Neurology Asia 2017; 22(4) : 377 – 379

IMAGING HIGHLIGHT

Neuralgic amyotrophy in the lower extremity diagnosed with gadolinium-enhanced lumbar magnetic resonance imaging: A case report

Min Cheol Chang *MD*

Department of Physical Medicine and Rehabilitation, College of Medicine, Yeungnam University, Taegu, Republic of Korea

This is the report of an elderly man with subacute onset of left lower limb weakness demonstrating the usefulness of gadolinium-enhanced MRI spine for the diagnosis of neuralgic amyotrophy.

CASE REPORT

A 74-year-old man complained of weakness in the left lower extremity since 25 days. Five days before the weakness occurred, severe sharp neuropathic pain developed in the left lateral and posterior thigh and calf area. When the pain decreased, weakness in the left lower extremity appeared. On the day of the hospital visit, weakness and atrophy were found in the muscles innervating the left L5 and S1 roots (Table 1). The Achilles tendon reflex was decreased. He was admitted to hospital for further examination.

On the day of admission, the compound motor action potential (CMAP) of the left peroneal and tibial nerves was decreased compared to that of the right side (CMAP amplitude of left peroneal nerve was 4.1% of the right peroneal nerve, and that of the left tibial nerve was 46.8%). The sensory nerve action potential in the bilateral superficial peroneal nerve showed no response, and that in the sural nerve was 6μV on both sides. The electromyography showed active denervation potentials in the left paraspinalis around the L5 and S1 levels, tibialis anterior, extensor hallucis longus, medial head of the gastrocnemius, tensor fasciae latae, and gluteus maximus muscles. Thus, the patient was diagnosed with left L5 and S1 radiculopathy and peripheral sensory polyneuropathy in the lower extremities. Peripheral sensory polyneuropathy is considered an aging-related degenerative disorder. Conventional MRI showed no abnormal findings (Figure 1A), except for mild lateral recess stenosis in the right L4–5. T1-weighted gadolinium-enhanced lumbar MRI revealed increased intensities in the left L5 and S1 nerve roots (Figure 1B). Increased signal intensities were observed in the left multifidus, erector spinalis, and quadratus lumborum muscles between the L5 and S1 levels (Figure 1B). Laboratory test results ruled out Guillain-Barre syndrome, sarcoidosis, invasion of malignant tumors, and post-infectious radiculopathy. Cerebrospinal fluid analysis showed no abnormal findings (protein=36.95mg/dL; glucose=58mg/dL; white blood cell=2 cells/μL). Based on his medical history and the results of our evaluations, the patient was diagnosed with neuralgic amyotrophy.

The patient received high dose intravenous methylprednisolone for 10 days (1,000mg/day for five days; then, tapered for another five days). Three months after finishing treatment, the motor weakness has improved (Table 1).

DISCUSSION

This report describes a patient with neuralgic amyotrophy in the left lower extremity. Neuralgic amyotrophy occurred owing to lesions in the left L5 and S1 nerve roots. Lesions in the nerve roots were demonstrated using gadolinium-enhanced MRI.

Using gadolinium-enhanced MRI, the exact location of the lesion causing the neuralgic amyotrophy was identified. Gadolinium-enhanced MRI can show inflammation in neural structures.[1,2] Nerve enhancement using gadolinium-enhanced MRI is related to the accumulation of gadolinium in granulation tissue, inflammatory cytokines, and disruption of endoneurial capillaries.[2,3] Inflammation mediated by proinflammatory cytokines results in breakdown of the blood-nerve barrier and increased vascular permeability[2,3],

Address correspondence to: Min Cheol Chang, MD, Professor, Department of Physical Medicine and Rehabilitation, College of Medicine, Yeungnam University 317-1, Daemyungdong, Namku, Taegu, 705-717, Republic of Korea. Tel: 82-53-620-4682; E-mail: wheel633@ynu.ac.kr

Table 1. Changes in MRC scores in the patient

	On admission	3 months after finishing treatment
Hip flexor	5	5
Hip abductor	2	2^+
Hip extensor	3^+	4
Knee extensor	5	5
Ankle dorsiflexor	3^-	4
1st toe extensor	1	2^+
Ankle plantarflexor	3^+	4

MRC scores are as follows: 0, no contraction; 1, palpable contraction but no visible movement; 2, movement without gravity; 3, movement against gravity; 4, movement against a resistance lower than the resistance overcome by the healthy side; 5, movement against a resistance equal to the maximum resistance overcome by the healthy side.
MRC, Medical Research Council.

