

# CASE REPORT

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## CHRONIC SPONTANEOUS LUMBAR EPIDURAL HEMATOMA SIMULATING EXTRADURAL SPINAL TUMOR : A CASE REPORT

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### ABSTRACT

Spinal epidural hematoma (SEH) is an uncommon disorder, and chronic SEHs are rarer than acute SEHs. However, there is few reported involving the bone change of the vertebral body in chronic SEHs. We present a case report of lumbar epidural hematoma that required differentiation from extramedullary spinal tumors by a long process because the CT scan revealed scalloping of the vertebral body and review the relevant literature. A 78-year-old man had experienced a gradual onset of low back pain and excruciating pain in both legs. Lumbar MRI on T1-weighted images revealed a space-occupying lesion with a hyperintense signal relative to the spinal cord with no enhancement on gadolinium administration. Meanwhile, T2-weighted images revealed a heterogeneous intensity change, accompanying a central area of hyperintense signals with a hypointense peripheral border at the L4 vertebra. Moreover, the CT scan demonstrated scalloping of the posterior wall of the L4 vertebral body which is generally suspected as the CT finding of spinal tumor. During the epidural space exploration, we found a dark red-colored mass surrounded by a capsular layer, which was fibrous and adhered to the flavum and dura mater. Microscopic histological examination of the resected mass revealed a mixture of the relatively new hematoma and the hematoma that was moving into the connective tissue. Accordingly, the hematoma was diagnosed as chronic SEH. The particular MRI findings of chronic SEHs are helpful for making accurate preoperative diagnoses of this pathology.

Key Words: chronic lumbar epidural hematoma, spontaneous spinal epidural hematoma, scalloping, MRI findings

### INTRODUCTION

Spinal epidural hematoma (SEH) is an uncommon disorder, accounting only for 0.3–0.9% of all space-occupying lesions in the vertebral canal.<sup>1)</sup> SEHs can be acute or chronic; chronic SEHs are rarer than acute SEHs. Acute SEHs tend to be located in the cervical and thoracic spine.<sup>2)</sup> Meanwhile, chronic SEHs are generally located in the lumbar spine.<sup>3)</sup> However, there is few reported involving the bone change of the vertebral body in chronic SEHs.

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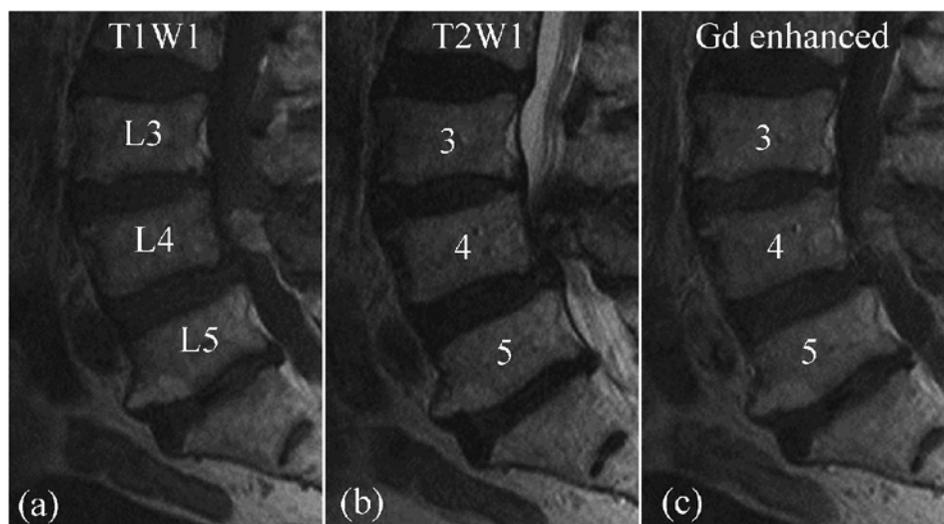
Here, we present a case report of lumbar epidural hematoma that required differentiation from extramedullary spinal tumors by a long process because the CT scan revealed scalloping of the vertebral body.

