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Commentary: Identifying sarcopenia—can the pectoralis do the heavy lifting?

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CENTRAL MESSAGE

Early identification of sarcopenia can predict overall survival and present opportunities for peri-operative optimization.

It is easy to recognize a healthy physique or, at the other extreme, cachexia. The notorious eyeball test is inevitably part of every surgeon's first subjective evaluation for risk stratification. The challenge lies in identifying and accurately prognosticating the vast majority of patients that remain in the middle. Immunonutrition, sarcopenia, and frailty are parts of a complex continuum that are currently being investigated to understand their purpose as biomarkers for morbidity and mortality.

In this issue of the *Journal*, Sun and colleagues¹ retrospectively review 348 patients undergoing curative surgery for non-small cell lung cancer (NSCLC), exploring sarcopenia as a prognostic factor. They define sarcopenia using preoperative pectoralis muscle indices (PMI) and peak expiratory flow rate (PEFR). Almost one-third of their patient cohort had sarcopenia, which was associated with a lower 5-year overall survival and identified as an independent adverse prognostic factor.

Sarcopenia is defined as a decrease in muscle mass due to malnutrition or a disease process with common measurements, including psoas muscle² indices obtained on abdominal computed tomography (CT) scans. Sun and colleagues choose to use PMI measurements, which are easily obtained on routine chest CT scans for lung cancer management and PEFR to assess respiratory strength, another parameter obtained on routine preoperative spirometry testing. Interestingly, low PEFR or low PMI alone was not an independent prognostic factor, but together they were associated

with lower overall survival. It is unclear which factor is doing the heavy lifting in prognostication when combined together. Compared with psoas muscle measurements, the pectoralis muscle parameter cutoffs to define sarcopenia and accurate adjustments for sex, body mass index, and race are still evolving.

Sarcopenia has proven to be prognostic for overall survival but not necessarily for cancer-specific survival. This is a recurring theme in this study and many others.³ It highlights that sarcopenia is associated with overall poor patient prognosis independent of disease process. Expectedly, several studies have correlated sarcopenia with postoperative complications and readmissions.⁴ However, in this study, neither PMI nor PEFR, nor their combination, was predictive for surgical morbidity. We wonder why these factors lack power in prognosticating these important outcomes; perhaps the variables themselves are not predictive, the measurement or cutoffs of PMI or PEFR need refinement, or the study has limited power.

Sun and colleagues' research on pectoralis muscle index and respiratory strength is a warmup for much-needed prospective studies on defining sarcopenia. As we get closer to better risk stratification, the effectiveness of interventions such as prehabilitation and nutritional supplementation and their impact on changing sarcopenia, will need further investigation. A recent randomized controlled trial on prehabilitation demonstrated increased postoperative functional outcomes, yet translation into decreased mortality remains to be proven.⁵ Much of the research in sarcopenia focuses on preoperative identification, yet worsening of postoperative sarcopenia⁶ is also a poor actor that warrants

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further research and solutions. Although muscle protein dynamics is a work in progress,⁷ what we do know is that more muscle mass is a good thing, and interventions to maintain or increase it are worthwhile.

References

1. Sun C, Anraku M, Kawahara T, Karasaki T, Kitano K, Nagayama K, et al. Respiratory strength and pectoralis muscle mass as measures of sarcopenia: relation to outcomes in resected non-small cell lung cancer. *J Thorac Cardiovasc Surg.* 2022; 163:779-87.e2.
2. Papaconstantinou D, Vretakakou K, Paspala A, Misiakos EP, Charalampopoulos A, Nastos C, et al. The impact of preoperative sarcopenia on postoperative complications following esophagectomy for esophageal neoplasia: a systematic review and meta-analysis. *Dis Esophagus.* March 20, 2020 [Epub ahead of print].
3. Yang M, Shen Y, Tan L, Li W. Prognostic value of sarcopenia in lung cancer: a systematic review and meta-analysis. *Chest.* 2019;156:101-11.
4. Pipek LZ, Baptista CG, Nascimento RFV, Taba JV, Suzuki MO, do Nascimento FS, et al. The impact of properly diagnosed sarcopenia on postoperative outcomes after gastrointestinal surgery: a systematic review and meta-analysis. *PLoS One.* 2020;15:e0237740.
5. Minnella EM, Awasthi R, Loiselle SE, Agnihotram RV, Ferri LE, Carli F. Effect of exercise and nutrition prehabilitation on functional capacity in esophagogastric cancer surgery: a randomized clinical trial. *JAMA Surg.* 2018; 153:1081-9.
6. Otsuji H, Yokoyama Y, Ebata T, Igami T, Sugawara G, Mizuno T, et al. Surgery-related muscle loss and its association with postoperative complications after major hepatectomy with extrahepatic bile duct resection. *World J Surg.* 2017;41: 498-507.
7. Kim IY, Park S, Jang J, Wolfe RR. Understanding muscle protein dynamics: technical considerations for advancing sarcopenia research. *Ann Geriatr Med Res.* 2020;24:157-65.