinal cord ischemia showed DWI abnormality with reduction of ADC, while transverse myelitis and compressive myelopathy showed vasogenic edema. Spinal cord DWI is useful in the evaluation of acute myelopathy syndromes of the spinal cord.

Abstract

We investigated the usefulness of diffusion weighted MRI in the evaluation of acute myelopathy syndromes. Eight patients [multiple sclerosis (n=2), spinal cord ischemia (n=1), idiopathic myelitis (n=3), cord edema due to tumor (n=1), compressive myelopathy (n=1)] received DWI. DWI abnormality was seen in acute phase of MS and spinal cord ischemia with decreased ADC. DWI is useful in the differential diagnosis of acute myelopathy.

Introduction

Acute myelopathy comes from various etiologies including multiple sclerosis, systemic disease, spinal cord infarct, post-infectious myelopathy and radiation myelopathy (1). They have similar radiographic and clinical features, and sometimes make the diagnosis difficult. Diffusion weighted imaging of the spinal cord is a challenging field and recently introduced technique because of its difficulty in imaging. Surrounding CSF and bony structures may interfere proper evaluation by EPI technique (2). These problems can be compensated by multi-shot technique with cardiac gating. The purpose of our study is to evaluate the usefulness of diffusion weighted imaging using multi-shot spin echo EPI technique in the differential diagnosis of acute myelopathy syndromes.

Methods

Eight patients [multiple sclerosis (n=2), spinal cord ischemia (n=1), idiopathic transverse myelitis (n=3), acute cord edema due to tumor (n=1), compressive myelopathy (n=1)] were included in this study. Diagnosis was made by clinical settings and follow up imaging (MS, tumor, compressive myelopathy) or angiography (dural AV fistula with venous hypertension and cord ischemia). Patients with unknown cause were classified to idiopathic transverse myelopathy. We obtained MR images with Gyroscan Intera T15 (Philips Medical Systems, Best, Netherlands). Conventional T2, T1 and post-Gd sagittal and axial images were obtained. Diffusion MRI was performed with parameters as: Multi-shot spin echo EPI with ECG gating, 3 R-R interval image acquisition, TE=72msec, FOV=25cm, 256 matrix, 5mm thickness, b-value = 400, 3 sagittal slices containing spinal cord. ADC was automatically calculated. Routine MR and DWI findings of patients were compared with special emphasis on the location of the lesion, changes of signal intensities and drop of ADC.

Results

Multiple sclerosis showed increased signal intensity lesions in the dorsal aspect of the spinal cord on T2WI. One of them showed increased DWI SI and decreased ADC at the corresponding area (Fig. 1). Patients with spinal DAVF showed diffusely increased signal intensity area at the lumbar spinal cord before embolization on both T2WI and DWI, and follow up MRI showed myelomalatic change, suggesting irreversible damage to the tissue (Fig. 2). Tumor edema, idiopathic transverse myelopathy did not showed abnormality on DWI, suggesting vasogenic edema (Fig. 3).

Conclusion

Multishot spin echo, cardiac gated diffusion weighted imaging can provide suitable images in the differential diagnosis of acute myelopathy syndromes. Further investigation for the findings of spinal cord disease on diffusion-weighted imaging is needed.

References