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Case Report

Intramedullary spinal cord hemangioma: A rare case report ☆☆☆

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ABSTRACT

Spinal cord hemangiomas are rare vascular malformations that can cause neurological deficits. We report a case of a 57-year-old male who previously underwent spondylolisthesis reduction for treatment of a 30% (1 cm) anterolisthesis of L4-L5 with continued neurological deficit post-operatively. The patient still reported bilateral lower extremity weakness, and he was found to have an additional ovoid intramedullary lesion at the T2-T3 level, pathologically consistent with a hemangioma. The patient underwent a T2-T3 laminectomy, and the lesion was resected without any complications. Histopathological examination confirmed the diagnosis of hemangioma. Postoperatively, the patient showed significant improvement in his lower extremity weakness and back pain. Hemangiomas are rare lesions that account for less than 5% of all spinal cord tumors. They consist of vessels similar to those of embryonic capillaries and can cause pressure on the surrounding neural tissue, leading to neurological deficits. MRI is the imaging modality of choice for diagnosing spinal cord hemangiomas. Hemangiomas typically demonstrate mixed signal intensities on T1-weighted images, depending on the fat content of the lesion. They usually demonstrate high T2 signal intensity due to high water content, and avid contrast enhancement due to high vascularity. Surgical resection is the treatment of choice for symptomatic hemangiomas, and complete resection is associated with a good prognosis.

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Introduction

Hemangiomas are abnormal benign proliferation of blood vessels. Hemangiomas can occur in any part of the neuroaxis but are commonly found in the brain [1]. Most spinal hemangiomas are found in vertebral bodies, with occasional extension to the extradural space. Although extradural hemangiomas causing neurological deficits have been reported, true intradural hemangiomas are extremely rare. Intramedullary lesions account for 0.3% of all spinal cord tumors [2] and hemangiomas are the third most common among the intramedullary masses. They are slow growing lesions that may lead to compression of the spinal cord, causing delayed symptoms [3].

Case report

The patient was a 57-year-old male with a past medical history of hypertension, hyperlipidemia, who presented with bilateral extremities weakness, bladder, and bowel incontinence. The symptom onset was 1 week prior and the patient did not report any inciting event or injury. The patient also reported bilateral lower extremities numbness and saddle anesthesia. The numbness was primarily located in the inner thighs and perineal region. Since the onset of symptoms, the patient reported at least 4–5 falls. On physical examination, the patient was found to be tachycardic, hypertensive with blood pressure in the high 190 over 90, hip flexion strength was 4 out of 5 bilaterally, and strength in the remaining bilateral lower extremity was 4 out of 5.

Initial CT abdomen pelvis with contrast demonstrated a severely distended bladder, measuring up to 19 cm. Additionally, there was a 30% (1 cm) anterolisthesis L4 on L5, with bilateral pars defect, and severe bilateral neural foramina stenosis at L4–L5 (Fig. 1). The patient then underwent MRI of the lumbar spine with and without contrast, which demonstrated resultant L4–L5 degenerative disc disease from the above mentioned anterolisthesis, and moderate compression of the exiting L4 spinal nerve root on the left (Fig. 2).

The patient was taken into surgery for L4–L5 spondylolisthesis reduction with instrumented inter body fusion at this level. After the surgery, the patient reported no significant improvement in bilateral lower extremities weakness. On the second day postoperative, the patient reported new decrease in sensation on his right side, approximately 10 cm below the right nipple. The new symptoms raised clinical concerns for additional pathology in the remaining spine. The patient was sent for additional MRI of the thoracic, cervical spines and the brain.

MRI of the thoracic spine with and without contrast demonstrated an intramedullary thoracic cord lesion at the level of T2–T3. This lesion was T1 isointense, T2 hyperintense with a circumferential rim of low T2 signal intensity and had avid contrast enhancement. There was associated extensive superior and inferior central cord signal abnormality extending to the visualized lower cervical spine and lower thoracic spine, indicating vasogenic edema superior and inferior to this lesion (Figs. 3A–C)



Fig. 1 – Sagittal CT abdomen pelvis with contrast shows grade II spondylolisthesis at L4–L5.

MRI of the cervical spine with and without contrast demonstrated the above-mentioned spinal cord signal abnormality extending to the level C5–C6 with distal tapering (image not shown).

The patient also underwent an MRI brain without contrast, which showed no evidence of abnormalities or intracranial vascular malformation (image not shown).

The patient was taken to an additional surgery for T2–T4 bilateral laminectomies and midline myelotomy for resection of the lesion. Intraoperatively, the mass was found to have a rubbery surface and avidly adherent to the surrounding spinal cord. Circumferential dissection using micro instruments revealed numerous serpiginous blood vessels associated with the mass. The mass was sent for pathologic examination, with results compatible with spinal cord hemangioma. Postoperatively, the patient reported improvement in bilateral lower extremity strength.

