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Case Series

Surgery Section

Decompression with or without Stabilisation in Cervical Ossification of the Posterior Longitudinal Ligament: A Case Series of Seven Cases

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ABSTRACT

Cervical Ossification of the Posterior Longitudinal Ligament (OPLL) is a common cause of cervical myelopathy requiring surgical intervention. Options include posterior decompression alone or decompression combined with stabilisation. Seven patients with radiologically proven cervical OPLL who underwent posterior cervical surgery were retrospectively reviewed. Three underwent decompression alone, and four underwent decompression with stabilisation. Neurological recovery was assessed using the modified Japanese Orthopaedic Association (mJOA) score. All patients showed postoperative neurological improvement. Patients undergoing decompression alone improved by 1-3 mJOA points, while those undergoing decompression with stabilisation, chosen for kyphosis, multi-segment OPLL, or instability, improved by 2-3 points. The mean improvement in mJOA score was 2.0 in the decompression group and 2.75 in the stabilisation group. Both surgical strategies are effective; however, stabilisation offers better outcomes in cases with kyphosis, long-segment OPLL, or dynamic instability. A tailored approach ensures optimal surgical results.

Keywords: Instability, Laminectomy, modified Japanese Orthopaedic Association (mJOA) score, Myelopathy, Spine

INTRODUCTION

The OPLL is a progressive spinal pathology that commonly affects the cervical spine and leads to cervical myelopathy [1]. Surgical management is recommended when patients demonstrate neurological deterioration, radiological cord compression, or significant disability [2].

Posterior decompression alone is considered appropriate in patients with preserved cervical lordosis and focal or segmental OPLL [3]. Conversely, patients with long-segment, continuous, or mixed OPLL; cervical kyphosis; or dynamic instability benefit from additional stabilisation to maintain alignment and prevent post-laminectomy deformity [4].

CASE SERIES

In this case series, seven patients with cervical OPLL were managed using a posterior approach, with the choice between decompression alone and decompression with stabilisation based on spinal alignment, OPLL morphology, and dynamic instability.

The decompression-alone group included a 58-year-old male with segmental OPLL who underwent C4-C6 laminectomy and improved from an mJOA of 12 to 15, showing marked improvement in fine motor control and gait. A 49-year-old male with focal C5 OPLL and mild myelopathy underwent C4-C6 laminectomy, improving from mJOA 15 to 16 with resolution of sensory symptoms. A 55-year-old female with segmental OPLL at C3-C4 and gait imbalance improved from mJOA 13 to 15 following laminoplasty, with progressive recovery in proprioception and balance.

