

## Anterior Versus Posterior Approach in Cervical Fusion in Patients with Ossification of the Posterior Longitudinal Ligament

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**INTRODUCTION:** The optimal surgical approach for ossification of the posterior longitudinal ligament (OPLL) is controversial. While an anterior approach offers direct decompression, drawbacks include operative complexity, inability to decompress cranial to C2, and complications of dysphagia or durotomy. Generalizability of OPLL literature to North American patients is limited due to a preponderance of studies comprised solely of non-North American, East Asian patients. This study aimed to compare outcomes of anterior cervical discectomy and fusion (ACDF) versus posterior cervical decompression and fusion (PCDF) for OPLL in a North American cohort.

**METHODS:** Following approval from the Institutional Review Board, we retrospectively identified adult patients with OPLL who underwent 1-4 level ACDF or PCDF at a single tertiary center (2011-2023). Demographic, surgical, and radiographic data were identified through chart review. Radiographic measurements were performed by two fellow-trained spine surgery researchers. Outcomes included length of stay (LOS), drain output, neurologic deficits, 30/90-day readmissions, and 1-year reoperation rate. Opioid utilization was assessed using the Pennsylvania Department of Health Prescription Drug Monitoring Program (PDMP). Bivariate analyses were employed as appropriate for continuous and discrete variables.

**RESULTS:** In total, 48 patients with OPLL were included (32 ACDF, 16 PCDF). The PCDF group had a higher percentage of revision (31.2% vs. 6.3%,  $p=0.033$ ) and trauma (25.0% vs. 3.1%,  $p=0.037$ ) procedures, otherwise the groups were demographically similar. Patients undergoing PCDF had a significantly longer hospital LOS (7.0 vs. 2.6 days,  $p=0.002$ ) and higher postoperative drain output (310 vs. 80 mL,  $p=0.003$ ). There were no significant differences in rates of 30/90-day ED visits or readmissions, 1-year reoperations, or postoperative motor deficits. K-line, C2-C7 Cobb angle, and sagittal vertical axis, were similar between groups. Preoperative and postoperative opioid utilization, measured in milligram morphine equivalents (MME), was similar between groups at all timepoints.

**DISCUSSION:** In this cohort both ACDF and PCDF appeared to be safe and effective for the treatment of OPLL, with no significant differences in major complications or reoperation rates at one year. However, the anterior approach was associated with significantly shorter LOS and decreased drain output. Further work is needed to confirm these findings with more patients and less heterogeneity regarding indications for surgery.

**CLINICAL RELEVANCE:** This study represents one of the largest North American cohorts of patients treated for OPLL and suggests that an anterior approach may be associated with reduced resource utilization for appropriately selected patients. Though further work is needed, this information may inform surgical decision making in similar patients.