DOI: 10.5152/TurkThoracJ.2019.39

[Abstract:0026] MS-053 [Accepted: Oral Presentation] [Thoracic Surgery]

Surgical Outcomes of Neurogenic Thoracic Outlet Syndrome Based on Electrodiagnostic Tests and QuickDASH Scores

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Objectives: The surgical treatment of the neurogenic thoracic outlet syndrome (NTOS) is debate in the literature. The transaxillary surgical technique provides the clinical and electrodiagnostic improvements on neurogenic TOS patients. There is a positive correlation between postoperative electodiagnostic tests and Quick Disability of Arm, Shoulder and Hands (QuickDASH) scores. In this study, we evaluated the surgical outcomes of neurogenic thoracic outlet syndrome based on electrodiagnostic tests and QuickDASH scores.

Methods: In total, 665 of 680 (97%) patients with NTOS improved with conservative treatment. The remaining (3%) patients (15 of 680 patients) did not benefit after 3 months of conservative treatment and were referred for transaxillary first rib resection (TFRR). We retrospectively compared the preoperative and postoperative (3 months) electromyelography and QuickDASH results of operated NTOS patients. Three of the 15 (20%) patients in the surgical cohort were male, with a median age of 25.3±4.16 years, and the other 12 patients (80%) were female with a median age of 31.9±9.48 years. Two of the 15 patients had a cervical rib, 4 of the 15 patients had an extension of the C7 transverse process, and 14 of the 15 patients had a cervical band. These bone and tissue abnormalities were removed in addition to the first rib resection and division of the anterior scalenus and middle scalenus muscles.

Results: Postoperative complication occurred in 1 patient with a winged scapula and 1 patient with pain in the incision area, which improved following regular subcutaneous 1% lidocaine injection. One patient was admitted with relapsing pain 6 months after surgery. Twelve (80%) patients in this cohort experienced total remission, and 2 patients (12.5%) received partial remission. QuickDASH scores were 1062 preoperatively and 549 postoperatively. The latency of the median F-wave was significantly prolonged on the affected side compared to the unaffected side preoperatively ($p=0.015$). There was no remarkable difference in the latency of ulnar F-waves between sides ($p=0.246$). The medial antebrachial cutaneous nerve response values increased significantly postoperatively ($p<0.0001$). Significant increases in ulnar sensory nerve action potential values amplitude ratio ($p<0.003$) and median nerve motor amplitudes ($p<0.0001$) were also found postoperatively.

Conclusion: The treatment strategy for NTOS should be combine. Conservative treatment (medical treatment and physiotherapy) is performed first, followed by surgical treatment. Decompression of the TOS stops the progression of the atrophy of intrinsic hand muscles and sensory impairment in NTOS. We also noted good clinical and electrodiagnostic outcomes in NTOS patient treated with TFRR.

Keywords: EMG, medial antebrachial cutaneous nerve, thoracic outlet syndrome, transaxillary surgery