World Neurosurg. 2017 Nov;107:445-450. doi: 10.1016/j.wneu.2017.07.173. Epub 2017 Aug 5.

Cervical Paraspinal Muscle Atrophy Rates Following Laminoplasty and Laminectomy with Fusion for Cervical Spondylotic Myelopathy

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PMID: 28790004 DOI: 10.1016/j.wneu.2017.07.173

Abstract

Background: Cervical spondylotic myelopathy (CSM) is a disorder that can cause neurologic deterioration. Studies on paraspinal muscular atrophy (PMA) in the lumbar spine have shown that these changes are caused by several perioperative factors. It is possible that PMA in the cervical

spine could behave similarly. In this retrospective study, we compared the degree of PMA after laminoplasty versus laminectomy and fusion (LF) using a standard posterior approach to the cervical spine.

Methods: 18 laminoplasty and 43 LF patients were included in this study. For each patient, preoperative and postoperative MRI files were obtained and transferred into OsiriX imaging software. Atrophy rate was obtained and reported as percentage change in cross-sectional area of the cervical paraspinal muscles from preoperative to postoperative imaging.

Results: Mean cross-sectional cervical muscle atrophy rates were 6% and 13.1% for laminoplasty and LF, respectively, representing a 2.19 times increase in the degree of atrophy ($P < 0.001$). Independently, LF was associated with a 5.84% increase in the rate of PMA ($P = 0.03$). Involvement of C3 as the cephalad surgical level was associated with a 5.78% decrease in the rate of PMA ($P = 0.03$). For each degree increase in postoperative Cobb angle, there was a 0.66% decrease in the rate of PMA ($P = 0.02$).

Conclusion: PMA should be part of the decision making process when a posterior approach is considered, inasmuch as this study demonstrates that cervical laminoplasty was associated with significantly lower rates of PMA compared with cervical laminectomy and fusion. Additionally, these results suggest that minimizing PMA may help preserve cervical lordosis.

Keywords: Atrophy; Cervical spine; Laminectomy fusion; Laminoplasty; Paraspinal muscle.

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