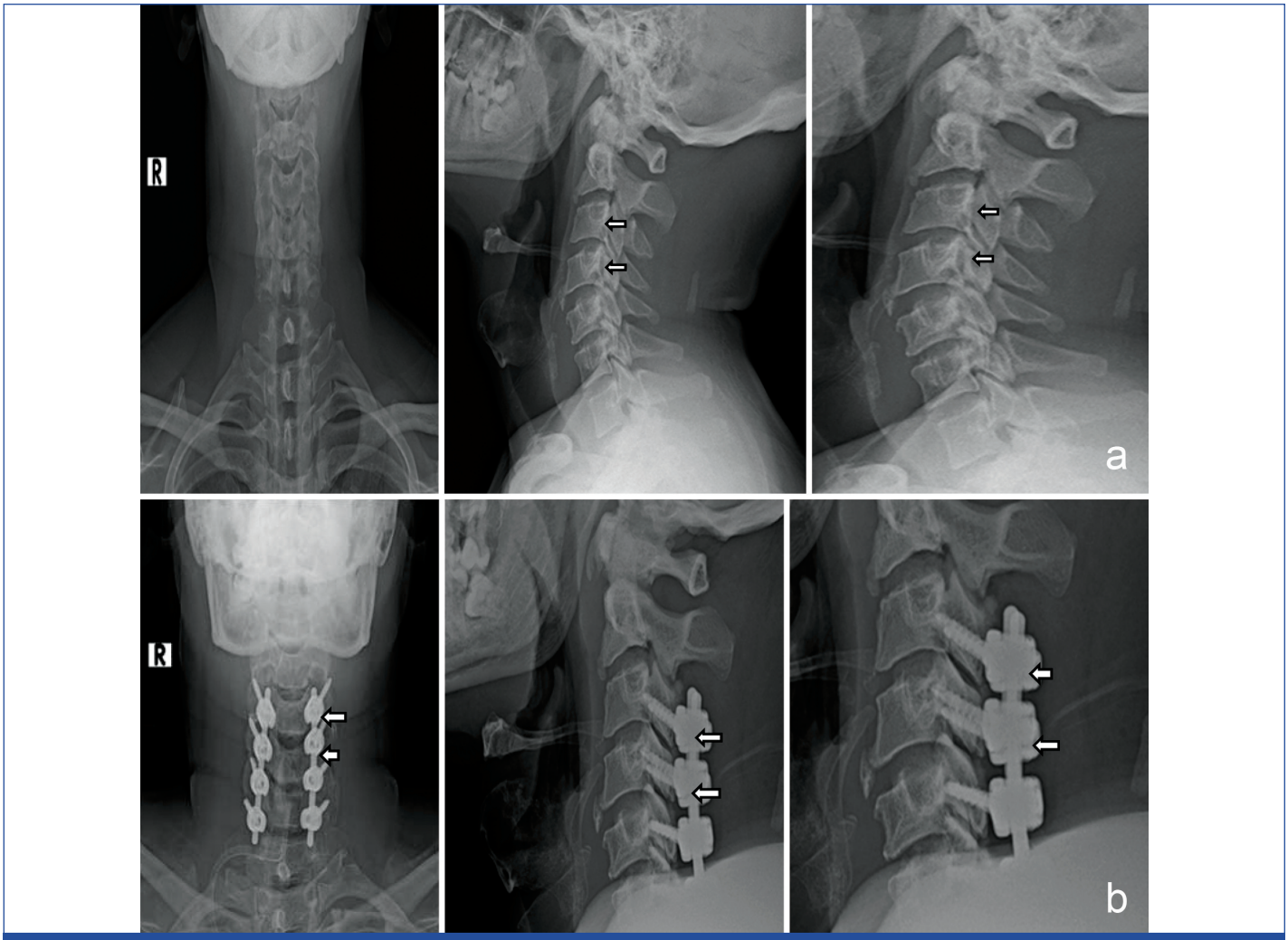
The decompression-plus-stabilisation group consisted of a 57-year-old male with mixed OPLL and kyphosis who underwent C3-C6 laminectomy with fixation, improving from mJOA 11 to 14 with relief of axial pain and limb weakness. A 51-year-old male with continuous OPLL extending from C2-C6 and radiological instability improved from mJOA 9 to 12 following multilevel laminectomy and screw fixation, showing significant neurological and radicular symptom relief. A 40-year-old male with continuous OPLL at C3-C4 and early kyphosis underwent C3-C5 laminectomy with stabilisation, improving from mJOA 10 to 13 with better ambulation and reduced pain. Finally, a 62-year-old female with multisegmented OPLL from C3-C6 and dynamic instability improved from mJOA 14 to 16 after C3-C6 laminectomy and fixation, with notable recovery in grip strength and sensory function. Detailed clinical characteristics were given in [Table/Fig-1]. A few representative radiographs are shown in [Table/Fig-2,3].

DISCUSSION

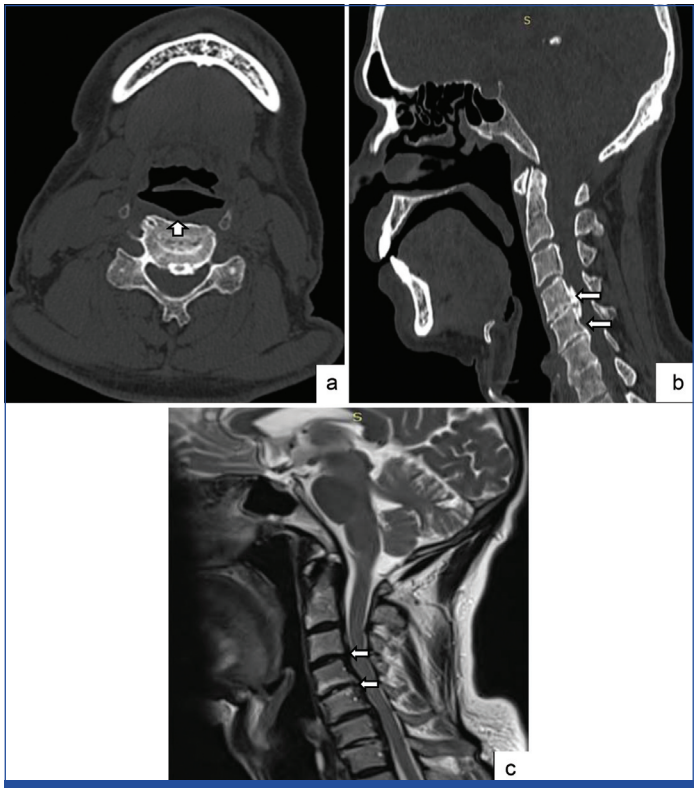
The OPLL is a multifactorial disease process that can cause spinal canal stenosis. It is recognised as one of the most common causes of severe cervical myelopathy, and surgery is often necessary. OPLL

