Clinical: Deformity

Segmental Correction of Adult Focal Sagittal Plane Deformity Using a Novel Lateral Interbody Approach with Anterior Longitudinal Ligament Release

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Objectives: To present the surgical technique and preliminary results of minimally invasive far lateral approach (LIF) with anterior longitudinal ligament (ALL) release to accomplish focal sagittal plane deformity correction.

Introduction: Correction of sagittal plane malalignment has been increasingly recognized as a critical component to successful treatment of adult spinal deformity. The traditional surgical methods of posteriorly-based osteotomies are technically demanding procedures with significant peri- and post operative morbidity. Minimally invasive procedures, such as LIF, combined with ALL release have not been reported for the treatment of focal sagittal plane deformity.

Methods: Surgical and radiographic records of five patients with adult spinal deformity who had significant sagittal imbalance and focal deformity were retrospectively reviewed. All underwent single level LIF with ALL release. The pre- and post-op segmental sagittal malalignment and global lumbar lordosis were measured and compared to final results.

Results: There were 2 males and 3 females. Mean age at surgery was 50±4 (34±9 to 64±9). The mean follow-up was 36 m (8 to 57). The single level intervention was done at L1-2 in one, L2-3 in two and L4-5 in two patients. The mean pre operative segmental Cobb was +8.4 that corrected to -23.1 and 20.5 in immediate post operative and final visits, respectively. Similarly, the mean pre operative lumbar lordosis was -20 that changed to -39.8 in post operative and to -41.6 in final F/U. The mean correction achieved with one level LIF and ALL release was -30.2 for segmental sagittal deformity and -21.6 for lumbar lordosis. No peri-operative vascular or neurologic injury was observed. One patient had severe metallic allergic reaction that required surgical drainage and one had vertebral body fracture at the upper level of posterior instrumentation that did not required revision.

Conclusion: Our preliminary experience shows that the results of minimally invasive lateral approach combined with ALL release are comparable to traditional posterior open approach using osteotomies in correcting focal sagittal alignment and restoring lumbar lordosis. Moreover, this technique may benefit patients having a lower peri-operative risks and complications. It is important to adhere to surgical detail to avoid complications especially neurovascular injuries.