Impact of Sarcopenia on Post-operative Complications and Oncological Outcomes of Head and Neck Cancer Patients

Ramez Salameh[1], Amjad Zoabi[2], Tami Slobodov[3], Nariman Abdelhadi[2], Inbar Finkel[4], Orit Gutfeld[5], Anton Warshavsky[1], Gilad Horowitz[1,2], Nidal Muhanna[1,2,], Jobran Mansour[1,6]

1. Department of Otolaryngology, Head and Neck Surgery and Maxillofacial Surgery, Tel-Aviv Sourasky Medical Center, Tel-Aviv, Israel
2. Faculty of Medical and Health Sciences, Tel Aviv University, Tel Aviv, Israel
3. Ben Gurion University of the Negev, Beer Sheva, Israel.
4. Department of Radiation Oncology, Tel Aviv Sourasky Medical Center, Israel.
5. Department of Medical Oncology, Tel Aviv Sourasky Medical Center, Israel.
6. Department of Otolaryngology-HNS, Lewis Katz School of Medicine at Temple University, Philadelphia, Pennsylvania, USA.

Introduction

- Sarcopenia is a progressive loss of muscle mass, strength, and function. It is increasingly recognized as a negative prognostic factor in oncology linked with poor overall survival and increased post-op complications.
- BMI is a crude measure of body size, while sarcopenia provides a more comprehensive assessment of an individual's health, particularly in older adults and oncological patients.
- Sarcopenia impairs nutritional status and delays postoperative healing, increasing the risk of complications after surgery.
- Evidence links sarcopenia to adverse surgical outcomes, chemotherapy toxicity, and reduced survival across multiple cancers.
- This study investigates its prevalence and prognostic impact in head and neck cancer patients undergoing ablative and reconstructive surgery.

Methods

- Retrospective study including patients who underwent ablative head and neck cancer surgery +/- free flap reconstruction.
- Demographic, clinical, and oncological data, including BMI, comorbidities (ECOG, CCI), tumor site, histology, stage (AJCC 8th edition), treatment details, and outcomes—were collected.
- Postoperative complications were classified as medical or surgical and Early (<30 days) or late (CTCAE v5.0)
- Sarcopenia was assessed using the skeletal muscle index (SMI), measured on axial CT scans at the C3 vertebral level, with validated published thresholds. Manual segmentation was performed in Vue Motion software.
- As neck CT imaging was available for all patients, sarcopenia was essentially evaluated at the C3 level.
- Statistical analysis was conducted using JMP SAS (v16), with χ^2 tests applied to evaluate associations between sarcopenia, complications, and oncologic outcomes, considering $p < 0.05$ as significant.
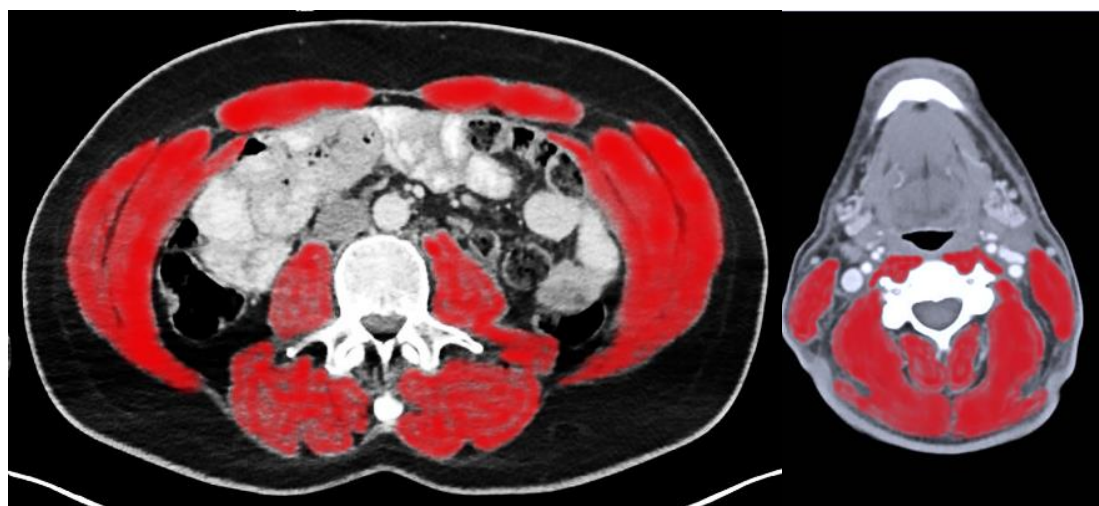

Figure 1: Abdominal wall skeletal musculature at the level of L3 and C3 (a and b, respectively) depicted in red.

