

Ligamentum flavum hematoma in the lumbar spine mimicking epidural tumor: A case report

^{1,2,4}Cheng-Ta Hsieh, ^{1,2,3}Chih-Ju Chang, ^{1,2}Kun-Chuan Chang

¹Division of Neurosurgery, Department of Surgery, Cathay General Hospital, Taipei; ²Department of Medicine, School of Medicine, Fu Jen Catholic University, Taipei; ³Department of Mechanical Engineering, National Central University, Taoyuan; ⁴Graduate Institute of Basic Medicine, Fu Jen Catholic University, Taipei, Taiwan

Abstract

Nerve root compression due to ligamentum flavum hematoma is extremely rare, with less than 70 cases reported in the literature. The clinical presentation and images were similar to those of spinal epidural tumors. Herein, we reported a previously healthy 64-year-old female who presented with right radicular leg pain. Neurological examination was consistent with right L5 root compression. The magnetic resonance imaging revealed a mass posterior to the L5 thecal sac, appearing as high intensity on T1-weighted and T2-weighted images. During operation, the dark hematoma within the ligamentum flavum was found. The pathological examination confirmed the diagnosis of hemorrhage. Her prognosis following surgery was excellent.

INTRODUCTION

Sciatica due to nerve root compression is frequently caused by a herniated disc, hypertrophic ligamentum flavum, degenerative spinal stenosis, infection, or tumor.¹ However, ligamentum flavum hematoma has been rarely reported as a cause of nerve root compression, and may mimic epidural tumor.² Herein, we report a case of ligamentum flavum hematoma in the lumbar spine mimicking epidural hematoma and review the relevant literature.

CASE REPORT

A 64-year-old female presented with an 8-week history of low back pain radiating to the right leg. She had been a transport worker for many years. For 2 years before admission, she experienced intermittent low back pain and did not undergo medical examination. She has been diagnosed to have hypertension, but had not been taking antihypertensive medication. She has no recent history of trauma, lumbar surgery or puncture. There was a 3kg of body weight loss noted during the past 3 months. On admission, she was afebrile, alert, and oriented. Neurological examinations revealed right postero-lateral pain in the right leg on stretching, with paresthesia on the dorsal face of the right foot, compatible with right L5 dermatome pathology. The remainder

of the general examination was unremarkable. Laboratory examinations revealed no abnormal findings. No bleeding diathesis was found.

The radiographs of the lumbar spine revealed marginal spur formation and grade I spondylolisthesis at L4 to L5. The magnetic resonance imaging (MRI) of the lumbar spine revealed a mass, measuring about 2.6x1.3x1.2cm in size, at a location posterior to the L5 thecal sac level (Figure 1). The mass appeared as high intensity on T1-weighted and T2-weighted images. Based on these findings, spinal epidural tumor was diagnosed. The patient then received laminectomy of L4 to L5 and postero-lateral fixation with transpedicular screws from L4 to S1 plus inter-transversal bone grafts. At operation, a solid brownish mass firmly adherent posteriorly to the dural sac at the L5 region was resected with difficulty. The content of the mass was mixed with solid and brownish liquid. The histological examination revealed the presence of collagenous fibrous tissue exhibiting fibroblastic proliferation and scattered gaping, hemorrhagic, and thin-walled blood vessels (Figure 2A and B). Immunohistochemical study showed that the cells were negative for actin (Figure 2C), S-100 protein (Figure 2D) and beta-catenin (Figure 2E). No evidence of malignancy was seen. The pathological examination confirmed a diagnosis of hematoma. After the operation, the