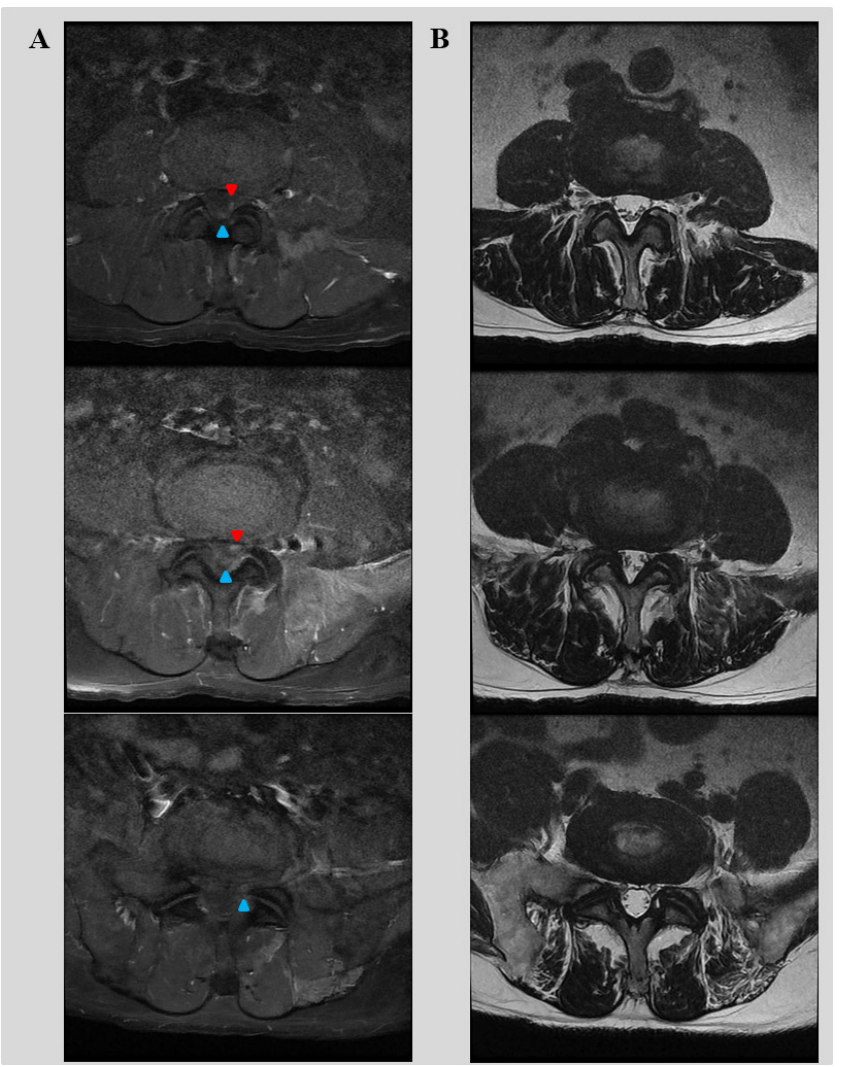

Figure 1. Upper: L3–4 disc space level, middle: L4–5 disc space level, lower L5–S1 disc space level. (A) T1-weighted gadolinium-enhanced axial MRI shows increased intensities in the left L5 and S1 nerve roots (red arrowheads: L5 nerve root; blue arrowheads: S1 nerve root). (B) Conventional T2-weighted MRI shows no abnormal finding in nerve roots.

resulting in enhancement in the nerve tissue. Gadolinium-enhanced MRI can be used as a marker for spinal nerve and nerve root pathology.[3] The left L5 and S1 roots were enhanced on T1-weighted gadolinium-enhanced MRI, consistent with the nerve conduction study and electromyography results and the clinical findings that the weakness occurred in the muscles innervated by the left L5 and S1 nerve roots. In addition, on gadolinium-enhanced MRI, the paraspinal muscles between the L5 and S1 levels were also enhanced. Denervation of the L5 and S1 nerve roots may have resulted in edema throughout the nerve roots innervating the muscles, and this may have caused the enhancement in the gadolinium-enhanced MRI.[4]

This study shows the usefulness of gadolinium-enhanced MRI for the diagnosis of neuralgic amyotrophy in the lower extremity. Gadolinium-enhanced MRI is useful tool for the exact and immediate diagnosis of neuralgic amyotrophy.

DISCLOSURE

Conflicts of interest: None

Keywords: Neuralgic amyotrophy; gadolinium-enhancement; magnetic resonance imaging

REFERENCES

1. Ishii K, Tamaoka A, Shoji S. MRI of idiopathic lumbosacral plexopathy. *Neurology* 2004; 27(63):E6.
2. Tak HJ, Jones R, Cho YW, Kim EH, Ahn SH. Clinical evaluation of transforaminal epidural steroid injection in patients with gadolinium enhancing spinal nerves associated with disc herniation. *Pain Physician* 2015; 18:E177-85.
3. Jinkins JR. MR of enhancing nerve roots in the unoperated lumbosacral spine. *AJNR Am J Neuroradiol* 1993; 14:193-202.
4. May DA, Disler DG, Jones EA, Balkissoon AA, Manaster BJ. Abnormal signal intensity in skeletal muscle at MR imaging: patterns, pearls, and pitfalls. *Radiographics* 2000; 20:S295-315.