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Evoked Potentials as a Potential Biomarker to Quantify the Effectiveness of Surgery in Degenerative Cervical Myelopathy

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Title: Evoked Potentials as a Potential Biomarker to Quantify the Effectiveness of Surgery in Degenerative Cervical Myelopathy

Background: Degenerative Cervical Myelopathy (DCM) is a leading cause of neurologic dysfunction in adults. Surgical treatment is recommended for patients with moderate to severe or progressive disease to halt neurological decline and improve function. The mJOA scale is commonly used to quantify improvement and surgical effectiveness but is subjective. Objective markers should be identified.

Research Question: Evoked potentials may serve as an objective tool for assessing surgical outcomes in DCM patients.

Design and Methods: This prospective cohort study included 32 patients diagnosed with DCM based on clinical findings, mJOA scale, MRI-DTI sequences at cervical levels, and neurophysiological studies. Surgical decompression was performed using DTI sequence information, either via an anterior or posterior approach with titanium implants. Postoperative assessments were done at 1 year with mJOA and neurophysiological studies. Postoperative DTI sequences could not be obtained due to artifacts from metal implants. Previous studies by our group showed the prognostic value of DTI and its high concordance with neurophysiological studies, suggesting evoked potentials can assess surgical outcomes.

Results: 14 patients completed the study. Descriptive statistics were performed for demographic, preoperative, and surgical variables. The Kolmogorov-Smirnov test assessed normality. The minimal clinically important difference (MCID) was defined as a 1-point change for mild, 2 for moderate, and 3 for severe DCM. Spearman's correlation was used to evaluate relationships. Strong correlations were found between pre- and post-N20 potentials and N20-P14 potentials. An inverse correlation was observed between preoperative mJOA scores and MCID results. These findings hold clinical relevance.

Discussion Evoked potentials could serve as an objective tool in assessing surgical outcomes in DCM patients. MRI-DTI metrics allow for better selection of functionally affected levels.

Fig. 1

