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Case Report

Spinal MRI is not a Complete Replacement for Spinal Cord Angiography: A Rare Case of Spinal Canal Neoplasia in the Spinal Canal that Causes Paralysis: Case Report and Literature Review

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Abstract

Objective: One case of acute spinal cord injury was confirmed by spinal myelography, and the application of spinal angiography in patients with special spinal cord injury was explored.

Methods: One patient with acute spinal cord injury and severe low back pain was unable to lie supine and could not be examined with MRI and CT of the spine. The cause and location of the injury could not be determined; spinal angiography had to be performed; spinal angiography showed cerebrospinal fluid circulation disorder; emergency surgery showed thoracic spine Intraductal Schwannoma with hemorrhage.

Results: Schwannoma with hemorrhage

Conclusion: The patient had acute lower back pain with paraplegia of both lower extremities. Because of severe lower back pain, he could only take a seat and could not lie supine. He could not complete MRI and CT examinations, and could not clearly identify the location and nature of the lesion; spinal cord nerves were progressively worsened and spinal cord was given for spinal cord surgery. Spinal angiography showed that cerebrospinal fluid in the spinal canal was blocked, suggesting that there was a space occupying lesion in the spinal canal. Emergency surgical exploration was performed to remove the occupying schwannomas. In the diagnosis and treatment of spinal diseases in modern medicine, magnetic resonance is often the gold standard, but Spinal vertebral angiography still has an irreplaceable status in some special conditions.

Keywords: Schwannoma; Haemorrhage; Spinal cord injury; MRI; CT; Intraspinal space occupation; Cerebrospinal fluid

Introduction

MRI has been used more and more in clinical medical examination because of its safety, non-invasive, and clear image, especially in the spinal and neurological aspects. Then, some primitive spinal puncture methods were ignored or even forgotten. For example: spinal vertebral angiography, because of a certain risk of spinal canal angiography; However, when the patient is unable to receive MRI examination for some reason, the vertebral angiography becomes very important. Here is a case of paralysis caused by sudden haemorrhage of schwannoma in the spinal canal.

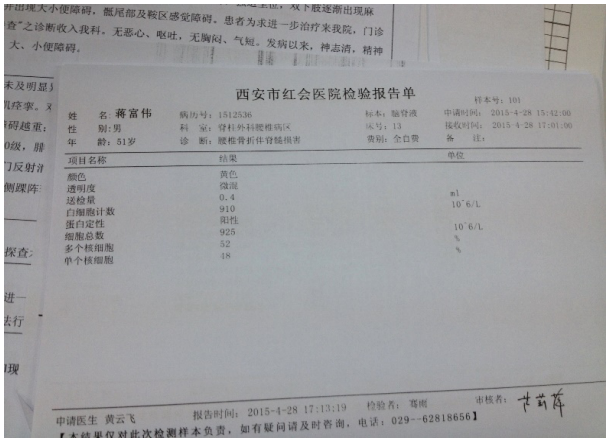
The leading cause of spinal Subarachnoid Haemorrhage (SAH) is trauma or vascular malformations [1]. Spinal SHA is very rare that was caused by complicated spinal tumors [2]. According to the reports its incidence rate is about 0.05-1.5% [3-5]. From the histology, the most common tumor type was ependymoma; other neoplasms, such as neurinomas and gliomas, were rarer [4]. According to our knowledge and literature review, there are only a few cases were reported, many of them have neurological symptoms from schwannoma before haemorrhage of schwannoma [5-10].

We report a very rare case, which previously asymptomatic, of spinal schwannoma hemorrhage, manifested as extreme back pain and paraplegia.

Methods and Materials

Case Report

A 51-year-old man with a complaint of extreme back pain and rapidly progressing unable to walk after stood up from the sofa 3 days ago. He became paraplegia and incontinent on admission. The patient had to keep compulsive sitting position and could not lie down even for one second because of severe back pain. Neurological examination revealed muscle weakness (G0 level) of lower limbs and without feeling below the 2 cm under the navel level; lower abdominal reflex, anal reflex and deep tendon reflexes were absent; pathologic reflex has not drawn out. Platelet levels, bleeding and coagulation times, were unremarkable. Cerebrospinal fluid was xanthochromic liquid with high pressure, examination of cerebrospinal fluid showed white blood cell: 910×10^6/L and qualitative protein: positive (Image 1).


西安市红会医院检验报告单

项目名称	结果	单位
颜色	黄色	
透明度	微混	
送检量	0.4	ml
白细胞计数	910	10^6/L
蛋白定性	阳性	
细胞总数	925	10^6/L
多个核细胞	52	%
单个核细胞	48	%

Image 1: Lumbar spinal angiography Cerebrospinal fluid microscopy.

