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(CASE REPORT)

UPPER THORACIC MYELOPATHY DUE TO COMBINED OSSIFICATION OF THE POSTERIOR LONGITUDINAL LIGAMENT AND LIGAMENTUM FLAVUM AT THE SAME LEVEL: A CASE REPORT

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ABSTRACT

Thoracic ossification of the posterior longitudinal ligament (OPLL) combined with ossification of the ligamentum flavum (OLF) is an uncommon cause of myelopathy, especially in our population. The optimal treatment for this thoracic myelopathy remains controversial, and the high risk of postoperative paralysis remains a major complication. We report the case of a 66-year-old man with progressive spinal cord compression due to simultaneous OPLL and OLF at T2–T3. Posterior decompression by T2–T3 laminectomy was performed without extirpating the OPLL. Postoperatively, symptoms improved greatly, with residual hyperreflexia and grade 3/5 muscle strength in the lower extremities.

Conclusion: Simultaneous OPLL and OLF in the same thoracic segment is very challenging and risky to treat, regardless of the surgical method selected. Early surgery should be considered for OPLL and OLF in the thoracic spine.

Keywords: Ossification of the posterior longitudinal ligament, Ossification of the ligamentum flavum, Thoracic myelopathy, Posterior decompression

1 INTRODUCTION

Simultaneous ossification of the posterior longitudinal ligament (OPLL) and ligamentum flavum (OLF) at the same thoracic level is rare but can occur [1, 2]. It is thought to be multifactorial, involving genetic predisposition, local biomechanical factors, and metabolic abnormalities [3]. Its exact cause and pathogenesis are not fully understood.

2 CASE REPORT

A 66-year-old man presented with progressive weakness in the lower extremities, difficulty walking, and bilateral hand clumsiness. Neurological examination revealed spastic paraparesis, hyperreflexia, and a positive Babinski sign. Sensory examination showed decreased vibratory sensation below the T4 level.

MRI of the thoracic spine demonstrated ossification of the posterior longitudinal ligament and ligamentum flavum at the T2–T3 level, resulting in severe spinal cord compression (Figure 1). The spinal cord appeared compressed between the anterior and posterior ossified lesions, leading to the clinical manifestations observed.

Figure 1: Preoperative thoracic MRI showing severe spinal cord compression at T2–T3 by simultaneous ossification of the posterior longitudinal ligament and ligamentum flavum.

2.1 Surgical intervention

Due to the patient's deteriorating neurological symptoms and the severe compression observed on imaging, surgical intervention was recommended. A posterior approach was chosen for decompression.

During surgery, a T2–T3 laminectomy was performed to expose the affected region and decompress the spinal cord. The OLF was removed, taking care not to damage the neural structures; the OPLL was not extirpated.

Postoperative course: Following surgery, the patient experienced gradual improvement in his neurological symptoms. Spasticity decreased, muscle strength improved, and gait disturbances diminished, although residual hyperreflexia and grade 3/5 muscle strength in the lower extremities persisted. Postoperative MRI showed decompression of the spinal cord and adequate spinal alignment.

2.2 Long-term follow-up

The patient was followed up for one year after surgery. He showed sustained improvement in his neurological symptoms and maintained good spinal stability. Periodic imaging studies were performed to monitor for any signs of recurrence or complications, but no abnormalities were observed during the follow-up period.

3 DISCUSSION

Thoracic myelopathy resulting from simultaneous OPLL and OLF at the same level is a rare condition. This unique combination of pathological changes can lead to spinal cord compression and neurological symptoms [1, 2]. The exact cause of simultaneous OPLL and OLF is not fully understood. It is believed to result from a combination of genetic predisposition, metabolic abnormalities, and local biomechanical factors [3], which contribute to abnormal calcification and ossification of both the posterior longitudinal ligament and the ligamentum flavum.

Patients with thoracic myelopathy due to simultaneous OPLL and OLF typically present with symptoms related to spinal cord compression. These may include pain, sensory disturbances, motor weakness, gait abnormalities, and bowel or bladder dysfunction. The severity and distribution of symptoms depend on the extent and level of compression [2].

Diffuse idiopathic skeletal hyperostosis (DISH), also known as Forestier's disease, is an idiopathic rheumatological disorder in which exuberant ossification occurs along ligaments throughout the body. It is characterized mainly by ligamentous ossification of the anterolateral side of the spine, sparing the disc and joint space [4]. Although typically asymptomatic, DISH has been associated with neurological problems [5], with a reported rate of 4% [6].

In our case, simultaneous OPLL and OLF was not associated with DISH. The management of thoracic myelopathy due to OPLL and OLF is challenging. First, the OLF makes posterior decompression necessary, but laminectomy alone in the thoracic spine may be insufficient, because the natural kyphosis restricts a backward shift of the spinal cord and decompression alone carries a long-term risk of kyphotic deformity [7]. Hioki et al. [1] described a patient with combined OPLL and OLF who underwent laminoplasty at C3–T1 and laminectomy at T2–T3. Her symptoms improved immediately and dramatically after posterior decompression, but anterior decompression at T2 was subsequently performed, and the authors concluded that posterior decompression alone was inadequate in that case. Second, if OPLL extirpation is performed, the spinal cord at the site of compression is vulnerable to damage. Several surgical procedures for thoracic OPLL, including anterior, posterior, and combined anterior and posterior approaches, have been associated with a high risk of postoperative neurological deterioration [8]. To evaluate the outcomes of different surgical methods in the treatment of thoracic OPLL, Matsumoto et al. [8] conducted a retrospective multi-institutional study. Despite the lack of statistically significant differences in surgical outcomes among the methods, neurological deterioration was observed more frequently when the OPLL was excised or thinned and floated than when the lesion was left untouched.

In our patient, posterior decompression by T2–T3 laminectomy without extirpation of the OPLL was followed by marked neurological improvement at one year, although residual hyperreflexia and grade 3/5 lower-limb strength persisted. Early surgery has been recommended for combined OLF and OPLL at the same level [2], and our experience is consistent with this recommendation, although a single case does not allow firm conclusions. The main limitations of this report are its single-case design and a follow-up limited to one year.

4 CONCLUSION

Simultaneous ossification of the posterior longitudinal ligament and ligamentum flavum at the T2-T3 level can result in thoracic myelopathy. Early diagnosis, careful surgical planning, and timely intervention are crucial for achieving successful outcomes and improving patients' quality of life. Further studies and case reports are needed to enhance our understanding of this rare condition and refine treatment approaches.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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Disclosure of conflict of interest

The authors declare that they have no conflicts of interest.

Statement of informed consent

The patient gave his informed consent to publish his case.

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