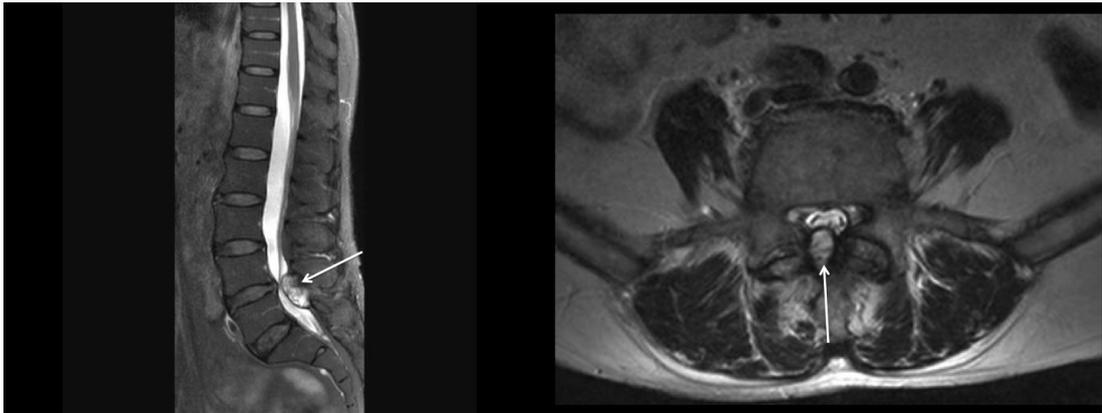


Figure 1: T2-weighted magnetic resonance images of the lumbar spine. (A) Sagittal view showed that the mass was at the dorsal aspect of the location posterior to the L5 thecal sac level. (B) Axial view showed that the mass was within the ligamentum flavum.

previous symptoms showed gradual improvement. On follow-up 6 months later, the patient was completely asymptomatic.

DISCUSSION

With the aging process, sciatica due to lumbar nerve root compression is commonly caused by lumbar herniated discs, hypertrophic ligamentum flavum, degenerative spinal stenosis, cyst or sometimes tumor.¹ Epidural hematoma is infrequently described as a cause of nerve root compression, which is most commonly associated with multilevel surgery, coagulopathies, neoplasms, post-lumbar puncture or the use

of anticoagulant medication.³ Most patients harboring acute epidural hematoma may present with rapidly deteriorating neurological deficits including numbness, leg weakness or incontinence.⁴ Although the spinal canal of the lumbar spine is relatively wide, chronic lumbar epidural hematoma is very uncommon, and some may present with signs similar to epidural tumors.^{3,5} However, compared with epidural hematoma, LFH resulting in nerve root compression is extremely rare. Since the first case was described by Sweasey *et al.* in 1992⁶, less than 70 have been reported in the literature.² Although the ligamentum flavum serves to bridge the space

