Anterior Spinal Cord Decompression via a Posterolateral Approach for the Treatment of Ossification of the Posterior Longitudinal Ligament in the Thoracic Spine: A Prospective Cohort Study

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INTRODUCTION:
Several surgical procedures have been developed to treat ossification of the posterior longitudinal ligament (OPLL) in the thoracic spine. However, favorable surgical results are not always achieved, and standard protocol and procedure for the surgical treatment of thoracic OPLL have not been established yet. Beak-type OPLL in the thoracic spine is known to be the most complicated in terms of clinical symptoms and surgical management. We developed a novel procedure to remove or float the OPLL in the thoracic spine via a posterolateral approach (Figure 1). This procedure allows the surgeon to perform anterior decompression for thoracic OPLL more safely and effectively than in conventional procedures. In this study, we describe this surgical procedure and report the clinical outcomes according to our surgical strategy for thoracic OPLL.

METHODS:
For a large and localized OPLL, particularly beak-type OPLL, which occupies more than 50% of the spinal canal diameter, the appropriate treatment strategy is anterior decompression using our technique, followed by posterior instrumented fusion. In this technique, with the patient in the prone position, we performed total resection of the posterior elements at the anterior decompression levels. This maneuver includes laminectomies and removal of the transverse processes and pedicles, which allows space creation bilateral to the dural sac and the targeted OPLL for subsequent anterior decompression (Figure 2). The thoracic nerves at the levels of anterior decompression were ligated bilaterally and lifted to improve the view of the OPLL and the anterolateral aspect of the dural sac with controlled bleeding (Figure 2). Anterior decompression was then performed postero-laterally. For other types of OPLL, posterior decompression with instrumented fusion is indicated. Between 2011 and 2021, using this strategy, we operated on 40 patients with myelopathy due to thoracic OPLL. Fifteen patients underwent anterior decompression via a posterolateral approach. We prospectively analyzed clinical outcomes over a minimum 1-year follow-up period.

RESULTS: The recovery rate, according to the Japanese Orthopedic Association score, was 65% in the anterior decompression group and 52% in the posterior decompression group. In all 15 patients in the anterior decompression group, adequate OPLL removal or floating was achieved without significant complications (Figures 3). Of the 9 patients in the anterior decompression group who had been non-ambulatory preoperatively due to severe myelopathy, all recovered ambulatory status. Of the 8 patients in the posterior decompression group who had been non-ambulatory preoperatively due to severe myelopathy, 2 remained non-ambulatory.

DISCUSSION AND CONCLUSION: Our results in terms of postoperative clinical outcomes for thoracic OPLL were favorable without significant complications. The results indicate that anterior decompression is appropriate for patients with beak-type OPLL, who generally have severe neurological symptoms. Thus, anterior spinal cord decompression using our technique appears to be safe and effective.

Figure 1

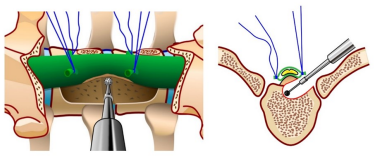

Figure 2

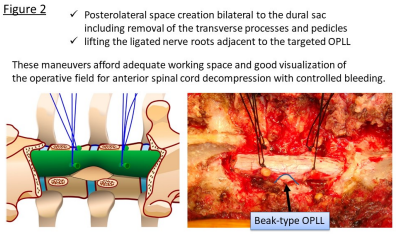

Figure 3