

Case Reports & Case Series

Dumbbell schwannoma complicated by intradural lumbar disc herniation at the same level—A rare case report



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ABSTRACT

Introduction: Dumbbell schwannoma complicated by intradural lumbar disc herniation at the same level is extremely rare.

Case presentation: We describe a 67-year-old female presented with low back pain for 10 years and weakness and numbness of the right lower extremity for one month. Contrast magnetic resonance imaging (MRI) revealed an inhomogeneous enhanced dumbbell lesion at the L4/5 right intervertebral foramen and the intradural part of the lesion is only annular enhanced. A single posterior-approach surgery, including L4 laminectomy and right L4/5 facet joint resection, intracapsular resection of extradural dumbbell tumor, and intradural nucleus pulposus resection, was performed. The patient's back pain and weakness of right lower extremity disappeared. Histological studies revealed a schwannoma and a herniated disc.

Conclusions: To our knowledge, this case is the first report of dumbbell schwannoma complicated by intradural lumbar disc herniation. Contrast MRI is helpful in preoperative differential diagnosis. Careful preoperative images reading are important to prevent misdiagnosis.

1. Introduction

Dumbbell schwannoma at lumbar spine is common that can lead to neurological deficits. For those with clinical symptoms, surgical resection is generally required. Lumbar disc herniation is a common degenerative disease of lumbar spine which can compress cauda equina nerve and lead to lower extremity pain, numbness, urinary and fecal dysfunction. In some cases, nucleus pulposus may break through the posterior longitudinal ligament and dural matter into the subdural space, resulting in intradural lumbar disc herniation [1]. To our knowledge, dumbbell schwannoma complicated by intradural lumbar disc herniation at the same level has not been reported. Here, we reported a rare case of L4/5 right dumbbell schwannoma complicated by intradural lumbar disc herniation at the same level which was successfully treated using a single posterior-approach surgery.

2. Case report

A 67-year-old female presented with low back pain for 10 years. Her back pain exacerbated after standing or walking and relieved by lying

supine. One month ago, however, her back pain worsened, accompanied by weakness and numbness of the right lower extremity. So she sought treatment at a local hospital, and magnetic resonance imaging (MRI) plain scan revealed a dumbbell lesion at L4/5 right intervertebral foramen (Fig. 1). She was referred to us for further treatment. Her bowel and bladder functions were normal since she was sick. Neurological examination revealed weakness of the right extensor hallucis longus. Her right knee reflex disappeared, and acupuncture sensation at the lateral dorsal side of her right foot diminished. Straight leg raising test was negative and pathological reflexes were negative at both sides. MRI enhanced scan revealed an inhomogeneous enhanced dumbbell lesion (23 × 29 × 45 mm) at right L4/5 intervertebral foramen (Fig. 2). In the spinal canal, the upper part of the lesion was only annular enhanced. The lesion extended into the spinal canal and outward to the paravertebral region, and the surrounding bone was compressed and absorbed. To remove the mass, the patient underwent total L4 laminectomy and right L4/5 facet joint resection. After intracapsular resection of extradural dumbbell tumor piece by piece, the dural matter was still tense and bulged. Therefore, the dura sac was opened micro-surgically and a gray-white mass was seen wrapped in the nerve roots of

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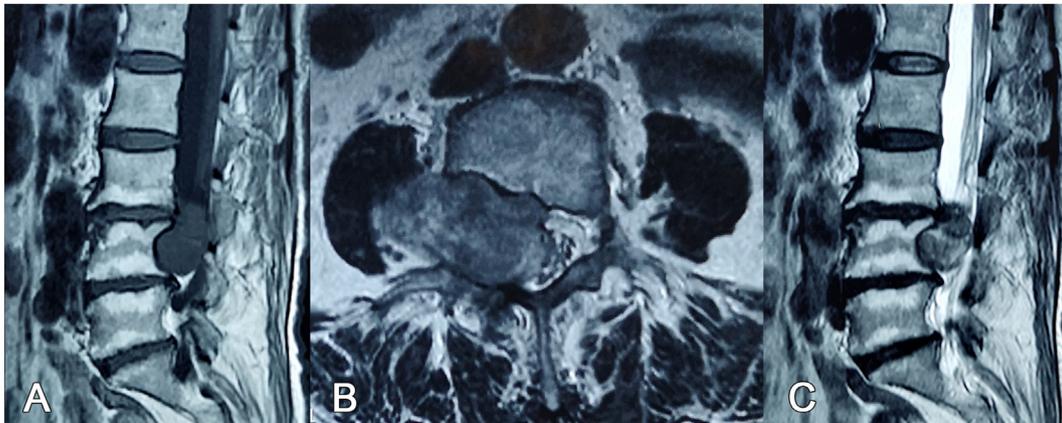


Fig. 1. T1-weighted sagittal MRI (A) and T2-weighted axial MRI (B) revealed a dumbbell lesion at L4/5 right intervertebral foramen. In the spinal canal, the upper part of the lesion is hypointense on T2-weighted sagittal image (C).