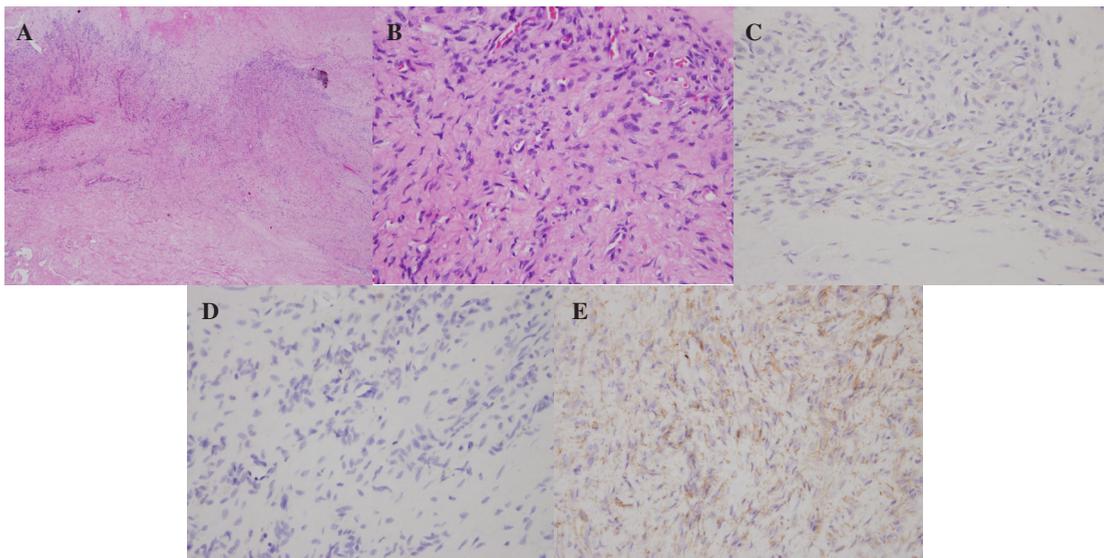


Figure 2: Histology examination of the tissues removed during surgery showing (A) Focal hypercellularity with spindle cells proliferation (Hematoxylin and eosin stain, 40X) (B) Mixed with fibroblasts and small vessels proliferation (Hematoxylin and eosin stain, 400x). Immunohistochemical staining showing that the mass was negative to actin (C), S100 (D) and beta-catenin (E).

between the laminae of adjacent vertebrae from the cervical to the lumbosacral region, a review of 65 patients with ligamentum flavum hematoma showed most cases (89.2%) occurred in the lumbar spine.^{2,7} The mean age was 65.5 years and most patients were male.²

Normal ligamentum flavum is composed of elastic fibers and collagen. It is poorly vascularized with few small vessels passing through it.⁸ Because of the poor vascularization, intra-ligamentous bleeding is very rare. The mechanism of development of ligamentum flavum hematoma remains unclear. The major mechanism has been hypothesized to be the bleeding related to irregular vessels with thin walls in a degenerative and hypertrophied ligamentum flavum.¹ When there is an increase in intra-abdominal pressure or a small trauma, the tearing of these vessels may lead to the development of hematoma within the ligamentum flavum. Repeated trivial abdominal or back trauma resulting from daily activities or sports has been posed as precipitating factors in the development of ligamentum flavum hematoma.⁷

The clinical symptoms of ligamentum flavum hematoma may be similar to those of other lumbar diseases, including herniation, degeneration, infection, facet cyst, or tumors.⁹ About 43.8% of 58 patients with ligamentum flavum hematoma have been misdiagnosed preoperatively as having epidural tumor.² MRI is the best diagnostic method for patients with ligamentum flavum hematoma.⁶ It reveals the anatomical relationship of the epidural space and the ligamentum flavum. In general, the round shape in the dorsal aspect of the spinal canal, which is attached at the ligamentum flavum, is one of the morphological features of LFH.² The intensity of MRI reflects the time course of chemical reaction from oxyhemoglobin to hemosiderin in the ligamentum flavum hematoma.⁷ Therefore, MRI may present different signal intensities, depending on the investigated stage of the hematoma. Otherwise, contrast enhanced MRI is more helpful in the diagnosis of ligamentum flavum hematoma, because contrast enhancement is very rare in hematoma, unlike spinal tumors.¹⁰

Ligamentum flavum hematoma is typically treated surgically because of the nerve root compression. Surgical methods including partial laminectomy or total laminectomy with posterior fixation have been described. However, the treatment of choice depends on the extensiveness of the removal of the hematoma. If there is enough of a surgical window to remove the hematoma, less destruction of the normal structure is recommended. The overall prognosis of patients

with ligamentum flavum hematoma following surgery is excellent.²

In our patient, repeated trivial activity may have been the predisposing factor inducing the bleeding within the ligamentum flavum. However, the preoperative MRI could not confirm the diagnosis of ligamentum flavum hematoma because of the lack of enhanced images. Following surgical decompression and pathological confirmation, she underwent laminectomy with removal of the ligamentum flavum hematoma. During the operation, a severe adhesion between the ligamentum flavum hematoma and dural sac was found. Her outcome following surgery was excellent, and no residual neurological deficits were noted.

In conclusion, although ligamentum flavum hematoma in the lumbar spine is extremely rare, it should be considered as a differential diagnosis of lumbar epidural mass. The outcome following surgery is excellent.

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