Quantitative Assessment of Hand Function in Cervical Spondylotic Myelopathy and Response to Surgical Treatment

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Introduction

Cervical spondylotic myelopathy (CSM) is the most common cause of spinal cord dysfunction in adults. Diminished hand strength and dexterity in CSM is a major contribution to disability. The goal of this study was to establish the functional impact of CSM severity on hand function using quantitative testing and evaluate the response to intervention.

Methods

Consecutive adult patients from a single institution with plans for surgical treatment of CSM were prospectively enrolled. Demographics, clinical history, physical exam, modified JOA score were collected. Patients underwent preoperative and posteroperative functional hand testing at 6 weeks: 1) grip strength (Jamar dynamometer), 2) pinch strength (palmar pinch gauge), 3) dexterity (9-hole peg test). Preoperative and postoperative test results were compared to evaluate the impact of surgery; changes were expressed as continuous variables and as proportion achieving minimum clinically important differences (MCID). For analysis, patients were stratified into mild, moderate, and severe myelopathy based on mJOA score (=15, 12-14, =11). Significance was defined as $p<.05$).

Results

33 patients were enrolled (Age: 58.1±13.1, Gender: 51.5% Male). Primary presenting symptoms were neck pain (11/33), numbness (7/33), and upper extremity weakness (4/33). 10/33 patients had severe myelopathy, 12/33 had moderate myelopathy, and 11/33 had mild myelopathy. Preoperative pinch and grip strength were lower in severe CSM ($p=.014$). 20/60 patients underwent anterior approach decompression, with mean of 3 levels treated. Significant improvement was observed in dominant grip strength ($p=.004$), non-dominant grip strength ($p=.008$), and dominant hand dexterity ($p=.001$); no significant improvement was observed in pinch strength ($p=.054$). 11/33 patients achieved MCID in dominant grip strength at 6 weeks; greatest proportion of patients improved in the moderate (58.3%) compared to low (30%) and high (9%) mJOA groups.

Conclusions

Patients with myelopathy demonstrate improvement in hand function following surgery, particularly in the moderate group.

Learning Objectives

By the conclusion of this session, participants should be able to (1) describe the functional impact of cervical myelopathy on hand function, (2) discuss the association of quantitative objective measures with known metrics, (3) identify the quantitative gains in hand strength and function following surgical intervention for CSM.

References

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