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Relationship between Amplitude of Common Peroneal Motor Conduction and L5 Radiculopathy

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Objective

To investigate the incidence of reduction of compound muscle action potential (CMAP) amplitude of common peroneal nerve and associations between reduction of CMAP amplitude of common peroneal nerve and clinical factors or the severity of image measurement in L5 radiculopathy.

Method

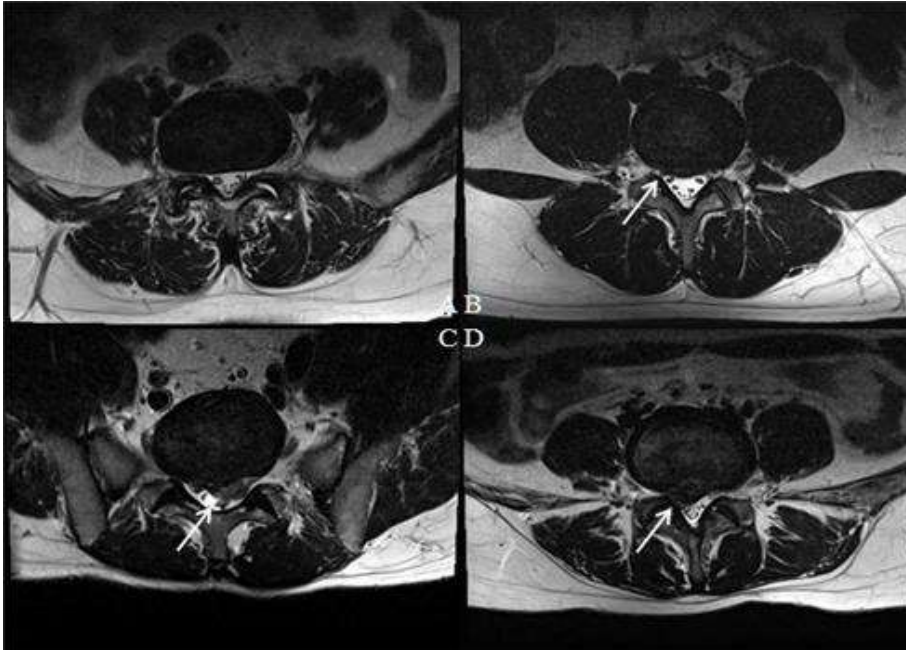
We retrospectively reviewed findings of electro-diagnostic study (EDX) and magnetic resonance imaging (MRI) of patients who were diagnosed with unilateral L5 radiculopathy and lumbar herniation of intervertebral disc (HIVD). 35 patients were enrolled and we investigated demographic and clinical characteristics (age, gender, duration of illness, straight leg raising test, motor power of ankle dorsiflexor (ADF) and big toe extensor (BTE)). We investigated CMAP amplitude of both common peroneal nerves with ratio (affected side to healthy side) and findings of needle electromyography (EMG). We also investigated MRI at the level of the L4-5 intervertebral disc for the severity of disc herniation with qualitative measurements (Pfirrmann root compromise grade, HIVD description depending on Recommendations of the combined task forces (CTF) of the North American Spine Society, the American Society of Spine Radiology and the American Society of Neuroradiology) and quantitative measurements (cross sectional area (CSA) of spinal canal and dural sac). Statistical analyses were performed using SPSS-K version 24.0.

Result

Reduced amplitude of CMAP (ratio < 1.0) was found in 22 (63%) patients. Ratio under 0.7 was in 12 (34%) patients and ratio under 0.5 was in 7 (20%) patients. In patients with CMAP ratio under 0.7, motor power of BTE showed significant decrease (P-value=0.041) and other clinical characteristics and MRI measurement showed no significant difference. In patients with CMAP ratio under 0.5, there was significant difference only in onset duration (47.3±94.3 vs 8.0±10.7 (weeks), P-value =0.031) and no significant differences in other clinical characteristics and MRI measurements. Analyses of all patients showed significant negative correlation between CMAP ratio and onset duration (R=-0.363, P-value=0.032) and positive correlation between CMAP ratio and motor power of BTE (R=0.364, P-value=0.032). However, there were no significant correlations between CMAP ratio and MRI measurements.

Conclusion

63% patients with HIVD in L4-5 level and L5 radiculopathy had reduced CMAP amplitude of common peroneal nerve. Patients with significantly reduced CMAP amplitude had a tendency of weakness of big toe extensor and chronic stage of disease. There were no significant relations between reduced amplitude of CMAP and the severity of MRI image. This study was preliminary study and further study with larger number of patients is necessary to investigate the clinical significance and diagnostic value of CMAP ratio of common peroneal nerve in L5 radiculopathy.



Pfirschmann root compromise grade



(A) Spinal canal CSA measurement, (B) Dural sac CSA measurement