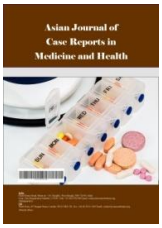

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A Ligamentum Flavum Cyst of Lumbar Spine in a 67-Year-old Man Presenting with Neurogenic Claudication

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Case Study

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ABSTRACT

Aims: Ligamentum flavum cysts are rare and may lead to compression of the spinal cord or surrounding structures which ultimately may require surgery. We report a case of a ligamentum flavum cyst presenting with neurogenic claudication with its clinical, radiological, and histopathological features.

Presentation of Case: We present a case of a 67-year-old male with chronic back pain, progressive bilateral neurogenic claudication, and worsening radicular symptoms in the right leg. A 9-mm cystic mass was revealed by MRI in the epidural space at the L4-5 disc level. After successful resection of the cyst, complete remission was achieved.

Discussion: Ligamentum flavum cysts may be confused with other benign cystic lesions called juxtafacet cysts comprising synovial cysts and ganglion cysts. In addition to typical histopathological findings, the anatomic location confirms the diagnosis. Surgical decompression with complete excision has been shown to be the most successful treatment strategy.

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Conclusion: Ligamentum flavum cysts are uncommon causes of spinal compression. Removal of these lesions provides the disappearance of patients' complaints.

Keywords: Ligamentum flavum; cyst; lumbar; spinal; pathology.

1. INTRODUCTION

The ligamentum flavum is a short and thick ligament lying in the posterior aspect of the spinal canal connecting adjacent vertebrae from C2 to S1. At each level, the ligaments originate from the lower anterior aspect of the superior laminae and attach to the upper posterior aspect of the inferior laminae and laterally to the Z-joints [1]. Ligamentum flavum is a structure consisting mainly of elastin and collagen fibers. It becomes thicker while running from cervical to lumbar regions.

Cysts of the ligamentum flavum, first described by Moiel et al. in 1967, are infrequent, and very few cases have been described in the literature [2]. These cysts are thought to be formed secondary to ligamentous and fibrocollagenous tissue degeneration and hypermobility of the spinal segment [3]. Ligamentum flavum cysts are rare causes of radiculopathy and spinal cord compression due to their location. As of October 2021, 77 ligamentum flavum cysts in the lumbar spine were reported in the literature and 20 of these cases were associated with motor weakness [4].

Here, we present a case of a 9 mm ligament flavum cyst, located in the epidural space at the level of L4-5 intervertebral disc, which caused neurologic compromise.

2. PRESENTATION OF CASE

A 67-year-old male patient, who previously had complaints of back pain, presented with bilateral progressive neurogenic claudication during the month preceding our consultation. His left limb complaints worsened over time and later on extended to the right limb. The patient did not report apparent trauma. The increasing pain affected his daily activities and his walking distance decreased gradually. According to the visual analog scale, his back pain score was increased from 5/10 to 8/10 and leg pain was at 8/10 intensity during the month preceding our consultation. Sensory and motor examination was unremarkable and bladder and bowel functions were normal.

The patient had a magnetic resonance imaging (MRI) study obtained eight months ago. The MRI showed mild spinal canal narrowing due to hypertrophies of both facet joints and ligamentum flavum (Fig. 1a). We ordered a new MRI study to evaluate the worsening symptoms. The second MRI revealed a droplet-like cyst of 9 mm in diameter in the midline at the L4-5 intervertebral disc levels without any contact with the facet joint (Fig. 1b).