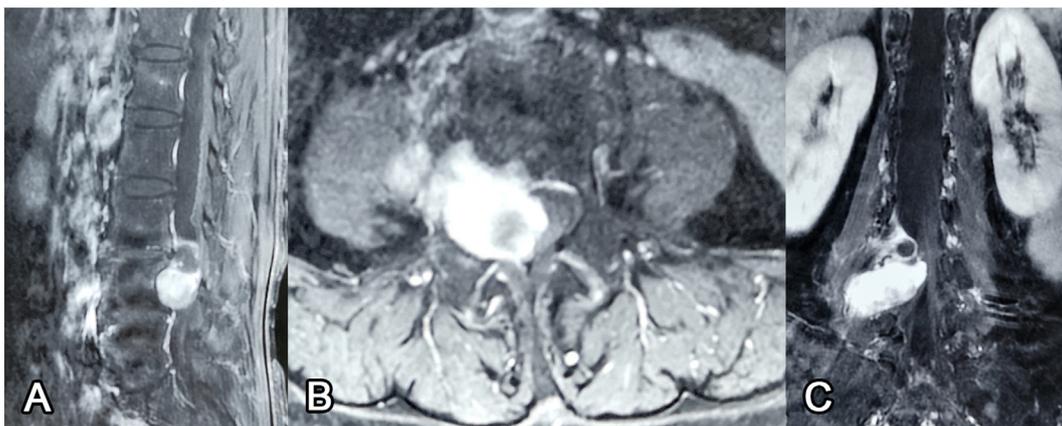


Fig. 2. Contrast-enhanced T1-weighted sagittal (A), axial (B) and coronal (C) MRI revealed an inhomogeneous enhanced dumbbell lesion. Annular enhanced region is significant on contrast-enhanced T1-weighted coronal (C) MRI.

the cauda equina mimicking a sort of tumor like a congenital tumor. After gentle dissection of the adhesions, the mass was taken out easily. Careful identification revealed that the mass was most likely nucleus pulposus tissue. Explored ventrally and a dura rupture was found (Fig. 3A). The annulus fibrosus and posterior longitudinal ligament were both ruptured. No residual nucleus pulposus was found, a primary straight suture was performed to close the dura sac. Histological studies revealed a schwannoma and a herniated disc (Fig. 3B–K). At the 1-month postoperative follow-up, the patient's back pain and weakness of right lower extremity disappeared. No more neurological deficits were detected except the numbness of lateral dorsal side of the right foot. At 6-months follow-up, no residual or recurrence of the lesion was found on MRI plain scan (Fig. 4).

3. Discussion

The present case report describes a patient with dumbbell schwannoma and intradural lumbar disc herniation at the same spinal segment. Although single intradural lumbar disc herniation or lumbar disc herniation coexisting with intradural tumor has been reported in English literatures, to our knowledge, this case is the first report of intradural lumbar disc herniation complicated with dumbbell schwannoma [1–4]. In our case, her low back pain resulted from lumbar degeneration and disc herniation. Other symptoms such as numbness and leg weakness, may be the results of both pathologies. Therefore, the intradural nucleus pulposus and dumbbell schwannoma were removed using a single operation.

Dumbbell schwannoma at lumbar spine is common [5]. The clinical

manifestations of dumbbell schwannoma are mainly pain, numbness and weakness of lower extremity. However, some giant dumbbell tumors have no clinical symptoms [6]. On plain MRI, schwannoma usually presents as an isolated and well-encapsulated mass, hypointense or isointense on T1-weighted images and hyperintense on T2-weighted images [7]. Gd-DTPA contrast MRI may reveal a homogeneous enhanced mass. If the tumor is giant with necrosis and cystic degeneration, there will be none enhanced area on contrast MRI. In this case, the upper part of the lesion in spinal canal was only annular enhanced. Therefore, we took it for granted that the annular enhanced area was due to the necrosis of the tumor, without considering the possibility of lumbar disc herniation. Fortunately, we carefully searched for the reason of high dural tension after resecting the dumbbell tumor and finally found the intradural disc herniation. After the operation, we carefully read the patient's MRI and found that L3/4 disc hernia backwards on sagittal T2-weighted image and a non-enhanced belt between the annular enhanced area and the main body of the tumor was obvious on coronal contrast MRI. These MRI findings were typical features of lumbar disc herniation. Reviewing the literatures, we found that the magnetic resonance manifestations of intradural disc herniation were interruption of the posterior longitudinal ligament, hawk-beak sign, crumble disc sign and annular enhancement of the discal fragment [8–10]. Therefore, careful preoperative images reading are important to prevent misdiagnosis.