Results

- 88 patients were included.
- 59.1% were male, median age was 64 years old.
- Mean BMI was 25.5 kg/m².
- The majority of patients presented with oral cavity squamous cell carcinoma (75%) and advanced stage disease (61.4%).

Results

- Primary oncologic surgery was performed in 77.2% of cases. Glossectomy was the most common surgery 30.7% . Free flap reconstruction used in 65.9% of patients.
- Sarcopenia (measured at the level of C3) was identified in 23 patients (26.1%).
- Sarcopenia was associated with male sex, lower BMI, and higher smoking rates.
- Sarcopenia was not associated with age, comorbidities, tumor characteristics, or treatment modalities.
- Sarcopenic patients experienced significantly higher rates of urinary tract infections (p=0.02) and wound infections (p=0.02), with no differences in fistula formation, flap failure or other complications, ICU admissions, or re-admissions.
- While sarcopenia was not associated with overall survival, it was linked to poorer 5-year recurrence-free survival on univariate analysis (OR 3.97, p=0.006), though not retained on multivariate analysis, where only age and disease stage remained significant predictors of recurrence.

Table 1- Patient and Disease Characteristics

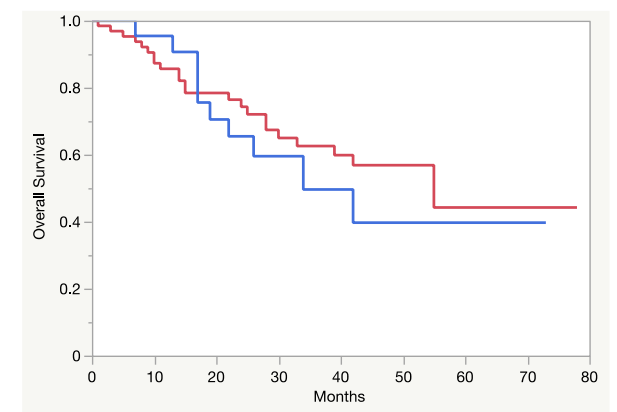| Variable	Total n=88	Sarc. n=23	No Sarc. n=65	p value
Age, median (yrs)	64	63	65	0.49
Male sex	52 (59%)	19 (83%)	33 (51%)	0.02
BMI ≤25	52 (59%)	15 (65%)	37 (57%)	0.48
Smoking (active)	19 (22%)	11 (48%)	8 (12%)	0.04
Oral cavity cancer	66 (75%)	18 (78%)	48 (74%)	0.30
Stage III–IV	54 (61%)	15 (65%)	39 (60%)	0.89
Salvage surgery	20 (23%)	6 (26%)	14 (22%)	0.65
Flap recon.	71 (81%)	21 (91%)	50 (77%)	0.10
Adjuvant therapy (RT/CRT)	39 (44%)	8 (35%)	31 (48%)	0.51

Figure 2: Kaplan-Meier- Overall survival among sarcopenia groups, no significant difference in survival between sarcopenic and non-sarcopenic patients (p=0.57).
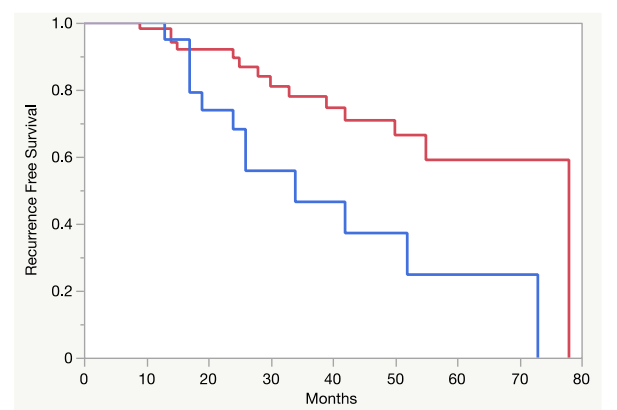

Figure 3: Kaplan-Meier -Recurrence-free survival among sarcopenia groups. A worse RFS was observed in the sarcopenic group (OR 3.97, p=0.006).

Conclusions

- In our study , sarcopenia defined at C3 is correlated with higher surgical site infection rates and a trend towards cancer recurrence after surgery.
- Sarcopenia was not correlated with other immediate or late post-op medical and surgical complications (flap failure, fistula rate) as well as overall survival , contrary to expectations.
- Further research is still needed to clarify the appropriate thresholds for diagnosing sarcopenia, as well as its effects on survival and recovery after surgical intervention