MR Features of Posterior Spinal Epidural Cavernous Hemangioma: A Case Report

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Cavernous hemangiomas may affect the central nervous system, usually asymptomatic and involving the cerebral hemispheres but it may become symptomatic when bleeds or occurs in the brain stem. Purely spinal epidural cavernous hemangioma is a rare benign tumor composed of sinusoid vascular channels. The differential diagnosis of epidural cavernous hemangioma on MR image includes neurogenic tumors, meningiomas, lymphomas, spinal angiolipoma, and metastasis. We report a case of 81-year-old man presented with progressive numbness and weakness of both lower limbs for one year. MR imaging revealed an infiltrative enhancing epidural tumor at the dorsum of T2 to T5 levels with foraminal extension. The MR image features along with their differential diagnoses are discussed and literature would be reviewed.

Key words: Cavernous hemangioma; Magnetic Resonance (MR); Spine; Vascular malformation

Cavernous hemangiomas are uncommon vascular hamartomatous malformations of the central nervous system (CNS). They may affect any site in the neuraxis, especially in the cerebral hemispheres, cerebellum and brainstem. Primary cavernous hemangiomas are uncommonly found at the spinal level, representing approximately 4% of all extradural lesions. [1, 2] They commonly affect the vertebral bodies and sometimes extend intraspinally into the epidural space. Purely epidural cavernous hemangioma without vertebral involvement is rare. We report the MR images of a purely posterior epidural cavernous hemangioma involving the upper thoracic spine. The patient presented with progressive numbness and weakness of the lower limbs.

CASE REPORT

An 81-year-old male presented with progressive numbness and weakness of the lower limbs for one year. The patient had no prior history of trauma or urinary incontinence. No evidence of fever or chills was noted recently. The neurological examination revealed moderate weakness in the lower limbs, causing gait difficulty. Sensory impairment was noted below the T10 level. Deep tendon reflexes and Babinski responses were negative. Computed tomography (CT) and MR examinations of the thoracic spine showed an intraspinal extra-dural mass located in the posterior epidural space at the level of T2 to T5 region. The bilaterally neural foramina were enlarged due to tumor invasion. The spinal cord was compressed and displaced anteriorly by the mass. Mildly bony erosion was seen in the posterior elements of spine adjacent to the tumor area. The mass displayed isointense signal to the spinal cord on T1-weighted images (Fig.1a) and hyperintense signal on T2-weighted images (Fig.1b). After intravenous administration of gadolinium-DTPA, the mass showed strong enhancement (Fig. 1c, 1d, 1e)

Decompression laminectomy from T2 to T6 level with total removal of tumor was thereafter per-
formed. During surgery, the epidural mass appeared to be a soft, elastic and easily bled tumor. The tumor extended from T1/2 junction to T5, more at the left side, with invasion into bilateral neuroforamina, resulting in compression of the spinal cord and roots. The histopathological examination revealed of thin-walled vascular channels embedded in collagenous connective tissue and lined by a single layer of endothelial cells. (Fig. 2). No evidence of mitosis or malignancy was noted. The diagnosis of cavernous hemangioma was confirmed. After surgery, the patient improved gradually and could walk after a three-month rehabilitation treatment.

**DISCUSSION**

Cavernous hemangiomas, also called cavernous angiomas, are congenital vascular malformations of

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**Figure 1.**

1. Precontrast sagittal T1-weighted (566 / 12 / 2) MR image shows a mass in the posterior epidural space at the level of T2 to T5 (arrows). The mass displays isointense signal to the spinal cord. b. On axial T2-weighted (3600 / 120 / 2) image, the mass reveals hyperintense signal. The spinal cord (arrow) is compressed by the mass. c. Postcontrast sagittal T1-weighted (756 / 12 / 2) image with fat suppression shows strong enhancement of the mass. d. On postcontrast axial T1-weighted (756 / 12 / 2) image with fat saturation, the spinal cord (arrow) is compressed by the enhanced epidural mass. Widening of the neural foramina, bilaterally, caused by tumor extension, is also demonstrated. e. On postcontrast coronal T1-weighted (756 / 12 / 2) image with fat saturation, the mass shows marked enhancement with extension along the bilateral neural foramina, more at the left side.
MRI of spinal epidural hemangioma

unknown etiology. They may occur anywhere in the CNS but are more commonly localized in the intracranial intra-axial level. [3, 4, 5] Globus and Doshay first described the case of spinal cavernous hemangioma in 1928. [2, 3] Cavernous hemangiomas are infrequently found at the spinal level, particularly pure epidural location, representing approximately 4% of all spinal epidural lesions and 12% of all intraspinal hemangiomas. Purely epidural cavernous hemangioma without bony involvement in the spine is rare. The most frequent location is thoracic level, especially at the dorsal site, followed by the lumbar and cervical regions. [2, 4, 5]

The presenting symptoms of spinal epidural cavernous hemangioma are variable. They may be manifested as back pain, as radiculopathy mimicking a disk herniation, as an insidious progressive paraparesis, or as an acute paraplegia. Trauma, exercise, posture, systemic infection, pregnancy and straining may aggravate the patient’s symptoms. [4, 6] However, sudden or acute onset of symptoms following trauma has been attributed to a sudden increase in mass effect secondary to microhemorrhage or thrombotic occlusion within the compartments of the mass lesion itself. [2, 4, 6, 7]

The conventional myelographic and CT findings of the spinal epidural cavernous hemangiomas included widening of neural foramina, erosions of adjacent bone and compression of spinal cord, often displaying a lobulated contoured mass that partially encircles the spinal cord and extends to the para-

spinal region from the neural foramina.

