



Low Cervical Paraspinal Skeletal Muscle Index in Head and Neck Surgery with Microvascular Reconstruction

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Marco A. Mascarella, MD, MSc, Lauren Gardiner, MD, Terral Patel, MD, Varun Vendra, MD, MA, Marie-Jeanne Kergoat, MD, Mark W. Kubik, MD, Mario G. Solari, MD, Carl H. Snyderman, MD, MBA, Katie S. Traylor, DO, Shaum S. Sridharan, MD

Introduction

Sarcopenia is increasingly being recognized as a negative prognostic factor in patients with head and neck cancer. Herein we associate sarcopenia biomarkers measured radiographically from routine CT imaging to short-term postoperative adverse events in head and neck cancer patients undergoing microvascular reconstruction.

Methods

- Prospective study of treatment naïve patients undergoing surgery for head and neck mucosal cancer with free tissue reconstruction at a single institution
- Cervical paraspinal skeletal muscle index (CPSMI) was calculated by a one head and neck radiologist using preoperative cross-sectional CT neck imaging and adjusted for height
- Sociodemographic, comorbid, and nutritional variables were collected. Postoperative adverse events were recorded within 30-days of the index surgery
- Multivariate logistic regression was used to evaluate the association between sarcopenia biomarkers and outcomes

Supplemental Figure 1 – Measurement of cervical paraspinal muscle area at the third cervical vertebra

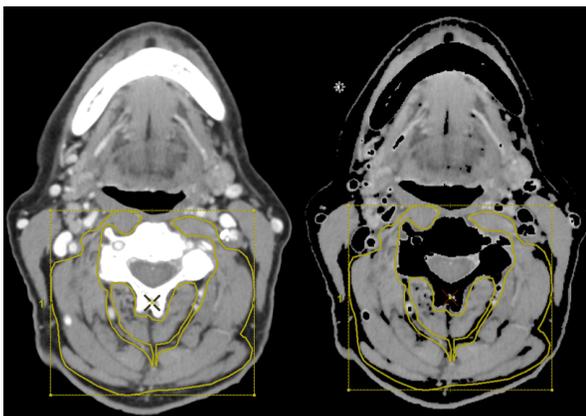


Table 1 – Univariate and multivariate logistic regression using the cervical paraspinal muscle index

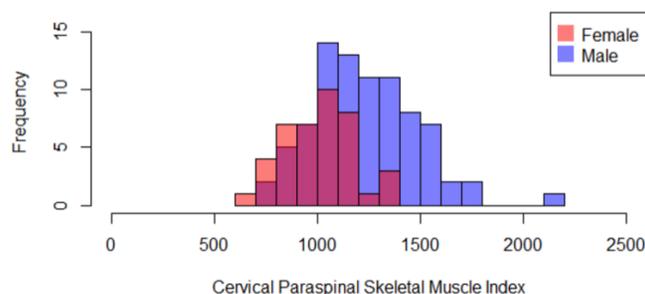
Outcome	Univariate OR	Multivariate OR*
Length of stay in days, mean (SD)	2.29 (1.02-5.16)	2.35 (1.03-5.45)
Clavien-Dindo grade 3+	2.69 (1.21-6.24)	2.80 (1.18-6.99)
Oro/pharyngocutaneous fistula	12.6 (4.01-48)	15.4 (4.39-69.6)
Return to operating room (all cause)	1.49 (0.61-3.62)	-
Free flap failure	2.74 (0.61-12.3)	-
Readmission within 90 days from index surgery	1.71 (0.74-3.87)	-
Death within 1 year	0.44 (0.13-1.32)	-

Adjusted for age, sex, Charlson comorbidity index, clinical stage

Results

- 127 patients, 104 with oral cavity and 24 with laryngeal cancer were included in the study
- Mean age was 60.5 years, and 87 (68.5%) patients were male
- 60 Clavien-Dindo grade 3+ events occurred within 30 days of surgery
- 17 patients developed an oro/pharyngocutaneous fistula. Low CPSMI was independently associated with wound complications including fistula formation (OR 17.1, 95% CI of 3.81-130.9) and prolonged length of stay (OR 4.83, 95% CI of 1.70-15) when adjusted for age, sex and Charlson-comorbidity index.

Figure 1 – Frequency Distribution of Cervical Paraspinal Skeletal Muscle Index by Sex



Discussion

In this study, patients with a low cervical paraspinal skeletal muscle index were more likely to develop Clavien-Dindo grade 3+ adverse events including fistula and prolonged length of stay in hospital following head and neck cancer surgery with microvascular reconstruction.

Several studies have shown correlation between cross sectional area of the paraspinal cervical muscles at the level of the third cervical vertebra on CT imaging of the neck and psoas muscle area.¹⁻³ However, there is a lack of clearly defined cut-off points for low skeletal muscle mass diminishing its validity in research and clinical use.¹ Defined cut-off points for sarcopenia and normative data have been established with DXA unlike CT imaging of the neck.²⁻⁴ Other imaging modalities, specifically with the use of CT imaging have provided surrogate biomarkers. In the head and neck region, CT imaging of the abdomen is not often performed. In these cases, the development of muscle mass quantification using CT neck imaging is practical and quick to measure.

A lower cervical paraspinal skeletal muscle index was independently associated with oro/pharyngocutaneous fistula and prolonged length of stay following head and neck cancer surgery with microvascular reconstruction. Although CPSMI is a biomarker for low skeletal mass in the cervical region, further studies are needed to identify specific threshold values where patients may benefit from prehabilitation and nutritional supplementation.

References

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