Discussion

Histologically, hemangiomas are divided into 3 types: capillary, cavernous and mixed-type [4]. Capillary hemangiomas consist of capillaries that are normal in size but contain sparse fibrous stromal tissues. Cavernous hemangioma consist of large blood vessels lined by flattened endothelium [5,6]. Mixed-type hemangiomas consist of a combination of both capillary and cavernous morphology. The mainstay treatment

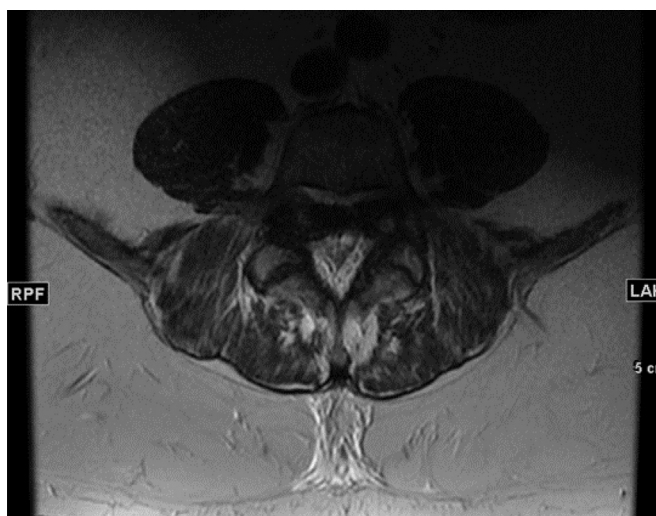


Fig. 2 – Axial T2 MRI without contrast of the lumbar spine showing a 30% anterolisthesis at L4-L5, with disc material abutting the exiting the left L4 nerve root.



Fig. 3 – (A) Sagittal T1 noncontrast through the thoracic spine demonstrating an intramedullary T1 isointense lesion at the level T2-T3. (B) Sagittal T2 MRI through the thoracic spine demonstrates a T2 hyperintense intramedullary lesion with a circumferential rim of low T2 signal intensity at the level T2-T3. (C) Sagittal T1 postcontrast MRI of the thoracic spine shows an intramedullary lesion with avid contrast enhancement at the level T2-T3.

is complete resection [7]. Neurological deficits can be due to their mass effect and their tendency to result in hemorrhage [8]. If the lesions are extradural, or intradural extramedullary, they can be completely resected without significant complications. Most intramedullary tumors are difficult to be excised completely due to their infiltrative nature. Patients with intramedullary lesions who undergo surgical resection are also at risk of significant neurological deficit postoperatively due to risk of injury to the sensory or motor tracts [9]. Intraoperative neurophysiologic monitoring can be employed to improve surgical outcome [10].

In our case, the patient presented with worsening lower extremity weakness over the course of 3 days, prompting the visit to the emergency department. Magnetic resonance imaging (MRI) of the spine was performed, revealing a well-defined, intramedullary lesion at the T2-T3 level of the spinal cord, proven to be a hemangioma. The imaging characteristics included the presence of isointense areas on T1-weighted images, a hyperintense signal on T2-weighted images, peripheral hemosiderin rim, and the associated surrounding edema.

The clinical presentation of worsening lower extremity weakness in our patient is likely attributed to the recent hemorrhage associated with the lesion. Hemorrhage within the spinal cord can cause compression and damage to the adjacent neural tissue, leading to the development or exacerbation of neurological deficits [11]. The progressive nature of the lower extremity weakness indicates ongoing compression and the need for timely intervention [12].

Treatment options for hemangiomas typically involve surgical resection, especially in symptomatic cases with progressive neurological deficits. Surgical intervention aims to remove the lesion and alleviate the compressive effect on the spinal cord [13].

Conclusion

In our case, the patient initially presented with bilateral lower extremities weakness and saddle anesthesia that had pro-

gressively worsened over a period of 3 days before seeking medical attention. Radiographic evaluation revealed an L4-L5 anterolisthesis, indicating a mechanical cause for the neurological symptoms. The patient subsequently underwent bilateral interbody fusion surgery at L4-L5 with the placement of pedicle screws and rods. Despite the spondylolisthesis reduction surgery, the patient continued to experience bilateral lower extremities weakness, suggesting an additional underlying cause.

Further investigation with MRI imaging of the thoracic and cervical spine revealed an additional T2-T3 spinal cord hemangioma. The lesion demonstrated characteristic features including T1 hypo- to iso-intensity, T2 hyperintensity [14] and a circumferential hemosiderin ring, with associated surrounding spinal cord edema. The lesion also enhanced vividly with contrast. Resection of the spinal cord hemangioma was subsequently performed, resulting in a significant improvement in the patient's symptoms.

It is important to recognize that even after addressing the patient's initial apparent cause of neurological deficit, in our case the spondylolisthesis, additional pathology may coexist. Clinicians should maintain ongoing clinical vigilance and pursue thorough investigation of the entire spinal cord and brain to identify all contributing factors to the patient's symptoms. In our case, the continued investigation further revealed an additional thoracic spinal cord hemangioma, with acute to subacute hemorrhage that also contributed to the patient's neurological deficits. Because of its rarity, hemangiomas can often be mis-diagnosed preoperatively due to its similar radiological appearance to other more common intramedullary lesions like cavernoma, ependymoma [15], etc. Regardless, symptomatic intramedullary lesions require prompt surgical removal and decompression [12]. The case underscores the importance of maintaining clinical suspicion and pursuing further investigations when patients continue to experience persistent neurological deficits despite initial surgical intervention.

Patient consent

Informed written consent was obtained from the patient for publication of this Case Report and all imaging studies. Consent form on record.

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