The radiograms of the thoracic and lumbar spine were normal (Figure 1). Patient could not take Magnetic Resonance Imaging (MRI) examination because supine position would cause unbearable back pain even use opium analgesics, so we only did lumbar myelography and thoracolumbar Computed Tomography (CT) myelography in lateral position. After we injected a little contrast medium, patient complained intolerable back pain. Lumbar myelography and CT myelogram revealed a complete block at T12 (Figure 2).

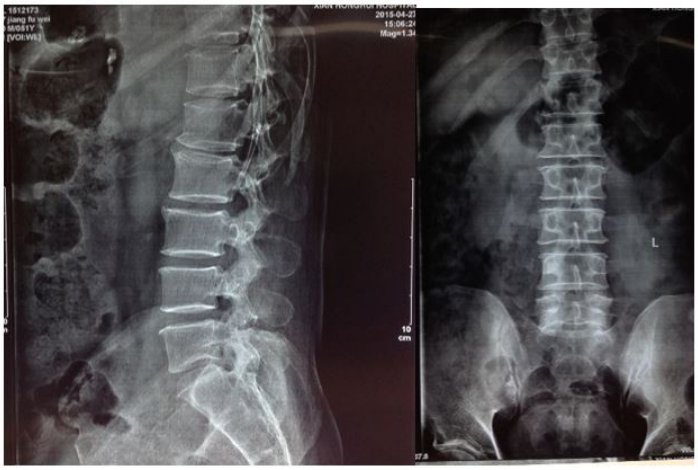


Figure 1: There are no obvious abnormalities in the lumbar spine x-ray film.

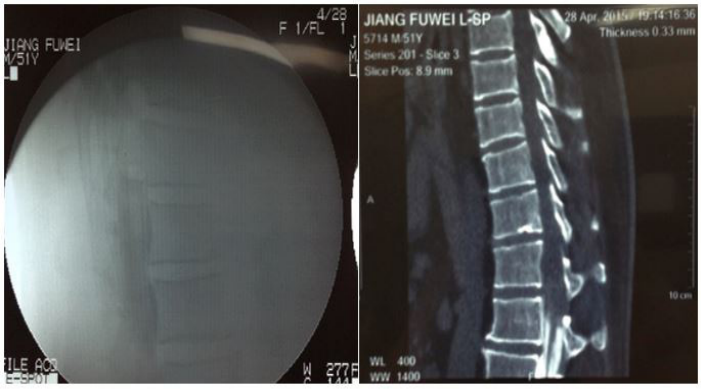


Figure 2: Lumbar spinal angiography: CSF block in the spinal canal, suggesting the presence of space-occupying lesions.

Because of severe neurological dysfunction patient underwent emergency laminectomy and surgically intradural exploration. A T11-L1 laminectomy revealed the endorhachis did not pulsate and appeared tense; opened the endorhachis and arachnoidea carefully and the deep purple huge mass bulged out with intact capsule (Figure 3). A turgid, large, vein was found from the ventral of mass. Ligated the root of vein then taken out the mass completely (Figure 4). The mass was approximately 2×7 cm. Operation was performed smoothly. After the operation, the back

pain disappeared immediately, and the patient could keep supine position without any discomfort. So we did MRI scan and excluded other space occupying disease. Histopathological examination of the excised mass was diagnosed schwannoma with macroscopic haemorrhage (Figure 5). At follow-up 9 months later, the patient sensory functions were normal, but lower limbs myodynamia still was not normal (G2 level).

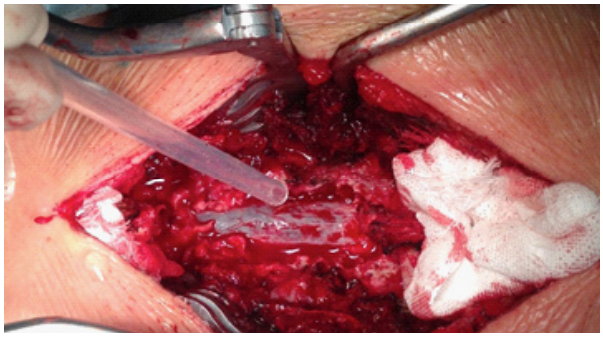


Figure 3: After decompression of the lamina: the dura mater appears blue-purple.

