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The Impact of Intraoperative Neuromonitoring on Clinical Outcomes in Anterior Cervical Discectomy and Fusion (ACDF) and Cervical Disc Replacement (CDR) Procedures for Cervical Radiculopathy – Immediate and One-Year Follow-Up Results

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Background: The use of intraoperative neuromonitoring (IONM) in cervical radiculopathy (CR) surgeries, specifically in anterior cervical discectomy and fusion (ACDF) and cervical disc replacement (CDR) procedures, has gained popularity in our institution since 2017. While the role of IONM in spinal deformity surgery is well-established, its utility in ACDF/R procedures (collectively ACDF/R-P) remains underexplored, particularly regarding its impact on safety and clinical outcomes.

Research question: Does the utilization of IONM in ACDF and CDR procedures improve clinical outcomes and safety in patients with CR, both immediately after surgery and at one-year follow-up?

Design and Methods: This retrospective study analyzed data from 312 patients who underwent ACDF and CDR procedures between 2017 and 2023. A total of 308 cases were divided into groups with/o IONM. Improvements were defined as amplitude signal (AS) >50%. Postoperative VAP <1 mean is improvement.

Clinical outcome included ODI and SF-36 scores, assessed one day, 3 months, 6 months, and one year after surgery. Correlations between AS >50% and VAP were analyzed using the chi-square test, with statistical significance determined by p-values.

Results: The analysis included 150 ACDF and 189 CDR levels procedures. Some data were excluded due to missing responses in motor-evoked potentials (MEP) and somatosensory evoked potentials (SSEP). Results demonstrated a clinical correlation between IONM signal improvements and VAP reduction. ODI and SF-36 scores also showed significant improvement in the IONM group.

Discussion: From data from 2017 until 2023 IONM usage increasing by year for CR surgery. The result showed immediate signal changes gain confidence about result among surgeon. Immediate clinical outcome showed relevance between signals more than 50% amplitude changes correlate with the VAP and other parameter.