Evaluation of malnutrition via modified GLIM criteria in patients with head and neck cancer

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INTRODUCTION

- 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.

- 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 by providing standardized 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

Multicenter, retrospective study of adult patients in National Surgical Quality Improvement Program (NSQIP) database with with an ICD-9 or ICD-10 diagnostic code for a malignant neoplasm of the head or neck and a CPT procedure code for a qualifying HNC surgical procedure between 2011 and 2020.

As the original GLIM criteria are not uniformly reported in NSQIP, mGLIM criteria were developed based on available variables and ease of clinical assessment in the acute care surgery setting:

	GLIM (requires ≥1 in each category)	mGLIM (requires presence of all 3)
Phenotypic Criteria	Weight loss Low body mass index Reduced muscle mass	Weight loss Low body mass index
Etiologic Criteria	Reduced food intake or assimilation Inflammation	Hypoalbuminemia

Multivariate logistic and linear regression models were used to measure the association between fulfillment of mGLIM criteria and postsurgical outcomes, controlling for patient demographics and comorbidities

RESULTS

Factor	White (n = 7304)	Black or African American (n = 771)	Asian (n = 336)	American Indian or Alaska Native (n = 59)	Native Hawaiian or Pacific Islander (n = 43)	Hispanic (n = 422)
Demographics						
Male, n (%)	5139 (70.36)	561 (72.76)	229 (68.15)	36 (61.02)	29 (67.44)	303 (71.80)
Age, mean ± SD (years)	62.8 ± 11.6	61.5 ± 10.7	59.1 ± 13.4	62.0 ± 12.6	57.6 ± 13.4	61.4 ± 12.3
mGLIM-criteria positive, n (%)	53 (0.73)	17 (2.20)	2 (0.60)	4 (6.78)	1 (2.33)	2 (0.47)
Comorbid conditions, n (%)						
Acute renal failure	3 (0.04)	1 (0.13)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Ascites	7 (0.10)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.24)
Cardiopulmonary disease	5024 68.78	654 (84.82)	183 (54.46)	47 (79.66)	27 (62.79)	276 (65.40)
Diabetes	917 (12.55)	141 (18.29)	68 (20.24)	9 (15.25)	12 (27.91)	74 (17.54)
Dialysis	18 (0.25)	8 (1.04)	3 (0.89)	0 (0.00)	0 (0.00)	4 (0.95)
Outcomes						
Mortality, n (%)	42 (0.58)	6 (0.79)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Complications, n (%)	1989 (27.23)	332 (43.06)	111 (33.04)	23 (38.98)	19 (44.19)	121 (28.67)
Hospital LOS, mean ± SD (days)	6.5 ± 7.0	9.8 ± 8.6	7.0 ± 7.5	8.7 ± 7.8	9.0 ± 8.4	7.2 ± 7.9
Discharge to home, n (%)	6502 (89.51)	619 (81.77)	314 (93.73)	54 (93.10)	42 (100.00)	382 (91.17)