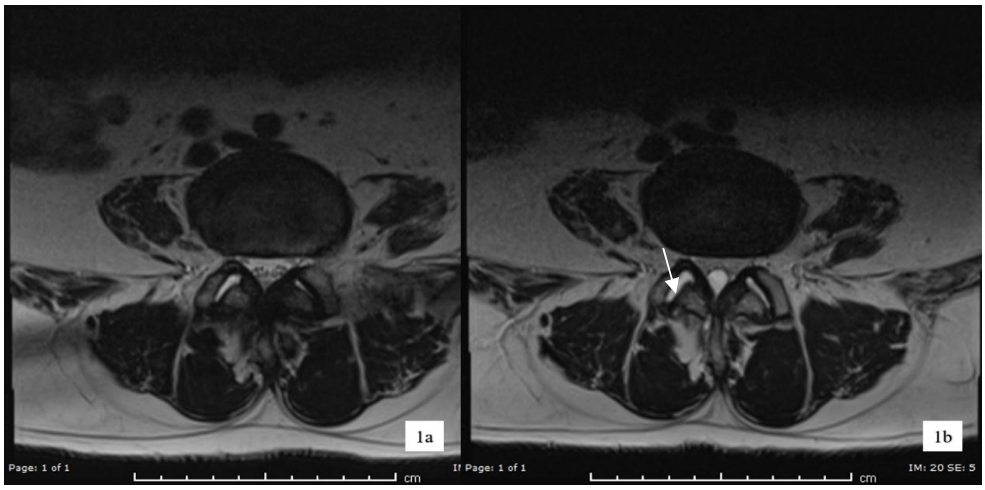

Fig. 1. The first MRI showed mild spinal canal narrowing due to hypertrophies of both facet joints and ligamentum flavum (a) The second MRI revealed a droplet-like cyst of 9 mm in diameter (arrow) in the midline at the L4-5 intervertebral disc levels without any contact with facet joint (b)

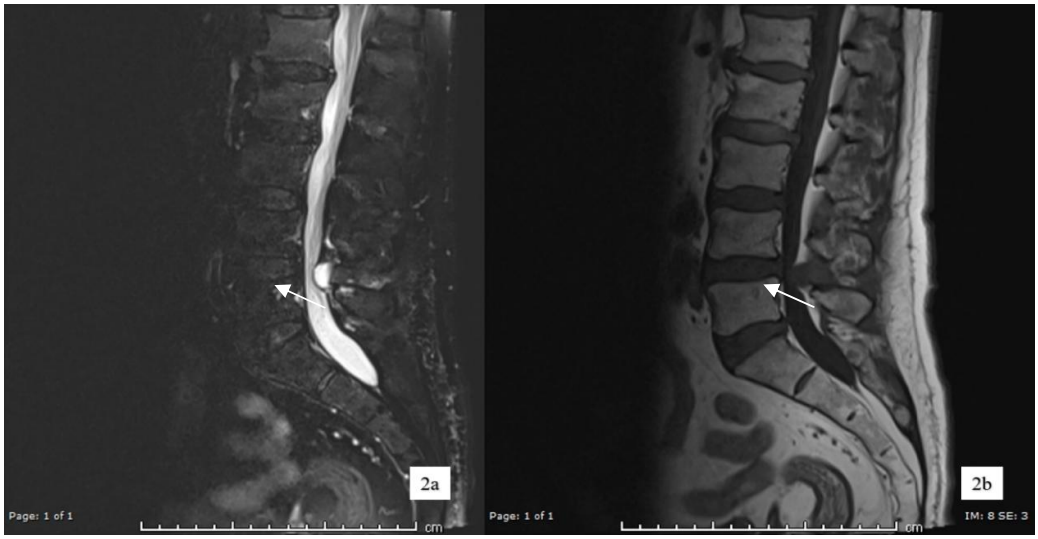

Fig. 2. The lesion was reviewed (arrow) in sagittal short tau inversion recovery (STIR) (a) and sagittal T1 (b) images. The lesion was seen posteriorly adjacent to the lamina at the level of L4-L5, hyperintense in STIR sequence, and hypointense in T1 sequence

The lesion was reviewed in sagittal short-TI inversion recovery (STIR) (Fig. 2a) and T1 (Fig. 2b) images. A surgical operation was recommended to the patient.

The patient was placed under general anesthesia in the prone position. A longitudinal midline incision with exposure of the L4-L5 junction was made and then a right-sided L4 hemilaminectomy together with flavectomy were performed. During flavectomy, we visualized a 1.5 cm cystic mass containing yellow fluid was arising within the dorsomedial part of ligamentum flavum. The mass was compressing the thecal sac and slightly adherent to the dura. The cystic lesion was dissected from the dura and resected totally. The thecal sac was decompressed (Fig. 3a). After successful resection of the cyst, complete remission was achieved. Five months after the operation, a control MRI did not show any residual lesion.

Histopathological examination showed vascularized, hemorrhagic, and dense fibrocollagenous cyst wall. Fibrin deposition and hemorrhage were present in the cystic space. There was no cyst-lining epithelium (Fig. 3b). Histopathological and radiological findings were consistent with a diagnosis of ligamentum flavum cyst.

