Exploring malnutrition in head and neck cancer surgery: a novel screening tool for a continuing challenge

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Background: Malnutrition is a significant driver of mortality in cancer patients – with estimates that between 10-20% of cancer patients die due to the consequences of malnutrition rather than due to the tumor itself. Patients with head and neck cancer (HNC) experience a unique combination of factors that synergize with underlying oncologic metabolic aberrations to compound malnutrition risk, including poor nutritional status and vitamin deficiencies related to heavy tobacco and alcohol use; tumor-associated dysphagia; social determinants; and chemoradiotherapy toxicity. Studies have shown that preoperative malnutrition intervention is associated with improved post-surgical outcomes, making identifying malnutrition early a crucial element of cancer care. In 2019, the Global Leadership Initiative on Malnutrition (GLIM) consensus addressed longstanding disagreement on diagnostic criteria for malnutrition. We hypothesize that applying modified GLIM (mGLIM) criteria will reveal significant associations between malnutrition and adverse post-surgical outcomes in HNC patients.

Methods: In this multicenter, retrospective cohort study, adult patients who underwent HNC surgery were identified by CPT code and extracted from the National Surgical Quality Improvement Program (NSQIP) database between 2011 and 2020. As the original GLIM criteria are not uniformly reported in NSQIP, modified criteria were developed based on available variables and ease of clinical assessment in the acute care surgery setting: low BMI (≤ 20 kg/m^2 for age ≤ 70 and ≤ 22 kg/m^2 for age ≥ 71), recent weight loss (> 5% within the last 6 months or > 10% beyond 6 months) and admission albumin ≤ 3.5 g/dL. The primary exposure was the presence of malnutrition upon hospital admission, as defined by the presence of all three mGLIM criteria. Multivariate logistic and linear regression models were used to measure the association between fulfillment of mGLIM criteria and mortality, hospital length of stay (LOS) and post-operative complications, controlling for patient demographics and comorbidities. Odds ratios (OR) and coefficients (β), plus their 95% confidence intervals (CI), were reported for multivariate logistic and linear regressions, respectively, with significance set at $p < 0.05$.

Results: Among 9,905 surgical HNC patients identified in NSQIP, 88 (0.89%) met mGLIM criteria. Black and African American surgical HNC patients were significantly more likely to be malnourished by mGLIM criteria ($p < 0.049$), in line with previous studies. Patients meeting mGLIM criteria showed associations with greater mortality (OR = 6.89, CI 2.08, 22,83, $p < 0.002$), longer LOS (β = 7.38, CI 5.69, 9.07, $p < 0.001$), and increased post-operative complications (OR = 3.44, CI 2.23, 5.32, $p < 0.001$). Compared to comorbidities available in NSQIP, mGLIM positivity carried the highest OR for postoperative complications, the largest regression coefficient for LOS and the third highest OR for mortality after renal failure (OR = 44.13, CI 7.23, 269.31, $p < 0.001$) and ascites (OR = 23.92, CI 2.77, 206.30, $p < 0.004$).

Conclusions: Amongst surgical HNC patients, fulfillment of mGLIM criteria for malnutrition was associated with elevated risk for adverse postoperative outcomes. The low percentage of malnutrition detected in this study suggests that malnutrition in HNC patients may be underdiagnosed compared to previously published rates. The novel mGLIM criteria demonstrate significant associations with adverse outcomes, emphasizing the need for improved screening and intervention strategies in this vulnerable population.