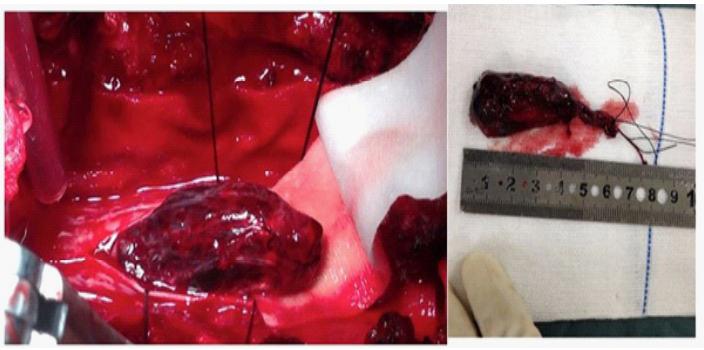


Figure 4: After incision of the dura, space-occupying lesions gushed out.

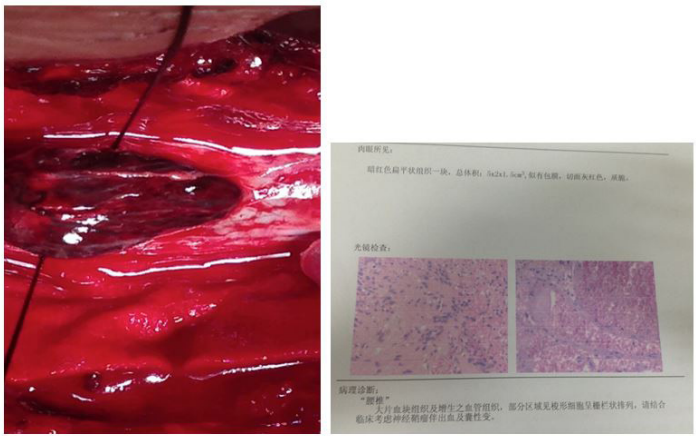


Figure 5: Postoperative pathological examination: schwannoma with bleeding.

Discussion

In general spinal tumors are grow slowly, local pain and slow, progressive neurological symptoms are main reasons to see a doctor. Shin, et al. retrospected 419 spinal cord tumors of the thoracolumbar junction, about 13.8% (58/419) were intradural extramedullary tumors [11]. Spinal tumors cause acute spinal SAH with rapid neurological deterioration are very rare, furthermore acute SAH caused by schwannoma is much rarer. Schwannoma also called neurilemoma and neurinoma. According to our knowledge and literature review, only 32 cases (include 2 cases from Chinese database) [2,4-10,12-35] were reported since André-Thomas, et al. first reported [12] (Table 1).

Year	Author	Site	Histological type of the tumor	Clinical Presentation
1930	[12]	L2-L3	neurinoma	Spinal
1947	[23]	cauda equina	neurinoma	Spinal
1947	[23]	T12	neurinoma	Spinal
1951	[19]	T12-L1	neurinoma	Spinal
1968	[20]	cauda equina	neurinoma	Spinal
1975	[22]	T8-L1	neurinoma	Spinal
1978	[2]	L1	neurinoma	Spinal
1978	[34]	cervical	schwannoma	Intracranial
1980	[24]	L1-L2	neurinoma	Intracranial
1981	[8]	T8-T11	neurinoma	Spinal
1985	[21]	C5-7	neurilemmoma	Spinal
1985	[4]	C4	schwannoma	Intracranial
1990	[15]	C1-C2	schwannoma	Intracranial
1992	[29]	cervical	schwannoma	Spinal
1993	[6]	C7-T1	degenerate schwannoma	Intracranial
1994	[26]	C5-7	schwannoma	Spinal
1996	[31]	C7-T1	schwannoma	Intracranial
1998	[9]	T12	schwannoma	Spinal
1999	[35]	cauda equina	schwannoma	Spinal
2000	[25]	T11-T12	schwannoma	Spinal
2001	[14]	C7	schwannoma	Spinal

2002	[33]	T9-T12	schwannoma	Spinal
2003	[30]	C1-C2	neurinoma	Spinal
2004	[27]	T11-L1	schwannoma	Intracranial
2009	[18]	T12-L1	schwannoma	Spinal
2010	[35]	C1-C2	schwannoma	Intracranial
2014	[13]	L4	schwannoma	Spinal
2014	[10]	T11-T12	cellular schwannoma	Spinal
2014	[28]	T12-L2	schwannoma	Intracranial and Spinal
2015	[16]	C3-C5	schwannoma	Spinal
2015	[32]	cauda equina	schwannoma	Spinal
2015	[7]	T10-T11	schwannoma	Spinal

Table 1: Literature Review of the Cases with Spinal Schwannoma Hemorrhage [2,4-10,12-35].