The characteristic MR image findings of spinal epidural cavernous hemangiomas that have been reported are soft tissue tumor with typical isointense signal to the spinal cord on T1WI and hyperintense on T2WI. Strong, homogeneous enhancement of these lesions was seen on post-contrast T1WI with fat-suppression. The absence of a low signal hemosiderin rim on both T1- and T2-weighted images serve to differentiate the epidural cavernous hemangiomas from intramedullary cavernous hemangiomas. [1, 6, 8] A different MR imaging appearance of spinal epidural cavernous hemangiomas showed mixed low- and high-signal intensity on T1- and T2-weighted images probably because of the presence of the degenerative phenomenon and hemosiderin pigments. [9]

The image differential diagnoses of extradural cavernous hemangiomas include neurogenic tumors, meningiomas, lymphomas, spinal angiolipoma, and metastasis. In neurogenic tumors, smooth contour and frequent cystic change could be differentiated from cavernous hemangiomas. Meningiomas can present with a dumbbell or epidural location with broad dural attachment. In lymphomas, frequent isointense signal on T2-weighted images and less paravertebral extension could be the clue for differentiating from cavernous hemangiomas. Metastatic tumors tend to enclose the spinal cord epidurally and are usually associated with bone erosion or the adjacent vertebral bone. Other rare differential diagnoses include fibrosis scar, extra-osseous Ewing’s sarcoma of spinal epidural space, epidural spread of multiple myeloma, epidural extramedullary hematopoiesis and epidural abscess or phlegmon. [1, 2, 4]

Spinal angiolipomas represent a distinct clinical and pathological entity that has been traditionally grouped as a variant of lipoma. They often contain a greater number of mature adipose elements and thick-walled vessels. The more invasive nature of the infiltrating type of spinal angiolipoma would represent a shift toward the hemangioma end of the spectrum. Some authors thought that angiolipomas and cavernous hemangiomas constitute a spectrum of hamartomas from pure angiolipomas to pure cavernomas. However, based on the actual system of tumor classification, these two lesions should no longer be considered hamartomas. Nonetheless, the clinical behavior and MR image findings are similar between the spinal epidural cavernous hemangiomas and the spinal epidural angiolipomas, especially in the infiltrating subtype. The absence of the lipoma-

Figure 2. Histomicrograph of surgical specimens shows characteristic cavernous hemangioma composed of thin-walled vascular channels in collagenous connective tissue and lined by a single layer of endothelial cells. (hematoxylin and eosin, original magnification x 100)
tous content is the key to exclude the spinal angiolipoma. However, it can be difficult to differentiate cavernous hemangioma from the infiltrating type of spinal angiolipoma.

Total surgical removal of the tumors is the first choice for treatment of spinal epidural cavernous hemangioma, usually with good prognosis. Severe intraoperative bleeding and anterior or intrathoracic extension are the main limiting factors for tumor removal. In some cases, only partial or subtotal resection of the tumor can be achieved. Even so, it can still provide a relief of substantial symptoms by decompression of spinal cord. Radiotherapy or embolization may play a less prominent role in management of spinal epidural cavernous hemangiomas.[2, 4]

In summary, spinal epidural cavernous hemangiomas are rare benign vascular malformations with characteristic MR image findings including a lobulated posterior epidural mass partially encircling the spinal cord, isointense signal to spinal cord on T1WI, hyperintense signal on T2WI and homogeneous strong enhancement with gadolinium-DTPA.

REFERENCES

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脊椎硬腦膜上海綿状血管瘤之磁振造影影像：
病例报告

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海綿状血管瘤可能發生於中樞神經系統，臨床上通常沒有任何症狀。除非發生出血現象或侵犯到腦幹部位較易產生神經學症狀。而發生於脊椎硬腦膜上之海綿狀血管瘤是相當少見的血管性腫瘤，其磁振造影影像之鑑別診斷有神經瘤、腦膜瘤、淋巴瘤、脊椎血管脂肪瘤、和轉移性腫瘤等。我們報告一81歲男性病例，臨床上表現為漸進性的兩腳麻木及無力約一年之久。磁振造影影像發現一硬腦膜上的腫瘤位於胸椎第二到第五節部位並有往神經孔蔓延現象。討論其磁振造影影像之鑑別診斷及文獻回顧。

關鍵詞：海綿狀血管瘤；脊椎；磁振造影影像；血管性畸形