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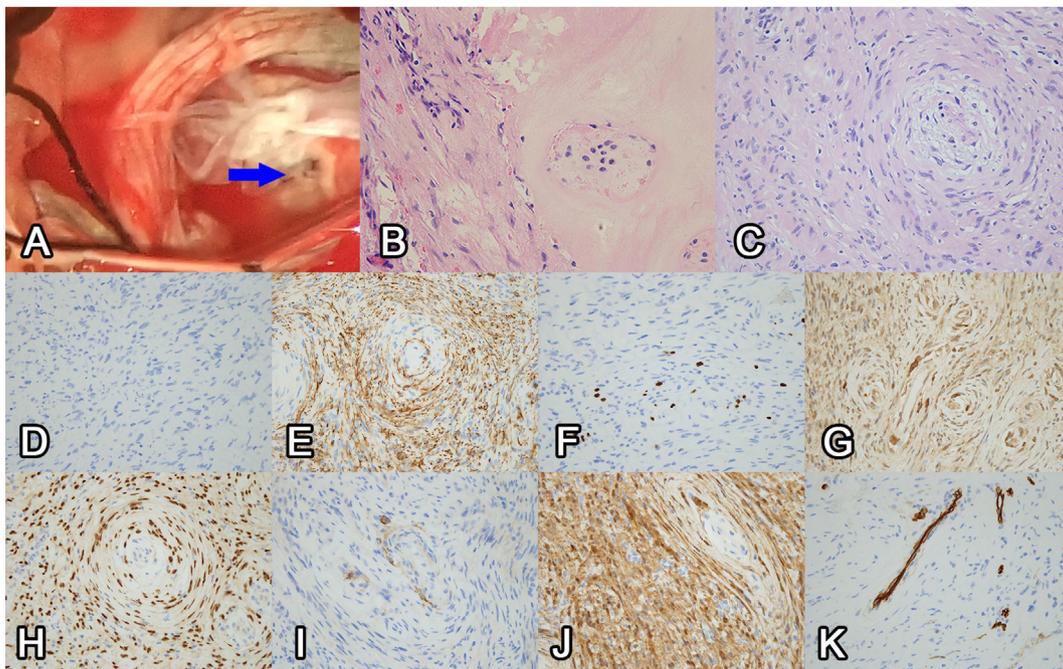


Fig. 3. Intra-operative photograph (A) showed a dura rupture (*arrowhead*). Degenerative fibrocartilage accompanied by granulation (B) indicates the herniated disc, spindle-shaped tumor cells (C) arranged in spiral and palisade pattern. Immunohistochemical staining revealed a schwannoma: the tumor cells were negative for CK (D), partial positive for GFAP (E), Ki-67 (F) (active region, 5% positive), weakly positive for PMP22 (G), positive for SOX10 (H), focal weakly positive for EMA (I), positive for S100 (J), and partial positive for CD34 (K). Hematoxylin-eosin stain, magnification $\times 400$.

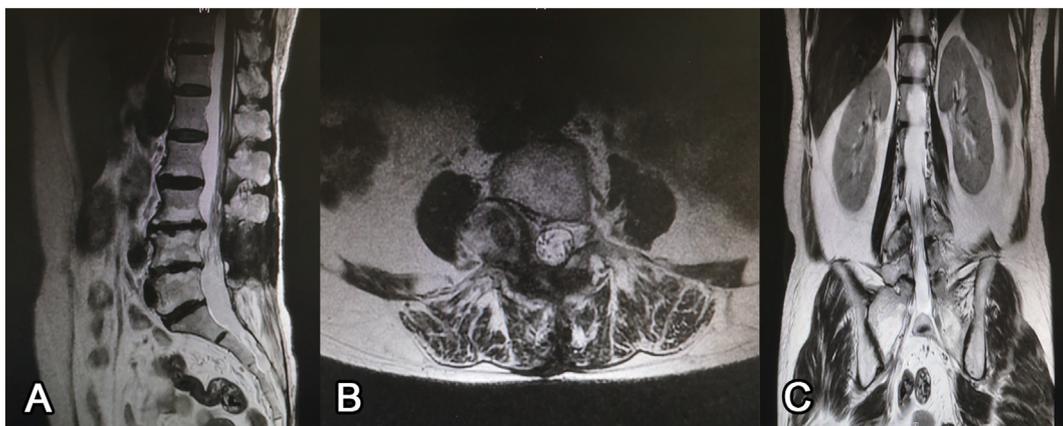


Fig. 4. At 6-months postoperative follow-up, T2-weighted sagittal (A), axial (B) and coronal (C) MRI revealed the cavity of the dumbbell tumor. Intradural disc disappeared and no lumbar spine kyphosis was found.

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Declaration of Competing Interest

We declare that we do not have any conflict of interest to this work.

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