### CASE REPORT

A 78-year-old man was admitted to our institution for low back pain and back pain. He had experienced a gradual onset of low back pain for over 9 months and progressive, excruciating pain in both legs for 3 months. He had a history of hypertension with medication and total gastric resection for carcinoma. He did not report any major or minor low back trauma and had not undergone any invasive spinal procedures. He was referred to our institution for the operation of a spinal extradural tumor suspected by magnetic resonance imaging (MRI) in the lumbar region at a local hospital.

Upon admission, the physical examination revealed the hypesthesia of the bilateral plantar fascia, but no evidence of motor, bowel, or bladder dysfunction. The straight-leg raising test and femoral nerve stretch test revealed signs of tension, but the deep tendon reflexes in the bilateral lower extremities were diminished. The Japanese Orthopaedic Association (JOA) lumbar score was 9 out of 29 (29 being the best as a measure of low back pain and lower extremity function). Results of all blood and coagulation tests (e.g., platelet count, prothrombin time, and partial thromboplastin time) were normal.

Plain spinal radiography revealed mild degenerative changes of lumbar intervertebral disc and L4 degenerative spondylolisthesis. Lumbar MRI on T1-weighted sagittal images revealed a space-occupying lesion with a hyperintense signal relative to the spinal cord with no enhancement on gadolinium administration. Meanwhile, T2-weighted sagittal images revealed a heterogeneous intensity change, accompanying a central area of hyperintense signals with a hypointense pe-



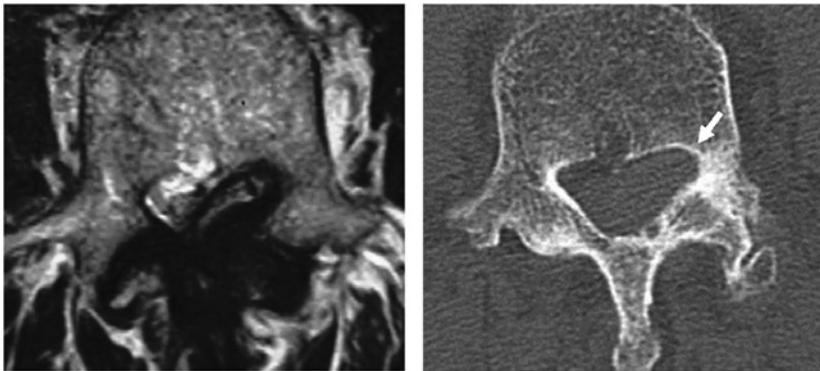
**Fig. 1.** MRI of the lumbar spine.

(a) Sagittal T1-weighted image reveals the extradural space-occupying lesion with a hyperintense signal relative to that of the spinal cord under the L4 vertebra. (b) Sagittal T2-weighted image reveals a heterogeneous intensity change accompanying the central area of hyperintense signals with a hypointense peripheral border. (c) Sagittal T1-weighted image after gadolinium administration shows no enhancement.

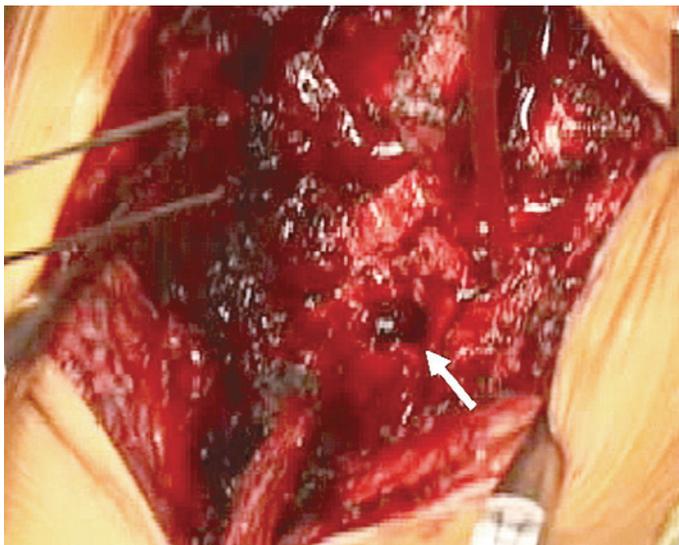
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ripheral border at the L4 vertebra (Fig. 1). Axial images revealed a space-occupying lesion that extended out of the intervertebral foramen from the vertebral canal; this was accompanied by an intensity change similar to that of the extradural left side. Moreover, the CT scan demonstrated scalloping of the posterior wall of the L4 vertebral body which is generally suspected as the CT finding of spinal tumor (Fig. 2). We assumed the presence of a tumor, abscess, or hematoma as a differential diagnosis of this space-occupying lesion. Surgery was subsequently planned because of the severity of the pain.

