Paraspinal Sarcopenia is Associated with Worsening Cervical Sagittal Alignment following Laminoplasty for Cervical Spondylotic Myelopathy

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INTRODUCTION:
No study has evaluated the impact of qualitative paraspinal sarcopenia on cervical sagittal alignment following laminoplasty for cervical spondylotic myelopathy (CSM). The purpose of the present study was to evaluate whether paraspinal sarcopenia is associated with worsening cervical sagittal alignment following laminoplasty.
METHODS:
We retrospectively reviewed a cohort of consecutive patients undergoing laminoplasty between the years 2010-2021 at a single academic institution. Patients were included if they underwent laminoplasty for cervical spondylotic myelopathy with or without radiculopathy and had standing lateral radiographs of the cervical spine performed preoperatively, 3 months postoperatively, and at 1 year postoperatively. Patient demographics were collected. Two independent reviewers blinded to the radiographic alignment parameters performed Goutalier grading of the bilateral semispinalis cervicis muscles at C5-6. The two reviewers' scores were then averaged, and patients were classified into mild, moderate, and severe sarcopenia subgroups based upon the Fuchs Modification of the Goutalier grading system. Cervical sagittal alignment parameters assessed at each radiographic time point included C2-7 sagittal vertical axis (SVA), C2-7 lordosis, C2 slope, C0-2 cobb angle, and T1 slope. Student's t-tests were performed to assess for statistically significant differences within and between groups. A P-value of <0.05 was utilized to determine statistical significance.
RESULTS:
We identified 146 patients for inclusion in this study, 42 of which had mild sarcopenia and 104 of which had moderate-severe sarcopenia. Patients with moderate-severe sarcopenia were older and had a higher proportion of patients with diabetes (Table 1). There was no difference in preoperative C2-7 SVA or the number of patients with C2-7 SVA ≥ 40 between subgroups. However, the subgroup of patients with moderate-severe sarcopenia demonstrated a significant increase in C2-7 SVA (+6.3; $P<0.001$) from preoperative to 3 months postoperatively and demonstrated a higher C2-7 SVA at 1 year postoperatively than patients with mild sarcopenia (41.9 vs 34.7, respectively; $P=0.04$)(Table 2). The moderate-severe sarcopenia subgroup had a higher preoperative C2-7 lordosis than patients in the mild sarcopenia subgroup (15.5 vs 10.8; $P=0.02$); however, the moderate-severe sarcopenia subgroup demonstrated a significant decrease in lordosis from preoperative (15.5) to 3 months postoperative (10.5; $P<0.001$), leading to no difference in lordosis between subgroups at 3 months or 1 year postoperatively. Patients in the moderate-severe sarcopenia subgroup demonstrated increased C2 slope from preoperative to 3 months postoperative (+3.8; $P<0.001$), increased C0-2 cobb angle from preoperative to 3 months postoperative (+2.3; $P=0.04$), and higher T1 slope at both 3 months and 1 year postoperatively (Table 3).
DISCUSSION AND CONCLUSION:
Paraspinal sarcopenia is associated with worsening cervical sagittal alignment following laminoplasty for cervical spondylotic myelopathy. Additional studies are needed to correlate this worsening cervical sagittal alignment with patient reported outcomes.