Patient	Procedure	Alignment/Stability	OPLL type	mJOA pre	mJOA post	Improvement
1	Decompression	Lordotic, stable	Segmental	12	15	+3
2	Decompression+Stabilisation	Kyphotic	Mixed	11	14	+3
3	Decompression	Lordotic	Focal	15	16	+1
4	Decompression+Stabilisation	Instability	Continuous	9	12	+3
5	Decompression	Lordotic	Segmental	13	15	+2
6	Decompression+Stabilisation	Early kyphosis	Continuous	10	13	+3
7	Decompression+Stabilisation	Instability	Multi-level	14	16	+2

[Table/Fig-1]: Clinical characteristics and outcomes of patients undergoing posterior cervical surgery for Ossification of the Posterior Longitudinal Ligament (OPLL).



[Table/Fig-2]: Preoperative and postoperative cervical radiographs in a patient with OPLL undergoing posterior decompression and stabilisation; a) Preoperative antero-posterior, lateral cervical spine radiographs demonstrating multilevel Ossification of the Posterior Longitudinal Ligament (OPLL) with loss of physiological lordosis. The lateral view highlights canal narrowing and spinal alignment changes associated with compressive pathology; b) Postoperative anteroposterior and lateral radiographs, showing adequate decompression with placement of bilateral lateral mass screws and rods (arrows).



[Table/Fig-3]: a) Axial CT cervical spine showing Ossification of the Posterior Longitudinal Ligament (OPLL) with spinal canal narrowing (arrows); b) Sagittal CT cervical spine showing multilevel OPLL causing cervical canal stenosis (arrows); c) Sagittal MRI of the cervical spine showing OPLL with resultant cervical spinal canal narrowing (arrows).

is a common disease in Asian countries, with reported prevalence of 1.9% to 4.3% in Japan and 3.4% to 5.7% in Korea [5].

Iwasaki M et al., demonstrated that outcomes following laminoplasty are significantly influenced by cervical alignment and OPLL morphology, with poorer results observed in patients with kyphotic alignment and a high occupying ratio (>60%) [6].

Ma L et al., in a meta-analysis, reported that laminoplasty and laminectomy with fusion provide comparable neurological recovery; however, fusion procedures are superior in maintaining cervical lordosis [7].

Lee JJ et al., reported in a retrospective study of 273 patients with multilevel cervical OPLL that laminoplasty demonstrated significantly higher postoperative JOA recovery rates and lower complication rates than laminectomy and fusion, despite the latter being more effective at limiting OPLL progression [8].

Both Posterior Decompression and Fusion (PDF) and Laminoplasty (LAMP) have been used to treat cervical myelopathy due to multilevel OPLL. However, considerable controversy exists over the choice of the two surgical strategies. Xu P et al., included nine studies, involving 324 patients. The current study suggests that compared with LAMP, PDF achieves a lower OPLL progression rate, better postoperative cervical curvature, and similar neurological improvement in the treatment of multilevel cervical OPLL. However, PDF has a higher complication rate, more surgical trauma, and higher postoperative Visual Analogue Scale (VAS) VAS than LAMP [9].

A prospective multicenter study by Nakashima H et al., reported that both laminoplasty and posterior fusion result in significant

neurological improvement, though fusion better maintains cervical alignment and prevents postoperative kyphotic changes [10].

These findings align with existing evidence supporting fusion in kyphotic, unstable, or multi-segment OPLL cases.

We observed that not only overt kyphosis or instability, but also early alignment changes and multilevel disease patterns, influenced functional recovery. Patients with preserved lordosis and focal disease achieved satisfactory outcomes with decompression alone, whereas those with borderline alignment or extensive OPLL demonstrated more consistent improvement with stabilisation.

CONCLUSION(S)

Posterior decompression alone appears to be effective in carefully selected patients with preserved cervical lordosis, focal OPLL, and stable biomechanics. In contrast, decompression with stabilisation was associated with better alignment maintenance and more consistent neurological improvement in patients with kyphosis, multilevel disease, or instability. However, these findings are based on observations from a small case series. Larger studies are required to validate these trends and establish definitive comparative outcomes.

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