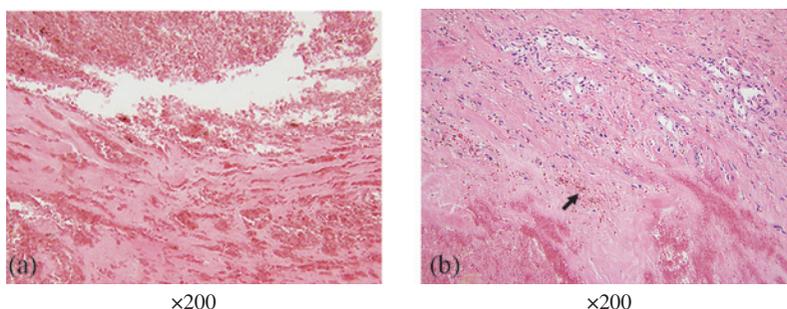
L4 hemilaminectomy and L3-5 posterior lumbar interbody fusion (PLIF) were initially performed. During the epidural space exploration, we found a dark red-colored mass surrounded by a capsular layer at the level between L3/4 intervertebral and the inferior margin of L4, which was fibrous and adhered to the flavum and dura mater (Fig. 3). After we carefully separated



**Fig. 2.** Axial MRI and CT scan at the L4 level. Scalloping (arrow) is apparent on CT at the same site at which the space-occupying lesion is shown on MRI.



**Fig. 3.** Intraoperative image shows an encapsulated fibrous dark-red hematoma adhering to the flavum and dura mater (arrow).



**Fig. 4.** Hematoxylin and eosin stain, 200 $\times$ . **(a)** Photomicrograph shows a mixture of the relatively new hematoma and the hematoma moving into the connective tissue. **(b)** A hemosiderin deposit was observed at the boundary between the connective tissue and hematoma (arrow).

the mass from the periphery, it was resected en bloc. On gross examination, the mass contained old hemorrhage fluid.

Microscopic histological examination of the resected mass revealed a mixture of the relatively new hematoma and the hematoma that was moving into the connective tissue (Fig. 4a). Hemosiderin deposits were observed at the other site at boundary between the connective tissue and hematoma (Fig. 4b). Accordingly, the hematoma was diagnosed as chronic SEH.

The postoperative course was uneventful with rapid and complete pain relief. Postoperative MRI of the lumbar spine revealed no residual hematoma at the operative site. There was no recurrence and the patient remained well at the 2-years clinical follow-up.

## DISCUSSION

The cause of SEH is classified as idiopathic, spontaneous, or secondary.<sup>1)</sup> Idiopathic SEH is defined as SEH without any associated causative factors.<sup>4)</sup> Spontaneous SEH is defined as SEH with causative risk factors such as minor trauma,<sup>5)</sup> anticoagulant usage,<sup>6)</sup> hypertension,<sup>7)</sup> and Paget's disease.<sup>8)</sup> Secondary SEH are defined as SEH due to distinct causes such as coagulopathies,<sup>9)</sup> vascular malformations,<sup>10)</sup> neoplasms,<sup>1)</sup> trauma with or without fracture,<sup>1)</sup> and medical procedures.<sup>11)</sup> Most chronic SEHs are idiopathic or spontaneous and are defined as spinal compression for months or years with mild symptoms and slight pain. To our knowledge, only 22 cases of chronic lumbar SEH, excluding our case, have been described thus far. Therefore, the present case is a rare, chronic, spontaneous lumbar SEH associated with hypertension. And chronic SEH is caused by bleeding of smaller vessels inside the ligamentum flavum.<sup>1)</sup> In this case, we consider the similar bleeding source because encapsulated hematoma adhered to the flavum and dura mater was founded.

