

Title: Preoperative frailty measured by risk analysis index predicts complications and poor discharge outcomes after Brain Tumor Resection in a large multi-center analysis

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Abstract:

Background

To evaluate the independent effect of frailty, as measured by the Risk Analysis Index-Administrative (RAI-A) for postoperative complications and discharge outcomes following brain tumor resection (BTR) in a large multi-center analysis.

Methods

Patients undergoing BTR were queried from the National Surgical Quality Improvement Program (NSIQP) for the years 2015 to 2019. Multivariable logistic regression was performed to evaluate the independent associations between frailty tools (age, 5-factor modified frailty score [mFI-5], and RAI-A) on postoperative complications and discharge outcomes.

Results

We identified 30,951 patients who underwent craniotomy for BTR; the median age of our study sample was 59 (IQR 47–68) years old and 47.8% of patients were male. Overall, increasing RAI-A score, in an overall stepwise fashion, was associated with increasing risk of adverse outcomes including in-hospital mortality, non-routine discharge, major complications, Clavien-Dindo Grade IV complication, and extended length of stay. Multivariable regression analysis (adjusting for age, sex, BMI, non-elective surgery status, race, and ethnicity) demonstrated that RAI-A was an independent predictor for worse BTR outcomes. The RAI-A tiers 41–45 (1.2% cohort) and > 45 (0.3% cohort) were ~ 4 (Odds Ratio [OR]: 4.3, 95% CI: 2.1–8.9) and ~ 9 (OR: 9.5, 95% CI: 3.9–22.9) times more likely to have in-hospital mortality compared to RAI-A 0–20 (34% cohort).

Conclusions

Increasing preoperative frailty as measured by the RAI-A score is independently associated with increased risk of complications and adverse discharge outcomes after BTR. The RAI-A may help providers present better preoperative risk assessment for patients and families weighing the risks and benefits of potential BTR.

Funding: None

Non-expert summary: This was an original research study which showed that a new frailty scale, Risk Analysis Index (RAI) is an effective predictor of post-operative outcomes in brain tumor resection patients. RAI can be used for preoperative risk stratification of these patients.