Laminoplasty Versus Laminectomy and Posterior Fusion for Cervical Myelopathy: A Meta-analysis of Radiographic and Clinical Outcomes

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INTRODUCTION:
For cervical myelopathy, the debate between laminoplasty (LP) and laminectomy with fusion (LF) focuses on a balance between optimizing outcomes while minimizing potential complications. While LF traditionally offers the ability for excellent posterior decompression, it may alter cervical spine biomechanics and increase the risk of adjacent segment degeneration. LP aims to preserve the natural kinematics of the spine but has not been universally accepted, and may be associated with inadequate decompression, neck pain, and recurrent stenosis. This meta-analysis investigates the outcomes of both techniques to guide effective patient selection for these two procedures.
METHODS:
PubMed, Cochrane, and Google Scholar (Pages 1-20) were searched up until March 2024. The outcomes studied were surgery-related outcomes (operating room (OR) time, estimated blood loss (EBL), and length of stay (LOS)), adverse events (overall complications, C5 palsy, and reoperations), radiographic outcomes (cervical lordosis (CL), cervical sagittal vertical axis (cSVA), and T1 slope angle (T1SA)), and patient-reported outcome measures (PROMs) (Neck Disability Index (NDI), Visual Analog Scale (VAS) for neck pain, and Japanese Orthopaedic Association score (JOA))
RESULTS:
Twenty-two studies were included in this meta-analysis, of which 19 were retrospective studies, two were prospective non-randomized studies, and one was a randomized controlled trial. A total of 2,128 patients were included, with 1,025 undergoing LP and 1,103 undergoing LF. LP patients experienced significantly shorter OR time (p=0.009), less EBL (p=0.02), a lower rate of overall complications (p<0.00001) and C5 palsy (p=0.003), a lower T1SA (p=0.02), and a lower NDI (p=0.0004). No significant difference was observed in LOS, the rate of reoperations, CL, cSVA, JOA, or VAS for neck pain (p>0.05 for all).
DISCUSSION AND CONCLUSION:
This meta-analysis demonstrates that for cervical myelopathy, LP has the benefits of shorter OR time, less EBL, and reduced incidence of C5 palsy as well as overall complication rate. Despite these benefits, there appears to be no difference in reoperation rate, alignment parameters, or clinical outcomes between the two procedures. Given these findings, LP remains an important surgical option with a favorable complication profile in patients with cervical myelopathy, although careful patient selection is still paramount in choosing the right procedure for individual patients.