

The Role of Preoperative Immunonutritional Scores in Predicting Complications after STN DBS in Parkinson's Disease

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Abstract

Introduction: Parkinson's disease (PD) is a progressive neurodegenerative disorder associated with systemic inflammation, immune dysregulation, and malnutrition, all of which may influence surgical outcomes. Subthalamic nucleus deep brain stimulation (STN DBS) is a widely used treatment for advanced PD, yet postoperative complications remain a concern. This study evaluates the predictive value of preoperative immunonutritional markers—including the Hemoglobin, Albumin, Lymphocyte, and Platelet (HALP) score, Aggregate Index of Systemic Inflammation (AISI), Lymphocyte-to-Monocyte Ratio (LMR), and Systemic Inflammatory Response Syndrome (SIRS) - for the risk of extracranial complications following STN DBS.

Method: A retrospective cohort study was conducted on 138 PD patients who underwent STN DBS. Clinical and laboratory data were analyzed to assess the association between preoperative immunonutritional markers and postoperative complications, including infections, wound healing disturbances, and surgical revisions. Logistic regression and receiver operating characteristic (ROC) analysis were performed to evaluate the predictive power of these markers.

Results: SIRS emerged as the strongest predictor of complications (aOR = 6.99, 95% CI = 1.844–26.509), emphasizing the critical role of systemic inflammation in surgical outcomes. HALP, AISI, and LMR also demonstrated significant predictive potential, with HALP (AUC = 0.69) and LMR (AUC = 0.73) being the most robust predictors of complications. While albumin alone was not a significant predictor, it correlated with inflammatory markers and comorbidities, underscoring its role in broader risk assessments.

Discussion: SIRS emerged as the strongest predictor of

complications (aOR = 6.99, 95% CI = 1.844–26.509), emphasizing the critical role of systemic inflammation in surgical outcomes. HALP, AISI, and LMR also demonstrated significant predictive potential, with HALP (AUC = 0.69) and LMR (AUC = 0.73) being the most robust predictors of complications. While albumin alone was not a significant predictor, it correlated with inflammatory markers and comorbidities, underscoring its role in broader risk assessments.

Conclusions: This study underscores the value of preoperative immunonutritional markers in predicting complications following STN DBS in PD patients. Incorporating these markers into clinical risk stratification may enhance preoperative planning and personalized postoperative care, ultimately improving surgical outcomes. These findings, while promising, warrant validation through prospective, multicenter studies to refine predictive models and enhance patient outcomes.

References

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