When the extradural space-occupying lesion is detected by MRI of the spine, it is very difficult to distinguish whether it is a tumor, abscess, or hematoma. The differential diagnosis is shown in Table 1. Although metastatic tumors, schwannomas, lipomas, and malignant lymphomas are possible in cases of spinal extradural tumors, the changes in their intensities on MRI differ. Metastatic tumors appear hypointense on T1-weighted images and hyperintense on T2-weighted images compared to the spinal cord, are either enhanced or not enhanced after gadolinium administration.<sup>12)</sup> Schwannomas appear hypo- to isointense on T1-weighted images and hyperintense on T2-weighted images compared to the spinal cord, gadolinium enhancement varies from intense homogeneous to faint enhancement.<sup>13)</sup> Lipomas appear hyperintense on both T1- and T2-weighted

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**Table 1** The differential diagnosis according to MRI of the epidural space-occupying lesion

	T1WI	T2WI	Gd
Metastatic tumor	hypo	hyper	— ~ +
Schwannoma	hypo~iso	hyper	+ +
Lipoma	hyper	hyper	—
Lymphoma	hypo~iso	hyper or hypo	+
Epidural abscess	hypo~iso	hyper	+
			(rim enhancement)
Acute SEH	iso~hyper	hyper	— ~ +
Subacute SEH	hyper	iso~slightly hypo	—
Chronic SEH (early phase)	hyper	hyper	—
Chronic SHE (late phase)	iso	very hyper	—

images and are not enhanced after gadolinium administration. Lymphomas appear hypo- to isointense on T1-weighted images and hyperintense or even hypointense on T2-weighted images compared to the spinal cord; they tend to be uniformly and diffusely enhanced after gadolinium administration.<sup>14)</sup> Spinal epidural abscesses appear hypo- to isointense on T1-weighted images and hyperintense on T2-weighted images compared to the spinal cord. Liquid pus in spinal epidural abscesses typically has low signal intensity on T1-weighted images, while granulation tissue typically has a rim of enhancement after gadolinium administration.<sup>15)</sup>

MRI signal intensities of SEHs, however, are variable and related to the timing of imaging relative to the age and biochemical evolution of the hematoma.<sup>4,16)</sup> Acute SEHs appear iso- to hyperintense on T1-weighted images and hyperintense on T2-weighted images, as compared to the spinal cord;<sup>17)</sup> they sometimes appear slightly enhanced after gadolinium administration.<sup>18)</sup> Therefore, since acute SEHs resemble schwannomas, lymphomas, and epidural abscesses on MRI examination, they may be difficult to differentiate. In the early phase of chronic SEHs, hematomas appear homogeneously hyperintense on both T1- and T2-weighted images.<sup>15)</sup> During the late phase, chronic SEHs appear isointense to the spinal cord on T1-weighted images and very hypointense on T2-weighted images<sup>15)</sup> due to ferritin and hemosiderin contents; furthermore, gadolinium administration very rarely enhances chronic SEHs.<sup>19)</sup> The present case had a chronic course, and lumbar T1-weighted MRI revealed the space-occupying lesion with hyperintense signal relative to the spinal cord with no enhancement after gadolinium administration; T2-weighted sagittal images revealed a heterogeneous intensity change that accompanied a central area of hyperintense signals with a hypointense peripheral border. However, it was difficult to carry out a differential diagnosis of the tumor type, because the CT scan revealed scalloping of the posterior wall of the L4 vertebral body. Since the hematoma and hemosiderin deposits were revealed by the histological examination after the extraction of the mass, it was thought that the early and late phases of chronic SEH were intermingled in this case. In the literature, there is only 1 reported case involving scalloping of the posterior wall of the vertebral body in chronic SEH.<sup>20)</sup> These finding suggests that the bone change was caused by the hematoma chronically pressing against the vertebral body, and requires differentiation with a tumor. MRI findings, such as the difference

of intensity on T1-weighted images, enhancement after gadolinium administration, and the timing of imaging relative to the age, are helpful in differentiating between chronic SEH and a tumor.

## CONCLUSION

We present a rare case of chronic spontaneous lumbar epidural hematoma with scalloping of the vertebral body, simulating an extradural spinal tumor. The particular MRI findings of chronic SEHs are helpful for making accurate preoperative diagnoses of this pathology.

Conflict of Interest: None

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