Thoracolumbar surgery and sarcopenia

TO THE EDITOR: In the December issue of the Journal of Neurosurgery: Spine, Bokshan and colleagues reported that sarcopenic patients had higher postoperative costs and rates of blood transfusion following thoracolumbar spine surgery (Bokshan SL, Han A, DePasse JM, et al: Inpatient costs and blood transfusion rates of sarcopenic patients following thoracolumbar spine surgery. J Neurosurg Spine 27:676–680, December 2017). We found their findings particularly valuable, as this was the first study to evaluate potential unfavorable postoperative effects of sarcopenia in patients who have undergone thoracolumbar spine surgery. We would like to offer some comments to provide an additional perspective for future studies of sarcopenia in this area.

Studies of sarcopenia do not have a long history; the condition was first described by Rosenberg in 1989 as age-related loss of muscle mass in the elderly. Further studies showed, however, that sarcopenia was not limited to the elderly population and that defining sarcopenia solely based on muscle mass measurement was not optimal. In 2009, the European Working Group on Sarcopenia in Older People (EWGSOP) was formed in order to address the need for a broadly accepted clinical definition and consensus diagnostic criteria, among other issues. The criteria for the diagnosis of sarcopenia that emerged from that consensus group specify that documentation of either low muscle strength or low physical performance is required in addition to documentation of low muscle mass. According to the EWGSOP criteria, the definition of sarcopenia in the article by Bokshan and colleagues was suboptimal because patients’ muscle function was not reported and patients were classified solely according to muscle mass measurement, which was based on CT assessment of psoas muscle area at the L-4 vertebral level.

Another point we would like to focus on is the muscle mass measurement technique that Bokshan et al. used in their study. CT analysis of muscle mass has been validated and is recommended by EWGSOP, along with MRI, dual-energy x-ray absorptiometry, and bioelectrical impedance analysis. However, the validated CT analysis technique was total body scan of the muscle tissue, rather than regional single muscle area measurement via CT. In their study, Bokshan and colleagues used psoas muscle area measurement at the L-4 vertebra level via CT, but to the best of our knowledge this methodology has not been validated against the gold standards.

We think that further studies on thoracolumbar spine surgery and sarcopenia should be designed with these points taken into account.

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References

Disclosures
The authors report no conflict of interest.

Response
We appreciate the comments of Dr. Safer and colleagues regarding our recent manuscript. Investigators examining sarcopenia should be aware of the recent International Sarcopenia Initiative to standardize the definition of sarcopenia, as lack of standardization has led to significant heterogeneity in the methods to measure sarcopenia reported in both the general geriatric and the subspecialty literature. As Safer et al. correctly stated, there has been a movement to include not only a measurement of muscle mass in the definition of sarcopenia, but also a measurement of functionality (e.g., grip strength assessment, timed up and go test). This constellation of measurable muscle atrophy along with functional impairment provides significant prognostic information, particularly in the elderly patient.

It must be noted, however, that measures of patient func-
tional assessment are rarely documented during a routine history and physical examination in the spine surgeon's office. While assessment of upper-extremity strength and gait analysis are routine portions of the spine physical examination, these metrics are rarely formalized and documented with grip strength dynamometry or a timed up and go test. We chose the L-4 psoas area as a measure of sarcopenia specifically to assess whether it may be a clinically useful and readily available metric in everyday practice to help in risk stratification. CT and MRI are routinely performed as part of spine surgery evaluation and may provide a clinically relevant assessment of sarcopenia.

Additionally, the working group definition of sarcopenia was developed as a general measure for all patients, and it must be noted that this definition may be flawed with respect to many spinal surgery patients. It is well known that cervical and lumbar spine pathologies commonly occur in tandem, and spinal pathology may influence both grip strength (commonly seen with cervical radiculopathy and myelopathy) and measurements of walking (commonly seen with lumbar spinal stenosis and thoracolumbar deformity) used in the consensus definition. Therefore, while further prospective research should include efforts to employ functional assessments of sarcopenia, researchers should be cautious in applying the results to all spine patients. Finally, we strongly agree with Dr. Safer and colleagues that the L-4 psoas area should be validated against other well-accepted measures of sarcopenia, and this should be done specifically in spine surgery patients due to the possible influence of lumbar pathology (previous surgery, scoliosis, etc.), which may affect psoas morphology.

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