Up to now, the exact mechanism of acute haemorrhage in schwannomas is still not not clear. Kasantikul, et al. reported that notable increase in vascularity is obvious in almost 60% of neural tumors larger than 2 cm, which are more vulnerable to rupture with the increase of fragility [36,37]. Motomochi reported spontaneous spinal SAH from a thoracic neurinoma, and haemorrhage considered due to anticoagulation therapy [8]. The contribution of coagulation disorders to the pathogenesis of spinal schwannoma intratumoral haemorrhage was still unclear. Alcoholic could result poor coagulation function even when results of blood coagulation indexes appear normal. Two theories are accepted by most scholars. One hypothesis proposed that the hyalinized ectatic vessels of schwannoma occur spontaneous thrombosis lead to distal tumour necrosis and haemorrhage. Another theory supposes that mechanical movement stretches tumour vasculature traction causes haemorrhage [4,6,14]. Divitiis, et al. [4] reviewed 12 cases of spinal schwannoma resulting SAH, and before the haemorrhagic event, all patients experienced head and body flexion. As for as we know, the lesion occurs primarily in cervical and thoracolumbar junction (Table 1). Symptoms of our patient just result of changed his body position and the lesion was situated at T11-L1, the thoracolumbar segment represents more flexible, which is the one of the great transitions from the less mobile thoracic cage to the lumbar spine [38]. So we speculated the latter one may be the primary factor of spinal SAH in our case.

Neurological examination is beneficial to localization of disease. Spinal SAH usually begins with severe pain at the site of the hematoma [5]. In our case, we conjectured supine position will reduce the spinal canal volume, aggravate partial obstruction, further exacerbate the back pain. Decompression operation completely relieved back pain, our patient can fall asleep in supine position, which confirmed our surmise. However, neurological symptoms are related to the level of the hematoma and the amount of haemorrhage. Massive haemorrhage causes a pidly progressive severe clinical symptoms, otherwise small bleeding can be responsible for minor, transient symptoms. Imaging examination is also necessary for diagnosis. Only a few cases reported widening of the neural foramina of plain films [16,21]. Well-known cranial CT is the preferred method in diagnosis of intracranial SAH, but in discrimination the contents of the spinal canal, CT scan is inferior to MRI [11]. We reviewed the literature, this method rarely used for the diagnosis of the spinal SAH from spinal tumor. MRI is highly sensitive for haemorrhagic spinal cord tumors [15]. The type of haemorrhage and duration after bleeding are major facts influenced the signal intensity of spinal SAH [7]. Uemura, et al. [9] found on T1-weighted images, intracystic haemorrhage may showed iso-intense signals in the very early stage. In early subacute haemorrhage, T1-weighted and T2-weighted show hypo intense signal. In late subacute and chronic bleeding stage, T1W respectively express hyper intense signal and hypo intense signal. This phenomenon also found in T2W [18]. Unfortunately, our patient could not take MRI scan, and he did not complain any symptom before, so the diagnosis of this disease is very difficult. We just did lumbar myelography and CT myelography, then found the contrast medium was complete blocked at T12 (Figure 1). Cerebrospinal fluid with high protein and high pressure suggested subarachnoid circulation disorder [5,6,31]. Combined with the result of routine examination, an intradural space-occupying focus was highly suspected. In our case, the significant value of myelography was reflected again. Myelography was the main imageology examination of spinal diseases, until the MRI was invented. MRI scan is widely used in the diagnosis of haemorrhagic spinal schwannomas (15 previous cases, it is a large number of a rare disease). But our case reminded us an important tip, when doctors meet special disease, like our case which cannot be able to take an MRI scan, or in primary-level hospital without MRI scanner, myelography should be an indispensable examination.

The histopathological diagnosis is schwannoma of our case, schwannomas are benign neoplastic lesions [37]. Because the patients with haemorrhage from spinal tumor showed acute spinal cord compression, emergency decompression operation may benefit for releasing the symptom of spinal cord compression, and resection of the tumor and envelope is necessary that could reduce the risk of recurrence. Because of the development of surgical technique, we reviewed 13 cases of haemorrhage from intradural schwannoma since 2000, except 1 case did not mentioned, the symptoms in all cases were improved after operation, even if there is still residual neurological symptoms in some cases. In our case,

because of severe neurological injury and paraplegia for 3 days, lower limbs strength recovery is not satisfied. However, operation is still beneficial to improve the symptoms of our patient.

Conclusion

Spontaneous spinal SAH from schwannoma is very rare, which will cause severe pain, neurological symptoms and even irreversible damage to the spinal cord. MRI of spine are beneficial for diagnosis. But in our case which cannot be able to take an MRI scan, myelography played a very important role in diagnosis. Early diagnosis and surgical treatment will reduce the risk of disability.

Ethical Approval

This article does not contain any studies with human participants or animals performed by any of the authors.

Informed Consent

Informed consent was obtained from all individual participants included in the study.

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