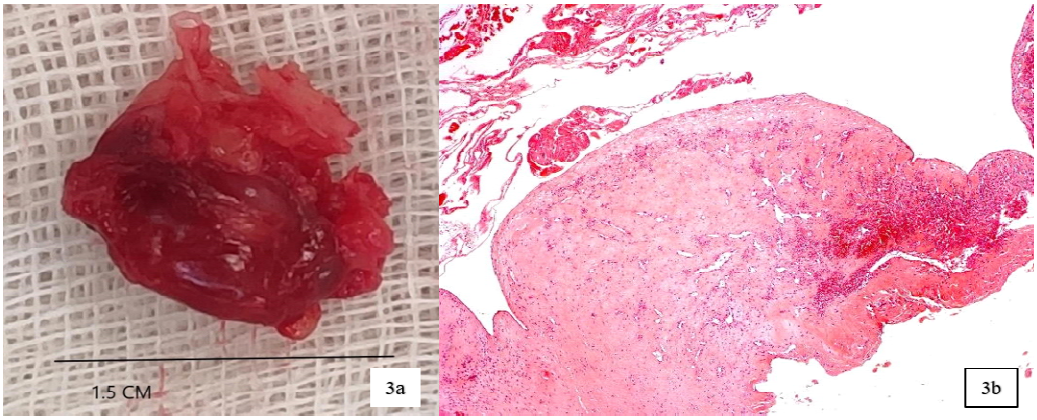

Fig. 3. Gross appearance of the cyst after the excision (a) Histopathological examination of the cyst showed a cyst wall that is composed of vascularized, hemorrhagic, and dense fibrocollagenous tissue. Fibrin deposition and hemorrhage were present in the cystic space. There was no cyst-lining epithelium (Hematoxylin-eosin stain, 100X magnification) (b)

3. DISCUSSION

Flaval ligaments are paired ligaments, running between the laminae of adjacent vertebrae. They laterally attend to the stability of the Z-joint and may function in maintaining the posture as well as preserving the curvature of the spine. Ligamentum flavum cysts, by definition, arise within this ligament [5]. The exact pathogenesis of these rare cysts remains unknown, however, it is thought to be a degenerative process and caused by microtrauma at a certain motion segment or associated with segmental instability and local stress [6].

Ligamentum flavum cysts represent a manifestation of the spectrum of degenerative disease of the spine. These lesions are predominantly detected in the lumbar spine but can be found, less commonly, in the cervical spine. The most common location is at the L4-5 level, the most mobile part of the spine, followed by the L5-S1 and L3-4 levels [7,8]. Due to their critical location and depending on their size and growth rate, ligamentum flavum cysts may cause compression of the spinal structures as in the case of spinal stenosis or disc herniation. The symptoms include radicular pain (97%), sensory (55%) or motor (39%) deficits, Lasègue's sign (33%), and abnormal reflexes (18%) [9]. In our case, the patient was suffering from neurogenic pain and claudication due to cyst compression.

Ligamentum flavum cysts may be confused with other benign cystic lesions called juxtafacet cysts comprising synovial cysts and ganglion cysts. The main feature distinguishing them is the location. Ligamentum flavum cysts arise inside the ligamentum flavum, while the latter originates from the joint capsule [5]. Histologically, both types of cysts have a fibrous capsule and may show signs of degeneration including hemorrhage, fibrin deposition, and calcification. Synovial cysts are distinguished by the presence of a synovial layer, while the others have no overlying epithelium [9]. Histopathological examination in our case showed a cyst wall consisting of vascularized, hemorrhagic, and dense fibrocollagenous tissue. A cyst-lining epithelium was absent. These findings together with the anatomic location were consistent with a diagnosis of ligamentum flavum cyst [10].

Percutaneous steroid injection or aspiration of the juxtafacet cysts have shown a limited effect on the treatment. Surgical decompression with complete ligamentum flavum cyst excision has been the most successful treatment strategy with excellent results [7]. After thorough inter-disciplinary discussions, we suggested a surgical intervention for our case. Following the surgery, the patient demonstrated good functional recovery and resolution of symptoms.

4. CONCLUSION

Ligamentum flavum cysts are uncommon causes of spinal cord compression, low back pain, and radiculopathy. Their diagnosis may be delayed due to their rare occurrence and nonspecific clinical and radiological findings. Ligamentum flavum cysts should not be forgotten in the differential diagnosis of a patient presenting with symptoms of lumbar canal stenosis. Surgical treatment of such patients is extremely successful, as in our patient.

CONSENT

Written consent was obtained from the patient for publication of this case report.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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