Table 1: Demographics, comorbidities, and outcomes by patient race/ethnicity

[a]Includes congestive heart failure, COPD, dyspnea, hypertension, pneumonia, smoking, and ventilator dependence
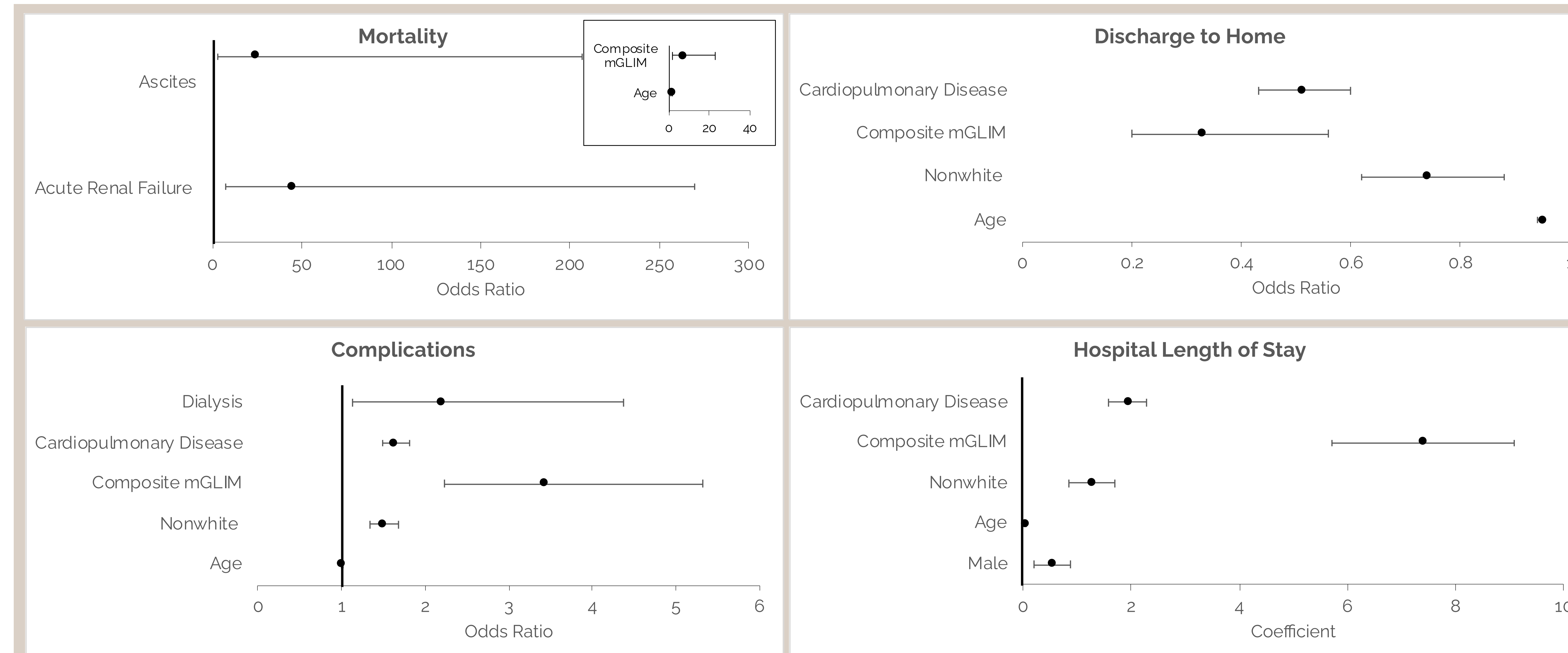

Figure 1: Associations between mGLIM and postsurgical outcomes compared to other variables available in NSQIP

- Of the HNC surgery patients identified by ICD and CPT codes in NSQIP, 0.89% (n = 88) were malnourished by mGLIM criteria.

- Black or African American patients and American Indian or Alaskan Native patients were significantly more likely to meet all three mGLIM criteria compared to White patients ($p < 0.0001$).

- All three mGLIM criteria were independently but less robustly associated with all postsurgical outcomes examined, with recent weight loss appearing to confer the greatest risk for mortality and hypoalbuminemia conferring the greatest risk for postoperative outcomes, increased LOS and not discharging to home.

LIMITATIONS

- Insurance status – a known modifier of outcomes in this surgical population – is not available in NSQIP.

- Many malnourished patients in NSQIP likely did not meet mGLIM criteria secondary to missing data.

- The trade-off between sensitivity and specificity by requiring the presence of all three mGLIM criteria likely unveils only the most severely malnourished patients

- mGLIM criteria inevitably exclude patients who are classified as obese, overweight, or within healthy range by BMI who may also be malnourished. As a result, the true prevalence of malnutrition is likely to be much higher than that reported here.

CONCLUSIONS

1. **Preoperative malnourishment is associated with substantial postoperative risk for surgical HNC patients.**

2. **mGLIM criteria offer a practical, readily accessible tool to identify those at highest risk.**

3. **Adverse malnutrition-related outcomes underscore the need to improve screening techniques and design interventions to meet preoperative oral, enteral, and, if appropriate, parenteral, nutrition goals in this population.**

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