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EDITORIAL – THORACIC ONCOLOGY

Optimizing Sarcopenia to Strengthen Patient Outcomes After Lung and Esophageal Surgery

Sadia Tasnim, MD[1,2], and Monisha Sudarshan, MD[2]

[1]Digestive Disease and Surgery Institute, Cleveland Clinic Foundation, Cleveland, OH; [2]Thoracic and Cardiovascular Surgery Institute, Cleveland Clinic Foundation, Cleveland, OH

Few quotes ring truer to surgeons than Dr. Cady's Society of Surgical Oncology's presidential address when he said "*Biology is King; selection of cases is Queen, and the technical maneuvers are princes and princesses of the realm who frequently try to overthrow the powerful forces of the King and Queen*". As we continue to make tremendous strides in refining our techniques for cancer, we know that understanding tumor biology and proper selection of patients for surgery is the backbone of successful operative management of malignancies. The investigation of sarcopenia, its accurate identification, use as a prognostic factor, and ability to improve it has been an increasing area of interest to ensure we properly select patients for surgery and to optimize outcomes.

Sarcopenia contributes to frailty and is defined as loss of skeletal muscle mass due to malnutrition or disease process. It has been linked to postoperative recovery and patient outcomes after oncologic resections in several malignancies, including lung, gastric, and pancreatic cancers.[1] In this month's issue of *Annals of Surgical Oncology*, two thought-provoking manuscripts explore how sarcopenia affects lung and esophageal cancer.

Kurita and colleagues[2] investigate the impact of preoperative sarcopenia as measured by the five-time chair stand test (5-CST) and handgrip strength test (HGS). In this retrospective review, 222 male patients had the 5-CST, HGS, and skeletal muscle index performed as an indicator of sarcopenia. The predictive ability of these tests for postoperative pneumonia after minimally invasive esophagectomy was analyzed. Age, 5-CST, and recurrent laryngeal nerve palsy (RLNP) were significant predictors of postoperative pneumonia, although one should note that 5-CST included 1.00 in the confidence internal, with a *p*-value of 0.046. Using other statistical techniques, the authors also concluded that 5-CST statistically improved a risk prediction model with age and RLNP. Interestingly although the HGS was not a significant predictor in this study, the authors' previous study has shown this test to be prognostic of postoperative pneumonia.[3] The authors are on the search for simple, easy-to-conduct preoperative tests that are accurate indicators of sarcopenia and frailty, however it is as yet unclear if 5-CST meets that criteria. By excluding females, the generalizability of their results is greatly limited. It is also possible that no single preoperative test accurately assesses frailty, however a combination may have better predictive ability. It would have been interesting to also see the predictive ability of these tests for complications other than postoperative pneumonia, which was unexplored.

Ushitani et al.[4] focused their investigation on the development and prognostic ability of postoperative sarcopenia. Of a total of 443 patients, 106 patients in their study developed new postoperative sarcopenia as defined by the Psoas Muscle Area Index (PAI) on computed tomography scan. When compared with the group with no sarcopenia, patients with sarcopenia (either pre, post, or both) had worse recurrence-free and overall survival after resection for early-stage non-small cell lung cancer.

The authors raise an important issue—a surgeon's responsibility to successful survival does not end at hospital discharge. Oncologic management includes ensuring the patient thrives after the operation. The retrospective

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M. Sudarshan, MD
e-mail: monisha3@gmail.com; sudarsm2@ccf.org

nature of this study prevented collection of important confounders such as functional status. There was also no information on other surgeries or medical conditions that could have contributed to the development of postoperative sarcopenia.

These studies are delving into an important issue and although the conclusions are limited, they raise important questions and set the stage for further studies. What is the best way to measure sarcopenia? Will prehabilitation impact this measurement and provide us with targets to meet prior to surgery? What are strategies to prevent postoperative sarcopenia? Our quest to strengthen patient selection for optimal outcomes continues with a focus on muscle mass.

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