

3T high resolution MR Neurography of sciatic neuropathy

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Purpose: The sciatic nerve may normally exhibit mild T2 hyperintensity in magnetic resonance neurography (MRN) images rendering assessment of sciatic neuropathy difficult. We employed quantitative and qualitative models to evaluate the sciatic nerves and regional skeletal muscles in patients with and without sciatic neuropathy, in order to increase the accuracy of 3T MRN in predicting pathologic cases.

Materials and Methods: We retrospectively reviewed the 3T MRN studies of the pelvis and thighs of 32 subjects (11 males, 21 females, mean age 51 ± 14 years), of which 15 had a final diagnosis of sciatic neuropathy based on electrodiagnostic or surgical confirmation, and 17 had no evidence of sciatic neuropathy and served as controls. On each side, the sciatic nerves were evaluated for signal intensity (SI), size, course, and fascicular morphology, whereas the regional skeletal muscles were evaluated for edema, fatty replacement, and atrophy. In addition, the nerve/vessel SI ration was registered for each side.

Results: The sciatic nerves of the abnormal sides exhibited higher nerve/vessel SI ratios, and higher incidence of T2 hyperintensity, enlargement, and abnormal fascicular morphology compared to the nerves of the normal sides. The regional muscles of the abnormal sides demonstrated higher grade of fatty infiltration, and higher frequencies of edema and atrophy, compared to the muscles of the healthy sides. A cut-off value of nerve/vessel SI ratio of 0.89 exhibited high sensitivity and specificity in predicting sciatic neuropathy. 27% of sciatic neuropathy cases did not show muscle denervation changes and nerve findings were the isolated abnormality.

Conclusion: Both qualitative and quantitative criteria should be employed to suggest a MRN diagnosis of sciatic neuropathy.

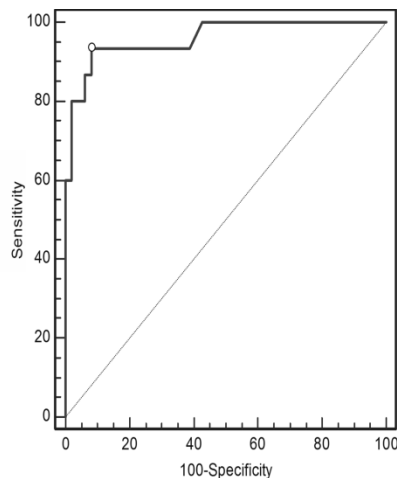


Figure 1: ROC curve to determine the predictive value of the nerve/vessel signal intensity ratio (the cut-off value is 0.89) for sciatic neuropathy. The diagonal line is the nondiscriminant curve.

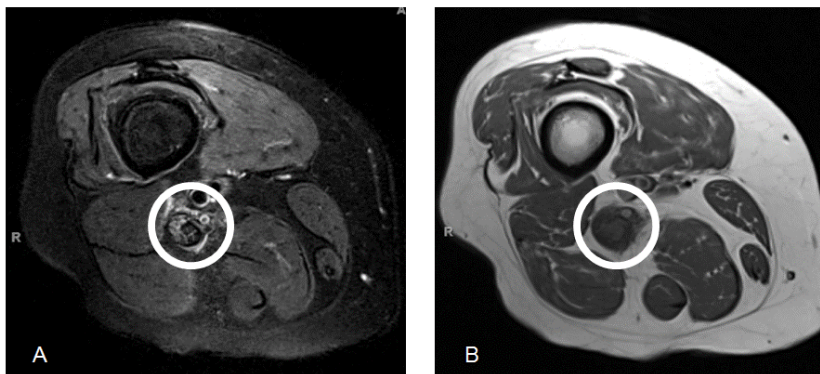


Figure 2: MRN study of a 68-year-old female with chronic sensory symptoms of right lower extremity. The electrodiagnostic study revealed right sciatic neuropathy. The axial fat-suppressed T2-SPAIR (A) and axial T1W (B) at the level of the distal left thigh demonstrates enlargement of the sciatic nerve and fascicles with fascicular hyperintensity similar to adjacent vessels, confirming neuropathy (circle).